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Zika 2016: A 3-Phase Longitudinal Study of the Media Impact on Public Attitudes and Behavioral Response Characteristics

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ZIKA 2016: A 3-PHASE LONGITUDINAL STUDY OF THE MEDIA IMPACT ON PUBLIC ATTITUDES AND BEHAVIORAL RESPONSE CHARACTERISTICS

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An Abstract of the Thesis
by Karly Kownslar

Using the Extended Parallel Processing Model (EPPM) as a theoretical framework, the present 3-phase longitudinal study examines the impact of media exposure to Zika information on public perception of the threat severity, personal susceptibility, and behavioral intentions toward the threat of Zika virus between May and November of 2016. A total of 826 participants took an online survey throughout three phases, roughly one month apart. Participants were recruited using Amazon *Mechanical Turk* and *TurkPrime*. Measured EPPM concepts include: *perceived severity, susceptibility, self- efficacy, response-efficacy, third-person effects,* combined with *behavioral intentions.* Participants also selected the sources from which they received information about Zika, and tested their knowledge of the symptoms of the disease. Results indicate that there was no significant difference between times surveyed and severity but perceived susceptibility and efficacy did change over time. Participants who heard about Zika more than ten times reported higher intentions to get screening and share Zika-related information online. Implications for health communication risk communication theorists and pragmatic patient-centered care are provided. The importance of studying public attitudes on disease outbreaks and premise for basing future studies is emphasized. Methodological limitations, and future research directions are provided.

Keywords: *Zika, EPPM, risk perception, behavioral intentions*

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CHAPTER I

INTRODUCTION

When it comes to disease, fear is always a part of risk communication. Risk communication is defined as reporting accurate health information quickly to the public, in order to calm fears and increase trust between the public and health agencies, like Centers of Disease Control and Prevention (CDC) and World Health Organization (WHO) (Park & Sohn, 2013). Unfortunately, health communication is intertwined with the media much more than with health agencies: most people report that they receive information about diseases from the news (Park & Sohn, 2013). These media sources can inflate the negative of health reports, creating an adverse effect and increasing fear and anxiety (Goodall, Sabo, Cline, & Egbert. 2012). Rosenthal wrote, "if CNN defines a situation as a crisis, it will indeed be a crisis" (as cited in Pennington, 2010, p. 81).

Zika virus made headlines in 2015 because of its debilitating effects on the most vulnerable populations--- pregnant women and infants. In a timeline published by the WHO, physicians had identified Zika virus and severe brain abnormalities in unborn fetuses before January 2016 (WHO, 2016a). By the middle of January, the CDC and authorities in Brazil partnered to investigate four fetuses with microcephaly, and connected it to the fever and rashes their mothers contracted in the early stages of pregnancy (WHO, 2016a). By the middle of January, Brazil reported 3,893 suspected

cases of microcephaly and 49 deaths due to its complications. Brazil also suspected that 1,708 cases of Guillain-Barre (GBS, full-body paralysis) were connected to Zika as well. In late January, health officials in El Salvador recommended that families delay having children for up to two years (Ahmed, 2016). The CDC named it a public health emergency February 1, 2016 (WHO, 2016a). In February, Texas Department of State Health Services (2016) reported their first local transmission: a woman was infected with Zika through sexual intercourse. The CDC and the WHO are encouraging travelers to be vigilant and protect themselves from mosquitos by wearing long pants and using repellant, and seeing a doctor if they suspect they are infected (WHO, 2016a). In September the WHO (2016b) released a report for impacted areas in Latin America until more research is conducted. It recommended contraceptives or abstinence among sexually active people, and that pregnant women abstain from sex throughout pregnancy.

These unknown implications only contribute to panic and fear (Petts, Draper, Ives, & Damery, 2010). The CDC and the WHO inform the public about diseases and emphasize actions to take to avoid disease, but research has shown that news media focus on informing the public about disease severity and not preventative measures. Thus, it is important to understand how the public processes these messages from the media and how news media and health agencies can improve messaging for better health outcomes.

Many studies have investigated media coverage of Ebola (Adeyanju & Neverson, 2007), H1N1 (Goodall, et al., 2012), Mad Cow Disease (Park & Sohn, 2013), and AIDS (Briggs, 2005) through content analysis, critical discourse analysis, and how that media coverage may increase fear and panic. However, very few have studied the media impact on behavioral intentions, fear control, and danger control. Even fewer have used real-time

data to capture risk communication processing.

CHAPTER II

LITERATURE REVIEW

Overview of Zika Virus

Zika is a disease that is spread by *Aedes* species mosquitos, human-to-human through sexual contact, and through blood transfusion (WHO, 2017). It was first discovered in Uganda in 1947, and was described as a mild infection that only flu-like symptoms and rashes that dissipated in 5-7 days (McNeil, Saint Louis, & St. Fleur, 2016). However, by 2016, researchers had identified co-occurring disorders: microcephaly, which can lead to miscarriages and stillbirths, and Guillain-Barre syndrome, which can be deadly (WHO, 2016a). These disorders as well as reports of inflamed spinal cords led researchers to conclude that Zika virus prefers to attack the nervous system (WHO, 2016a). Further, officials have yet to conclude how long Zika remains in the body after initial infection. The WHO reported that Zika virus tends to stay in the nervous system, in the amniotic fluid or, in some cases, only the vaginal cavity (WHO, 2016a). They have also reported evidence that fetuses can be infected with Zika months after the mother's first infection (WHO, 2016a).

Media and Risk Communication

Researchers study how to effectively inform the public about disease risk. Ideally, information about personal health risks should come from a personal physician who

knows patients personally, knows their risk factors, and physicians can make sure the patient understands the message (Birmingham, Hung, Watcharaporn, & Kohlman, 2015). However, more and more people hear about disease from only the media (Park & Sohn, 2013). Park and Sohn (2013) argued that it is important to understand where the public is receiving health information, how it impacts their risk perception, and how these sources can improve messaging for better health outcomes. Unfortunately, newspapers do not accurately report disease risk or health outcomes: they often use salacious and frightening language.

Goodall et al. (2012) studied fear-arousing messages in their content analysis of newspapers about the H1N1 or "swine flu" outbreak. I analyzed a sample of 200 national newspapers and electronic sources from April 2009 to September 2009. Coders looked for words that indicated themes of threat, susceptibility, fear, efficacy, and uncertainty. They found that newspapers focused on deaths and hospitalization when the CDC reported that most people recuperated at home. Goodall et al. argued that this increased panic and fear of swine flu.

Furthermore, there is typically a fair amount of uncertainty when new diseases emerge, and this can lead to fear, anxiety, and many questions (Petts, Draper, Ives, & Damery, 2010; Goodall et al., 2012). Lee (2014) wrote, "The kinds of questions that the layperson asks about a novel disease are, in part, the same questions that a doctor asks. That is, am I vulnerable, who is infected, and how can I assure my safety?" (p. 2). Adeyanju and Neverson's (2007) research into media coverage of Ebola found frequently published headlines using words "mystery" and "mystery illness." They investigated how four Canadian newspapers portrayed a visitor from the Congo who was suspected of

carrying Ebola. These keywords were organized into frames for analysis, a reliable content analysis method (Aubrey & Haun, 2016). They searched for themes of panic, diseases, identity, and others. They found that the newspapers over reported panic inducing words in regards to Ebola, such as deadly, death, mystery illness, bleeding, and virulent. Adeyanju and Neverson argued that this language was persuasive in increasing fear, leading to anger toward the woman suspected of carrying Ebola and negative attitudes toward immigrants in general. Researchers and communicators have to consider this fear when investigating how to communicate disease risk effectively.

Extended Parallel Processing Model and Zika

The Extended Parallel Processing Model (EPPM), developed by Witte (1992), focuses on predicting how people process risk communication messages and channel fear into adaptive or preventative behaviors, such as preventing disease transmission. Witte (2000) argued that the EPPM could be helpful in channeling fear into an effective direction. Risk communicators often use strong fear appeals to encourage adopting healthful behaviors, but often it backfires (Witte, 2000). When people are exposed to fear-arousing messages, two processes begin. First, people have to appraise the threat: they consider the severity (e.g. Zika is a severe threat) and they consider their own susceptibility to it (e.g. I am susceptible to getting Zika). If severity and susceptibility is low, people tend to dismiss the message and end this process. If they perceive severity and susceptibility to be high, then they appraise their efficacy. They have to appraise the response-efficacy, or how effective the recommended behavior will be in avoiding the threat (e.g. protecting myself from mosquitos will protect me from Zika). People also have to consider how able they are to perform the behavior (e.g. I am able to avoid Zika-

effected areas). Birmingham et al. (2015) wrote that when severity/susceptibility *and* efficacy appraisals are high, people would typically adopt a danger-control response and adopt the recommended behavior. However, when efficacy is low and severity/susceptibility is high, people will adopt a fear-control response, which often means avoiding thinking about the danger at all.

The Zika virus presents an interesting case with EPPM because as more about the disease is discovered, risk messages become more complex and people need to process them anew. For instance, people may constantly be appraising their efficacy as the disease spreads to a new area and it becomes harder to avoid it. In order words, while avoiding Zika-effected areas in the United States was easier to do in January, when few cases had been reported in the U.S., by summer it had spread to Miami and Texas. Furthermore, wearing long pants and using mosquito repellant may be perceived as an easy preventative measure, but delaying family planning until the Zika threat is over is much more complex. Thus, this researcher felt it was important to study public attitudes and behavioral intentions over time. Witte's original model of the EPPM combined the scores of severity and susceptibility into a single perception of threat, but perceived susceptibility may change depending on many factors i.e. location or family planning status. Thus, the current study asks the following questions:

RQ1. How does consumption of media content about Zika impact perceptions of severity?

RQ2. How does consumption of media content about Zika impact perceptions of susceptibility?

Lee (2014) investigated the intersection of disease and disease narratives to find

out how the stories of disease are often repeated in culture over and over again. At first he discussed the narrative arc of the SARS outbreak; it appeared out of nowhere, struck the world with panic and fear, and then disappeared from the national consciousness. These cycles were repeated during the AIDS epidemic, Ebola, and avian flu. Zika coverage in the news reached a fevered pitch in spring 2016 with the CDC's declaration of a public health emergency and the new information about microcephaly. Thus, this researcher hypothesizes:

H1. Participants will have lower perceived severity and susceptibility over time.

Further, like described above, news media emphasize the severity of diseases (Gwyn, 2001; Adeyanju & Neverson, 2007); however, health agencies give clear instructions to prevent acquisition, such as avoiding mosquito bites, and avoiding transmission, i.e. getting screening and delaying family planning (CDC, 2016). The perception of severity and susceptibility can affect behavioral intentions and third-person perception can be a moderating factor on behavioral intentions (Wei, Lo & Hu, 2008)

H2. Consumption of messages from health agencies will lead to higher intent to adopt the preventative behaviors compared to consumption of Zika-related media from the other channels.

Birmingham et al. (2015) wrote that the original EPPM model did not make a distinction between the two efficacy appraisals (self- and response-) to predict fear control and danger control responses. But Birmingham et al. felt that the distinction between the two is important. A person can believe that a preventative behavior is effective, but that they personally cannot adopt it, for example if they live in a Zika-infected area, they cannot avoid it.

Zika is an interesting case because as information came to light about the disease, preventative measures changed. At first, the CDC recommended merely wearing long pants and mosquito repellant (2016). However later in the year, some countries recommended delaying family planning (McNeill, St. Louis, & St. Fleur, 2016). The variety of behavioral responses, spread of disease, and complexity of behavioral responses can change self-efficacy and response-efficacy. Thus this study will investigate the following:

RQ3. Did perceived self-efficacy change over time?

RQ4. Did participants' perceived response-efficacy change over time?

As discussed above, the CDC's recommended preventative measures changed over time as new information about Zika was released (WHO, 2016a; WHO, 2016b) and some preventative measures are more complex and demanding than others, i.e. buying mosquito repellant versus delaying family planning. Thus, this study hypothesizes:

H3. There will be a significant difference between self-efficacy and response-efficacy.

Third Person Perception

Many studies have shown that individuals perceive others are more susceptible to 'harmful' media than they perceive themselves to be. Davies (1983) called this concept the third-person effect, also known as third-person perception (TPP). Researchers have investigated TPP regarding sexual and violent media content (Rosenthal, Detenber, & Rojas, 2015), avian flu, and tainted food (Lo, Wei, & Lu, 2016). Research has consistently reported that TPP tends to increase when the subject of the media is undesirable, such as pornography but studies on health risk messages get mixed results.

For example, while learning more about a health risk has been shown to be beneficial, the third-person effect still increases if the subject of the risk is negative (i.e. disease) (Lo, Wei, & Lu, 2016; Wei, Lo, & Hu, 2008).

In the last fifteen years, researchers have discovered that third-person perception could be a predictor of individuals' behavioral intentions. "How an individual responds to a media message depends largely on what the message is thought to do to others" (Tewksbury, Moy, & Weis, 2004, p. 140). Wei, Lo, and Hu (2008) investigated news about avian flu and the interaction of knowledge, media exposure, and third-person perception. They found that high consumption of health news "was found to narrow the self-other perceptual gap" (261). They hypothesized that health news about the disease was positive, because it was informational and recommended prevention measures, so audiences would internalize the risk to themselves and others. Media consumption also led to seeking further information about avian flu and intent to seek out Tamiflu. However, they also found that as third-person effects increased, participants were less likely to do the preventative behavior because the risk was perceived to be more severe on others rather than themselves, e.g. "Why bother if others are believed to be hit?" (266).

The third-person effect has been shown to vary according to content and source. Schweisberger, Billinson, and Chock (2014) found a decrease in the third-person effect when news stories were framed in a social media context (e.g. shared on Facebook) and were personally relevant to them. They argued that the quasi-interpersonal aspect of Facebook contributed to the decrease in TPP. For example, they felt that the news stories had more of an effect on themselves rather than on others. This effect was pronounced

when the stories were negatively framed by critical or negative comments surrounding the Facebook news stories. This study asked participants to identify the channels of media they consume because TPP can vary according to source of media and will investigate the following:

RQ5: Did consumption of media coverage about Ebola impact third-person effect including individuals' beliefs in: (a) others' perceived self-efficacy and (b) others' perceived response-efficacy?

Previous studies have found that source and medium of risk messages may affect third-person effects. For example, social media shared posts are more personally relevant (Schweisberger et al., 2015). Thus, we hypothesize that:

H4: Consumption of Zika-related media on social media platforms have decreased self-other perceptual gap (TPP) than consumption of other channels

Public Trust in Health Care

There is a lot at stake when a new disease emerges, such as potentially losing public trust. Trust in physicians and the health care systems is the belief that these institutions will act in the patients and the public's best interest. Trust is central to the relationship between providers and patients (El Malla et al., 2013). At best, the public trusts health care practitioners to "reduce risk" and "make sense of complexity" (Fugelli, 2001, p. 576). Van der Schee, de Jong, and Groenewegen (2012) argued that "public trust in health care provides information of public views on performance of health-care institutions, caregivers, and the system as a whole, as well as on how people might behave in future encounters with health-care providers" (p. 459).

Lately, trust in health care agencies like the CDC have declined (Park & Sohn,

2013). Public trust in health care or disease response teams can erode to such a degree that communities in Guinea were hiding their symptoms and hiding their ill family members for fear of malpractice (Dhillon & Kelly, 2015). Some populations depend on the healthcare system more than others. Guerrero, Mendes de Leon, Evans, and Jacobs (2015) studied African American and older populations' trust in health care. They argued that the effectiveness of preventative measures (e.g. screening), diagnosis, and treatment depend on trust in physicians and the health-care system.

Medical uncertainty can affect public trust in health care as well. Rosenbaum (2015) wrote that the CDC was over confident in hospitals' ability to cope with Ebola in 2014. When healthcare workers were infected, their credibility and reputation suffered and Congress called a hearing into the CDC's mistakes on Capitol Hill (Bernstein, 2014). Rosenbaum attributed this distrust to the CDC's refusal to communicate what it didn't know: "Communicating uncertainty undermines perceived expertise, but if you don't communicate uncertainty, and you're wrong, you risk losing even more credibility" (Rosenbaum, 2015, p. 7). Fear tends to increase when people perceive experts to have inadequate knowledge of disease. There has to be a balance between being honest about medical uncertainty and bolstering efficacy of healthcare systems (Rosenbaum, 2015; Dhillon & Kelly, 2015). However, van der Schee, de Jong, and Groenewegen (2012) wrote that extensively reported negative health care incidents such as accidents and mistakes lead to decreased trust in health care; negative media in particular could be generalized to distrust of the health care *system* as whole, and all physicians. However, the amount of media consumption may moderate trust in health care. For these reasons, this study will investigate Zika-related media and public trust in healthcare.

H5: There will be a positive relationship between efficacy and public trust in healthcare.

These questions and hypotheses will be investigated in a longitudinal study of consumption of Zika-related media, public perception of the disease, and behavioral intentions.

CHAPTER III

METHOD

Participants & Procedure

This study recruited participants for a longitudinal study in three time-phases (TP) during summer and fall of 2016, using Amazon Mechanical Turk (MTurk) and Turk Prime. MTurk and TurkPrime are recruitment webtools that can access respondents from across the globe (Buhrmester, Kwang, & Gosling, 2011). Studies were set up online and Mechanical Turk and Turk Prime participants were compensated for each response; university students were offered extra credit for their participation in TP1. These procedures resulted in 826 responses. TP1 was launched in April and completed in July 2016 (n = 426 participants); using TurkPrime, those respondents were sent a link to TP2 in early September and completed late-September, 2016 (n = 231) and those respondents were recruited again for TP3 in late October and completed in mid-November, 2016 (n = 169). The retention rate was 54% for TP2 and 39% for TP3 respectively. Participants accepted the terms of informed consent on the first page of the survey before continuing to the measures. Institutional Review Board approved all measures and procedures.

In TP1, respondents were generally equally spread among genders: 51% were female (n = 219), 48% were male (n = 205), two participants chose not to identify. Participants' age tended to skew in phase one toward the younger bracket: 63% of

respondents were 18-34 years of age (*n* = 269), 15% were 45-64 years old (*n* = 66), 12% were 35-39 years old, and only 1.6% participants were 65+ (*n* = 7), one participant declined to disclose age. Educational background varied slightly more: 38% respondents obtained a bachelor's degree (*n* = 166), 22% have completed some college (*n* = 95), 12% had completed an associate's degree (*n* = 53), approximately 11% had finished their Master's degree (*n* = 50), 9% had their high school diploma or GED (*n* = 40), and only 2% had a doctorate or other professional degree (*n* = 10). 25% of respondents said they had children in their local school system (*n* = 108), and 4.7% said they worked in the health sector (*n* = 34).

Because of the reported effects of Zika on fetuses, participants answered items regarding marriage and family status. In TP1, 38% of respondents were married (*n* = 163), and 3% disclosed that they were pregnant (*n* = 14). A 60% majority of participants said they were definitely not intending to become pregnant (*n* = 257), 12% indicated that they were probably not intending to be pregnant (*n* = 55), and 11% indicated that they might or might not intend to be pregnant (*n* = 51). A small 9% indicated that they probably (*n* = 25) or definitely (*n* = 15) were intending to be pregnant within 18 months.

Participants were sent an anonymous link to our study to complete the measures either through Mechanical Turk, Turk Prime, or through their college course's online bulletin board. This link took them to a splash page with information about the study. Participants who consented to participate and confirmed they were 18 years old or older were taken to the survey. Participants who did not consent would be sent immediately to the last page where they could enter a randomly generated key to confirm their participation. Turk and TurkPrime participants used that generated key to receive

monetary payment; students would use that confirmation page as proof for extra credit.

CHAPTER IV

MEASURES

Knowledge

Participants were given a six-item test of their knowledge of Zika. These items were previously reported facts from the CDC and participants were asked to select which were true, e.g. Infected mothers can pass the Zika virus on to their unborn fetus; the Zika virus is transmissible by sex with an infected individual. Participants who scored closer to 6 have higher knowledge of Zika.

Perceived Knowledge and Information Sufficiency

Information sufficiency was measured in two items. The first item asked participants to rate on a sliding scale of 1 to 100 their *perceived* knowledge of Zika virus. The second item used the same scale, and asked participants to estimate the knowledge they would need to personally deal with the risk of Zika. Their information sufficiency score was calculated by subtracting the response of the second item from the first item.

Severity

The current study measured severity as the degree to which participants perceived Zika to be severe, harmful, and serious. Receivers of risk messages consider the severity of the threat first before considering any response to the message (Witte & Allen, 2000). The current perceived severity scale is a 5-point Likert scale, ranging from *strongly*

disagree to *strongly agree*. There were three items, a) 'Zika is harmful', b) 'Zika is a severe threat', and c) 'Zika is a serious threat' (α = .83).

Susceptibility

Perceived severity and perceived susceptibility together are predictors of fear-control or danger-control responses. If a risk is perceived as highly severe and the risk is perceived to be very salient, people are likely to control their negative emotions rather than adopt a preventive behavior (Birmingham et al., 2015). Perceived susceptibility was measured by the degree to which people believed they were at risk in a three item Likert-type scale, a) 'It is possible I will contract Zika', b) 'I am at risk for contracting Zika', and c) 'I am susceptible to contracting Zika', α = .89.

Efficacy

Efficacy was measured in two dimensions, self-efficacy and response-efficacy. Self-efficacy is the degree to which one feels capable of responding to the threat, i.e. knowing who to call with questions concerning Zika. Self-efficacy was measured with four items on a 5-point Likert-type scale, ranging from *strongly disagree* to *strongly agree*. These items included statements such as 'I feel well-informed about how I can protect myself from Zika' and 'I know how Zika is transmitted' α = .78.

Response-efficacy is the degree to which one believes the response to the risk will be effective, such as seeking out information and taking care of oneself if contraction were to occur, and the self-confidence in doing those behaviors. Response-efficacy was measured in another four-item scale, items included, 'I am able to care for myself if I contract Zika' and 'I feel that I am in control of how and what I learn about Zika.' These items were rated on a 5-point scale, α = .81.

Third-Person Perception

Third-person perception (TPP) was divided into two dimensions. We wanted to study how participants perceived others' self-efficacy and response-efficacy. Third-person perception, or the third-person effect, is the degree to which people believe others are susceptible to media or risk (Lo, Wei, & Lu, 2016). Research has found that the effect is most significant when the stimuli (media or risk message) are undesirable or negative (Wei, Lo, & Hu, 2008). In other words, people are more likely to perceive others as more susceptible to disease risk messages than they are to perceive themselves as susceptible. However, few studies have investigated the third-person effect and efficacy, that is, the degree to which people believe others can cope and confidently manage the risk. Furthermore, the third-person effect can be a predictor of people's own behavioral intentions. Hence, audiences think about what others are going to do before they decide what they will do for themselves (Tewksbury et al., 2004).

Our third-person perception of self-efficacy measure was four items, including 'I believe other people will know who to call with questions concerning Zika' and 'I believe others I know can recognize the signs and symptoms of Zika.' The scale was another 5-point Likert-type, ranging from *strongly disagree* to *strongly agree*, $\alpha = .88$. Secondly, I wanted to measure the third-person perception of response-efficacy. This scale was four items including 'I believe others are able to care for themselves if they contract Zika' and 'I believe others are confident that they can protect themselves from Zika', $\alpha = .85$.

Behavioral Intentions

Perceived severity, susceptibility, efficacy, and the third-person effect have been shown to predict behavioral intentions (Witte & Allen, 2000). Behavioral intentions are

the probability that one will adopt a certain preventative behavior or response to a risk. Behavioral intentions were measured with a probability sliding scale of 1 to 100. Participants answered the question "I intend to _____" and selected the probability for behaviors that have been recommended to certain populations (CDC, 2016). Participants were asked to respond to a series of items and select which they intended to do. These items included 'delay family planning', 'get screened for Zika', 'consider or obtain an abortion', 'seek information', 'share information', 'avoid traveling to impacted areas', 'use mosquito nets', and 'use mosquito repellant'. Participants could select all that applied, $\alpha = .88$.

Public Trust in Health Care

Public trust in health care is affected when the media extensively reports negative incidents or during disease outbreaks (Rosenbaum, 2015). Trust in health care systems and government agencies have been in general decline (Park & Sohn, 2013). I wanted to investigate how consuming media about the Zika outbreak impacted public trust in health care (PTHC). The PTHC scale used in this study has six sub dimensions and each dimension is a 5-point Likert-type scale ranking statements from none, little, some, a lot, and no opinion. Some of these items were reverse-scored to previous scales.

Patient focus. The first dimension is a four-item scale on patient focus from the general healthcare system. Items included 'Zika patients will be taken seriously' and 'Zika patients get enough attention', $\alpha = .85$.

Policies for patients. The second dimension focused on the larger context of healthcare policies. This scale was 5 items, including 'cost-cutting will not disadvantage patients,' 'patients will be able to pay for their own health care,' and 'Zika patient care

will not be compromised by the shortening of waiting lists,' a = .85.

Healthcare provider. The third dimension focuses on trust in providers. Research has shown that trust is central to the relationship between providers and patients (El Malla et al., 2013). The four-item scale included such statements as, 'Zika doctors can do everything' and 'the education and training of doctors in my own country is one of the world's best', α = .68.

Quality of care. This seven-item scale measured the perceived quality of care, such as receiving medicine and getting the right diagnosis. Items included 'The doctor won't prescribe medicines too late', 'patients always get the right medicine', and 'Zika patients will always get the best treatment,' α = .90.

Information quality. The fifth dimension involves the quality of the information received by doctors and healthcare workers. Fugelli (2001) wrote that patients trust healthcare providers to explain complex concepts and assuage fear. This scale was six items, which included 'Zika patients will get sufficient information about the effects of their treatment' and 'the info given to participants will be clear and understandable', α = .91.

Quality of cooperation. The last dimension is about the degree to which healthcare workers work well together, to the patients' benefit. For example, items in this three-item scale were a) 'Health care providers are good at cooperating with each other', b) 'patients won't be given conflicting information, and c) 'High levels of specialization do not cause problems in the health care system', α = .78.

Knowledge Sources

Participants were asked how often they have seen or heard of the 2016 Global

Zika outbreak, on a scale ranging from a) not at all, b) once, c) 2-4 times, d) 5-10 times, e) 10 or more, or f) don't know. Then, using the same scale, were asked how many times they had seen or heard of the United States Zika outbreak. Then participants selected the sources from which they received information about Zika in the past six months. They could select all that applied: media, social media, friends and family, healthcare workers, government or health agencies, public schools, and other.

Lastly, participants were given an open-ended question to describe their concern or offer any final thoughts regarding the current Zika outbreak. This gave participants a chance to explain their further feelings that could not be addressed in the Likert-type scales.

CHAPTER V

RESULTS

A multivariate analysis of variance (MANOVA) was calculated with frequency of media consumption of the U.S. Zika outbreak and Global Zika outbreak as the independent variables and intentions to delay family planning, get screening, consider or obtain an abortion, purchase and apply bug repellant, contact a Dr./RN, seek Zika-related information, share Zika-related information, avoid traveling to impacted areas, and use mosquito nets as the dependent variables.

Table 1. Behavioral Intentions

	N	*M*	*SD*
Delay family planning	777	32.00	36.62
Get screening	161	29.54	32.08
Consider or obtain an abortion	773	16.45	27.79
Purchase and use bug repellant	778	58.57	37.79
Contact Dr./RN	774	34.64	34.66
Share Zika-related information	771	35.84	35.05
Seek Zika-related information	776	53.57	35.82
Avoid traveling to impacted areas	773	63.36	37.59
Use mosquito nets while camping	776	56.81	38.50

Note. On a scale of 1-100, higher value representing percentage likelihood participant is willing to adopt behavior

The results suggested a significant interaction effect, $F(9,134) = 2.91$, $p < .01$, $\eta^2 = .16$. Tests of between subject effects found significant effects on frequency of media consumption of the Global Zika outbreak and getting screening, $F(5, 154) = 2.92$, $p < .05$, $\eta^2 = .1$. Further, there was a significant effect between media consumption of the U.S. Zika outbreak and intention to get screening, $F(5,154) = 2.32$, $p = .05$, $\eta^2 = .08$.

Participants who reported hearing no news at all about the Global Zika outbreak reported higher intention to get screening (*M*=45.2) than those who reported hearing about the Global Zika outbreak 5-10 times (*M*=30.80). Conversely, participants who reported hearing about the U.S. Zika outbreak only once reported lower intention to get screening (*M* = 28.9) compared to those who reported hearing about Zika 5-10 times (*M* = 38.68).

Results also indicated an effect that was trending toward significance between Global outbreak media consumption and contacting a Dr./RN for information, $F(5,154) = 2.10$, $p = .07$, $\eta^2 = .07$. Participants who reported hearing nothing at all about the global outbreak reported higher intention to contact a healthcare worker for more information (*M*=49.7) compared to those who heard about it only once (*M*=33.15). There was also a nearly significant result on media consumption and sharing Zika-related information online, $F(5,154) = 2.02$, $p = .08$, $\eta^2 = .07$.

Pearson correlation coefficients resulted in significant positive relationships between susceptibility and delaying family planning, $r = .146$, $n = 777$, $p < .001$, considering or obtaining an abortion, $r = .08$, $n = 773$, $p = .03$, purchasing and using bug repellant, $r = .12$, $n = 778$, $p < .001$, contacting a doctor or nurse, $r = .012$, $n = 774$, $p = .001$, sharing information, $r = .16$, $n = 771$, $p < .001$, seeking information, $r = .17$, $n = 776$, $p < .001$, and using mosquito nets, $r = .11$, $n = 776$, $p = .002$. However these relationships were very weak.

The EPPM predicted that people who have higher perceived efficacy with dealing with the threat would engage in danger-control processes. However, a Pearson correlation coefficient found a weak positive correlation between self-efficacy and delaying family planning, $r = .08$, $p = .03$, and sharing Zika-related information, $r = .09$, $p = .009$. There

was a nearly significant negative correlation between response-efficacy and avoiding traveling to impacted areas, $r = .07$, $p = .06$, but it is a pretty weak relationship.

To investigate the predictions of the EPPM, a multiple regression analysis was run to predict sharing information online about Zika from severity, susceptibility, self-efficacy and response efficacy. These variables slightly statistically significantly predicted intention of sharing information online, $F(4, 776) = 17.51$, $p < .001$, $R^2 = .084$. However, only severity and susceptibility added statistically significantly to the prediction, $p < .05$. Self-efficacy and response efficacy were not significant. Another multiple regression analysis was run to predict seeking information online about Zika from severity, susceptibility, self-efficacy and response efficacy. These variables statistically significantly predicted intention of seeking information online, $F(4, 771) = 18.24$, $p < .001$, $R^2 = .086$. However, only severity and susceptibility added statistically significantly to the prediction, $p < .05$. Self-efficacy and response efficacy were not significant.

Table 2. Media consumption of U.S. Zika Outbreak and Perceived Severity and Susceptibility

	Severity *M(SD)*	**Susceptibility** *M(SD)*
Not at all	3.88(.09)	2.35(.12)[a]
Once	3.87(.08)[a]	2.53(.10)
2-4 Times	3.94(.05)	2.73(.07)[b]
5-10 times	4.03(.06)	2.85(.08)[a]
10 or more times	4.08(.06)	3.04(.08)[a]
Don't know	4.60(.33)	3.53(.43)

Note: [a]significant at .01 level; [b]significant at .05 level

RQ1 and *RQ2* of this study wanted to investigate if media consumption of Zika-related content could impact perceived severity and susceptibility. A MANOVA was conducted to investigate whether media consumption of Zika-related content had an impact on perceived severity and susceptibility. Results indicated that there were nearly significant effects of different levels of media consumption on perceived severity,

$F(5,762) = 2.08$, $p = .07$, $\eta^2 = .01$. Post-hoc tests revealed a significant difference between groups: participants who reported hearing about Zika only once had significantly lower severity scores than participants who reported hearing about Zika more than 10 times, $p < .001$. A multiple regression was run to predict severity from the different sources of information about Zika. These variables statistically significantly predicted intention of sharing information online, $F(7, 620) = 5.23$, $p < .001$, $R^2 = .056$. However, only traditional media (newspapers, TV, etc) and social media added statistically significantly to the prediction, $p < .05$. The other sources were not significant.

An ANOVA was calculated to test *H1*. Results indicated there were no significant differences times and severity, however there was nearly significant difference on susceptibility. Participants in Time 3 had lower perceived susceptibility scores than participants in Time 1, $F(2,792) = 2.77$, $p = .06$. There were significant effects between time and self-efficacy and response-efficacy (*RQ3* and *RQ4*). Participants reported higher self-efficacy scores on Time 1 than Time 3, $F(2,792) = 29.50$, $p < .001$ and response-efficacy, $F(2,792) = 12.34$, $p < .001$. There was a significant positive correlation between severity and susceptibility, $r = .22$, $n = 793$, $p < .001$.

Table 3. Severity, Susceptibility, Self-Efficacy, and Response-Efficacy over time

	T1 *M(SD)*	**T2** *M(SD)*	**T3** *M(SD)*
Severity	3.98(.74)	3.99(.75)	3.99(.76)
Susceptibility	2.81(.95)[a]	2.87(.95)	2.64(1.03)
Self-Efficacy	2.82(.86)[b]	3.20(.77)	3.34(.73)
Response-Efficacy	3.18(.84)[c]	3.41(.83)	3.53(.77)

Note: 1-5 Likert ranging strongly agree to strongly disagree, higher numbers indicate more positive reactions. [a]=.06, [b]p<.05, [c]p<.001.

Media consumption had significant impact on perceived susceptibility, $F(5,762) = 6.92$, $p < .001$, $\eta^2 = .04$. Participants who reported never hearing about Zika in the media at all had lower susceptibility scores than those who reported hearing about Zika 2-4

times, 5-10 times, and 10 or more times. These results indicate that never hearing about Zika, aside from the survey, made participants feel more susceptible to it. An ANOVA was calculated to test *H2* and resulted in a significant effect. Participants who reported hearing about Zika from government agencies had significantly higher behavioral intention scores on sharing Zika-relate information online, $F(1,626) = 5.69$, $p = .02$. There was a nearly significant effect of hearing about Zika from government agencies and seeking information online, $F(1, 628) = 3.65$, $p = .06$. However, no significant effects were found for any other behavioral intentions.

A MANOVA was conducted on Time-Phase and Third-Person Perception (TPP) to see if over time, perceptions of others' efficacy to deal with the threat had changed. There was a significant impact of Time-Phase on TPP self-efficacy, $F(2,792) = 10.53$, $p < .001$, and on TPP response-efficacy, $F(2,792) = 2.10$, $p = .01$.

Table 4. Time-Phase, Information Sufficiency, and Third Person Perception

	Info Sufficiency	**TPP self-efficacy**	**TPP response-ficacy**
	M(SD)	*M(SD)*	*M(SD)*
TP 1	-23.42(30.81)[a]	2.78(.88)[a]	2.95(.82)[b]
TP2	-13.58(28.19)	3.03(.77)	3.03(.80)
TP3	-13.07(20.61)	3.07(.81)	3.09(.79)

Information sufficiency was calculated by subtracting their perceived amount of information the participants would need to deal with the threat from the reported amount information they already had about the threat, unless participants felt they didn't need anymore information, these information sufficiency scores would be a negative integer. A lower number indicated that participants needed more information to deal with the threat. A one-way analysis of variance (ANOVA) was conducted on condition (Time-Phase) and information sufficiency, to investigate whether time had impacted participants' reported

information sufficiency. There was a significant impact of condition on information sufficiency. A Bonferri post-hoc test revealed that participants in Time-Phase 1 reported significantly lower information sufficiency scores than Time-Phase 2 and Time-Phase 3, $F(2, 789) = 12.53$, $p < .001$. These results indicate that participants in TP1 felt that they needed more information to deal with the threat. By TP2 and TP3, scores increased.

Table 5. Reported Information Suffiency

	M(SD)		*M(SD)*
Females	-20.61(29.18)	*Health care workers*	-13.26(22.08)
Males	-16.28(29.18)	*Laypersons*	-19.02(29.16)

An ANOVA was conducted on sex and information sufficiency. There was one significant difference between the sexes: women had lower information sufficiency scores, $F(1, 789) = 4.52$, $p = .03$.

I also wanted to investigate whether participants who were healthcare workers ($n = 69$) felt they had more information to deal with the threat compared to laypersons ($n = 721$). Another ANOVA was conducted but found no significant differences, $F(1, 789) = 2.55$, $p = .11$. There were no significant differences between self-efficacy and response-efficacy (*H3*), $F(2,137) = .84$, $p = .90$.

Table 6. Sources of information about Zika and self-efficacy

Information Source	**Self-Efficacy** *M(SD)*	
	Reported Source	Did Not Report Source
Media (TV, radio, newspapers)	3.07(.80)[a]	2.72(.98)
Social Media (Facebook, Twitter…)	3.07(.84)[b]	2.92(.85)
Friends/Family	3.26(.79)[a]	2.88(.85)
Healthcare workers	3.58(.76)[a]	2.91(.83)
Government agencies	3.58(.75)[a]	2.89(.83)
Public schools	3.18(.79)	2.95(.85)
Other	2.25(1.06)	2.99(.82)

Note: [a]Significant at <.001 level; [b]Significant at .05; [c]Test of homogeneity was signficant

A series of ANOVAs were conducted to test whether source of information about Zika had impacted perceived self-efficacy in dealing with the threat of Zika. Participants could select as many sources that applied in one item, however these scores were analyzed separately and assuming a binary, either participants used this source or not. The results indicated that participants who reported hearing about Zika from the following sources had higher self-efficacy sources than those who did not: media (TV, radio, newspapers), $F(1, 762) = 16.41$, $p < .001$, social media, $F(1, 722) = 5.22$, $p = .02$, friends and family, $F(1, 665) = 28.38$, $p < .001$, healthcare workers, $F(1,640) = 36.06$, $p < .001$, and government agencies, $F(1, 642) = 42.12$, $p < .001$. However, the test of homogeneity was significant, perhaps because most participants selected more than one source.

The same method was used to analyze source and response-efficacy. These results differed from self-efficacy scores. The only impact of information source on response-efficacy observed was in Media, $F(1, 761) = 5.13$, $p = .02$, Healthcare workers, $F(1, 640) = 11.82$, $p < .001$, Government Agencies, $F(1, 642) = 9.25$, $p = .002$, and Other, $F(1, 632) = 5.30$, $p = .02$. Interestingly enough, the participants who selected Other had lower self-efficacy scores than those who did not.

This study's *RQ5* and *H4* concerned third-person perception (TPP) and information source. This study hypothesized that participants who consumed information about Zika through social media platforms would have decreased TPP than others. An ANOVA did not find any significant impact of social media consumption and TPP-self efficacy, $F(1, 722) = 2.73$, $p = .10$, or TPP-response-efficacy, $F(1,722) = 1.56$, $p = .21$. However, when investigating other information sources and the TPP scores, there was a

significant impact of source on TPP-self efficacy and TPP-response efficacy. In almost every source, participants who reported consuming content or hearing about Zika from any source indicated a higher TPP-self efficacy.

Table 7. Source of information and third-person effects

	Media	Social Media	Friends/Family	Healthcare workers	Government Agencies	Public Schools	Other
	M(SD)	M(SD)	M(SD)	M(SD)	M(SD)	M(SD)	M(SD)
TPP self-efficacy	2.94(.032)[b]	2.95(.88)	3.02(.86)[a]	3.25(.11)[a]	3.18(.83)[b]	2.68(.92)	2.89(.85)[b]
TPP response-efficacy	2.99(.80)	3.03(.83)	3.05(.80)	3.23(.91)[b]	3.17(.77)[c]	3.01(.83)	2.87(.64)

Note: [a]significant at .001 level, [b]significant at .01 level, [c]significant at .05 level

Participants who reported hearing about Zika from (TV, radio, print) media (n = 656) had significantly higher TPP-self efficacy scores than those who did not (n = 106), $F(1,761) = 6.38$, $p = .012$. Participants who selected Friends/Family as sources (n = 209) also had higher TPP-self efficacy scores than those who did not (n = 457), $F(1,665) = 7.42$, $p = .007$. Participants who heard about Zika from healthcare workers had significantly higher TPP-self efficacy, $F(1,640) = 12.25$, $p < .001$, and TPP-response efficacy scores, $F(1,640) = 6.03$, $p = .01$. Likewise, participants who heard about Zika from government agencies (n = 69) also had significantly higher scores on the TPP-self efficacy, $F(1,642) = 9.57$, $p < .01$, and TPP-response efficacy, $F(1,642) = 3.93$, $p = .05$ than those who did not (n = 574). This result is interesting because it may indicate that sources with perceived expertise impact third-person effects and efficacy.

Pearson correlation coefficients were conducted to investigate *H5*, which predicted that there would be a positive relationship between efficacy and public trust in health care. There were significant yet weak positive correlations between self-efficacy (M = 3.05, SD = .61) and PTHS (M = 3.32, SD = .83), $r = .156$, $n = 780$, $p < .001$, and

response-efficacy and PTHS, $r = .265$, $n = 780$, $p < .001$. This indicates that perceived efficacy correlates a higher public trust in health care. There was not a relationship between PTHS and perceived severity. However, there was a negative correlation between perceived susceptibility and public trust in health care, $r = -.10$, $n = 793$, $p = .006$, indicating that participants with lower PTHS scores had increased perceived personal susceptibility and vice versa. However this correlation was very weak. An ANOVA revealed there was no significant impact of Time-Phase on any of the PTHS scales.

CHAPTER VI

DISCUSSION & LIMITATIONS

Results supported some hypotheses and research questions in this study. Results indicated that amount of consumption of media content about Zika does impact perceptions of severity (*RQ1*). Participants who heard about Zika more than 10 times had higher perceived severity than participants who had heard of Zika only once. Likewise, participants who heard about the U.S. Zika outbreak multiple times had higher perceived susceptibility than those who had heard about Zika only once (*RQ2*).

There was no difference between time-phases on severity and susceptibility so *H1* was not supported. Severity and susceptibility scores were relatively stable over time. Severity scores in particular were nearly identical every time and scored in the higher range (3.98-3.99). Zika news coverage may have still been at a peak during each time surveyed. Witte (1992) wrote in the original EPPM model that people consistently reevaluate messages in a feedback loop, and participants may have still been evaluating and reevaluating their severity. Participants who heard about Zika from government agencies did have significant more intentions to share Zika related information online, supporting *H2*. Government agencies may have more credibility and trust as a source and therefore participants felt more comfortable sharing the information to others online (Rosenbaum, 2015).

In a similar theme, there was a positive relationship between response-efficacy and public trust in the healthcare system, indicating that people who had more confidence in the effectiveness of dealing with the threat had more trust in the healthcare system, in healthcare workers, in healthcare policies, and quality of care and cooperation.

Regarding *RQ3* and *RQ4*, participants' self-efficacy and response-efficacy changed over time. In other words, they felt that they could deal with the threat and that others could deal with the threat more with each time surveyed. Perhaps the survey itself gave them information about the disease and behaviors to deal with the disease. As they were exposed to the survey and more information, they felt they would be more effective at dealing with the threat. I hypothesized that there would be significant differences between self-efficacy and response-efficacy because there were many extraneous variables that could have affected perceived response-efficacy; participants may perceive the practicality of buying mosquito repellant and delaying family planning differently. However, there was no significant difference observed between self-efficacy and response-efficacy, so *H3* was not supported.

While the evidence did not support *H4*: participants who reported consumption of social media messages did not have decreased third-person effect like predicted. However, the reasoning leading to *H4* was that social media messages were framed interpersonally, e.g. a friend or family member shared the information. In previous research, participants who consumed messages about socially undesirable content via social media felt that others were more affected by the message than themselves (Lo, Wei, & Lu, 2016). In this study, the survey items did not ask if others were more susceptible to Zika but asked if others knew how to deal with Zika. Participants who

heard about Zika from friends/family and healthcare workers did have higher TPP scores than those who did not. Rahman and Saeed (2013) found that interpersonal communication helped form political opinions rather than solely media and this could extend to opinions and disease as well.

These results have interesting implications for interpersonal and mass health communication. Those who reported interpersonal communication about Zika felt others would be more effective dealing with the threat, so there was a more pro-social third person effect than previous research suggested. This effect was found in almost every channel of media consumption about Zika: participants felt that other people knew how to deal with the threat. While perceived severity of Zika remained high, participants who reported hearing about Zika from any source had higher perceptions of self-efficacy and response-efficacy for themselves and others (TPP). Thus, they believe that they and others can deal with the threat effectively. So perhaps news media isn't as salacious and frightening as critical analyses have suggested (Adeyanju & Neverson, 2007).

Furthermore, participants who heard more (5-10 times, and 10 or more times) about the global Zika outbreak reported less intention to get screening for Zika than those who hadn't heard of it at all. But results suggested a reverse effect for the U.S. Zika outbreak: participants who heard of Zika in the United States more than five times reported more intentions to get screening than those who had heard of it only once. Even though the U.S. Zika outbreak was happening at the same time as the global Zika outbreak, this effect still occurred. I believe that this effect can be interpreted through the concept of psychological distance, the heuristic in our mind that a risk is farther away from us. White, Johnson, and Kwan (2014) discussed four pillars of psychological

distance--- temporal (when the disease can occur), social (who gets the disease), hypothetically/probability (the odds of infection), and spatial (where the disease is). These distances are evaluated with each risk message and the closer these risks are the more dangerous the risk is. Future studies could investigate this concept further in regards to processing risk messages.

Results suggested a strong correlation between personal susceptibility and behavioral intentions. Even though the average score on considering an abortion were low, (M = 16.45), results suggest that if participants felt particular susceptible to transmitting Zika to a fetus, they would consider terminating the pregnancy. Healthcare professionals and government agencies could use this information when crafting messages. It was interesting that there were not stronger correlation between self-efficacy and the several behavioral intentions. The EPPM predicts that there would be a strong relationship between self-efficacy, response-efficacy, and danger-control responses. Indeed, the negative correlation between response-efficacy and avoiding impacted areas is a surprising result. Perhaps the information that Zika is transmitted through body fluids impacted the perceived response-efficacy of avoiding areas. If the disease can be transmitted person-to-person, avoiding impacted areas may not help. In conclusion, these results suggest a strong relationship between perceived threat and some behavioral intentions just as the Witte predicted with the EPPM.

There were some technical problems with the “sliding scale” feature of the behavioral intentions items. Only 161 participants were able to answer the item regarding getting screening. I believe that is still a large enough sample for the significant findings to be relevant, but not as generalizable as the other behavioral intention scores, which

numbered close to 800. I also believe that the "sliding scale" feature led to a lot of deviance from the average on behavioral intentions compared to Likert-type scales or text-entry boxes.

Zika dropped from the news after late fall 2016, but CDC officials are still working to manage the disease. As of the time of this writing, one in 10 pregnant women infected with Zika had babies with microcephaly (Chang, 2017). It is important to study public attitudes about Zika and about future disease outbreaks while they are happening to capture data in real time. Even though this study did not find significant change in threat perceptions over time, it is still a sound method because knowledge about Zika changed throughout the course of 2016. Future studies should continue to study the impact of media consumption on perceptions of Zika, as the outbreak is still occurring and no cure or vaccine has been introduced. Furthermore, this researcher only used previous research into how news media covered disease epidemics and generalized findings to Zika-related media. She suggests that future studies investigate the content of the messages consumed by the public, not just relying on self-report and previous research so that the field can have an even deeper look into risk message processing.

REFERENCES

Adeyanju, C.T. & Neverson, N. (2007) "There will be a next time": Media discourse about an "Apocalyptic" vision of immigration, racial diversity, and health risks. *Canadian Ethnic Studies, 39,* 80-105.

Ahmed, Azam. (2016, January 23). El Salvador advises against pregnancy until 2018 in answer to Zika fears. *New York Times*. Retrieved from https://www.nytimes.com/2016/01/24/world/americas/el-salvador-advises-against-pregnancy-until-2018-in-answer-to-zika-fears.html?_r=0

Aubrey, J. S. & Haun, R. (2016). Health versus appearance versus body competence: A content analysis investigating frames of health advice in women's health magazines. *Journal of Health Communication, 21*(5), 496-503.

Bennett, P., Calman, K., Curtis, S., & Fischbacher-Smith, D. (Eds.). (2010). *Risk Communication and Public Health* (2nd ed.) (pp. 3-22). Oxford: Oxford University Press.

Bernstein, L. (2014, October 14). Dallas nurse Nina Pham will be transferred to NIH facility in Bethesda, Maryland. *Washington Post*. Retrieved from https://www.washingtonpost.com/news/to-your-health/wp/2014/10/16/dallas-nurse-nina-pham-will-be-transferred-to-nih-facility-in-bethesda-maryland/?tid=a_inl&utm_term=.fb55b4a4b270

Birmingham, W.C., Hung, M., Watcharaporn, B., Kohlman, W. (2015) Effectiveness of the extended parallel process model in promoting colorectal cancer screening. *Psycho-Oncology, 24,* 1265-1278. doi: 10.1002/pon.3899.

Briggs, C. (2005). Communicability, racial discourse, and disease. *Annual Review of*

Anthropology, 34, 269-291.

Buhrmester, M., Kwang, T., & Gosling, S. D. (2011). Amazon's mechanical turk: a new source of inexpensive, yet high-quality data? *Perspectives on Psychological Science, 6*(1), 3-5.

Chang, D. (2017, April 4). One in 10 pregnant women with Zika had fetus or baby with microcephaly, CDC says. *Miami Herald*. Retrieved: http://www.miamiherald.com/news/health-care/article142594664.html

Davison, W. P. (1983). The third-person effect in communication. *The Public Opinion Quarterly, 47*(1), 1-15. Doi: 10.1086/268763.

Dhillon, R. S., & Kelly, J. D. (2015) Community trust and the ebola endgame. *The New England Journal of Medicine, 373*(9), 787-789.

El Malla, H., Kreicbergs, U., Steinbeck, G., Wilderang, U., El Sayed Elborai, Y., & Ylitalo, N. (2013). Parental trust in health care — a prospective study from the Children's Cancer Hospital in Egypt. *Psycho-Oncology, 22*(3), 548-554. doi: 10.1002/pon.3028.

Fugelli, P. (2001). James Mackenzie Lecture. Trust — in general practice. *The British Journal of General Practice, 51*(468), 575-579.

Guerrero, N., Mendes de Leon, C. F., Evans, D. A., & Jacobs, E. A. (2015). Determinants of trust in health care in an older population. *Journal of the American Geriatrics Society, 63*(3), 553-557. doi: 10.1111/jgs.1331

Goodall, C., Sabo, J. Cline, R., & Egbert, N. (2012). Threat, efficacy, and uncertainty in the first 5 months of national print and electronic coverage of the H1N1 virus. *Journal of Health Communication, 17*(3), 338-355. doi:

10.1080/10810730.2011.626499

Gwyn, R. (2001). Communicating Health and Illness. London, GB: SAGE Publications Ltd.

Lee, J. D. (2014). An Epidemic of Rumors. Logan: Utah State University Press.

Lo, V., Wei, R., & Lu, H. (2016). Issue importance, third-person effects of protest news, and participation in Taiwan's Sunflower movement. *Journalism and Mass Communication Quarterly,* doi: 10.117/1077699016670122

McNeill, D. G., Jr., St. Louis, C., & St. Fleur, N. (2016, July 29). Short answers to hard questions about Zika virus. *New York Times*. Retrieved from: https://www.nytimes.com/interactive/2016/health/what-is-zika-virus.html

Park, J. E., & Sohn, A. (2013). The influence of media communication on risk perception and behavior related to Mad Cow Disease in South Korea. *Osong Public Health and Research Perspectives*, 4(4), 203–208. http://doi.org/10.1016/j.phrp.2013.06.005

Pennington, H. (2010). The role of media in public health crises: perspectives from the UK and Europe. In P. Bennett, K. Calman, S. Curtis, & D. Fischbacher-Smith (Eds.). *Risk Communication and Public Health* (2nd ed.). (pp. 81-96) Oxford: Oxford University Press.

Petts, J., Draper H., Ives, J., & Damery, S. (2010). Risk communication and pandemic influenza. In P. Bennett, K. Calman, S. Curtis, & D. Fischbacher-Smith (Eds.). *Risk Communication and Public Health* (2nd ed.). (pp. 147-162) Oxford: Oxford University Press.

Popova, L. (2012). The extended parallel process model: Illuminating the gaps in

research. *Health Education & Behavior, 39*(4), 455-473. doi: 10.1177/1090198111418108.

Rahman, B. H., & Saeed, S. (2013). The role of television and discussant group in political opinion process: understanding the effect of interpersonal communication, television, and political efficacy in the educated youth. *Journal of Contemporary Research in Business, 4*(9), 584-602.

Rosenbaum, L. (2015). Communicating uncertainty — ebola, public health, and the scientific process. *The New England Journal of Medicine*, *372*(1), 7-9.

Rosenthal, S., Detenber, B.H., & Rojas, H. (2015 February 19). Efficacy beliefs in third-person effects. *Communication Research*, 1-23. doi: 10.1177/0093650215570657

Scherr, S. & Muller, P. (2016). How perceived persuasive intent and reactance contribute to third-person perceptions: Evidence from two experiments. *Mass Communication and Society, 00*, 1-21. Doi: 10.1080/15205436.2016.1250911

Schweisberger, V., Billinson, J. and Chock, T. M. (2014), Facebook, the third-person effect, and the differential impact hypothesis. Journal of Computer-Mediated Communication, 19: 403–413. doi:10.1111/jcc4.12061

Smith, S. W., Rosenman, K. D., Kotowski, M. R., Glazer, E., McFeters, C., Keesecker, N.M., Law, A. (2008). Using the EPPM to create and evaluate the effectiveness of brochures to increase the use of hearing protection in farmers and landscape workers. *Journal of Applied Communication Research, 36*(2), 200-218. doi: 10.1080/00909880801922862

Tewksbury, D., Moy, P., & Weis, D. (2004). Preparations for Y2K: Revisiting the behavioral component of the third-person effect. *Journal of Communication*, 54,

138-155.

Texas Department of State Health Services. (2016, February 2). DSHS reports first locally acquired Zika case [Press release]. Retrieved from http://www.dshs.texas.gov/news/releases/20160202.aspx

Van der Schee, E., De Jong, J. D., & Groenewegen, P. P. (2012). The influence of a local, media covered hospital incident on public trust in health care. *European Journal of Public Health, 22*(4), 459-464. doi: 10.1093/eurpub/ckr033

Wei, R., Lo, V., & Hu, H. (2008). Third-person effects of health news: exploring the relationships among media exposure, presumed media influence, and behavioral intentions. *American Behavioral Scientist, 52*(2), 261-277. doi: 10.1177/000276408321.355

White, A. E., Johnson, K. A., Kwan, V.S. (2014). Four ways to infect me: Spatial, temporal, social, and probability distance influence evaluations of disease threat. *Social Cognition*, *32*(3), 239-255.

Witte, K. (1992). Putting the fear back into fear appeals: The extended parallel processing model. *Communication Monographs*, 59, 329-349.

Witte, K. & Allen, M. (2000). A meta-analysis of fear appeals: implications for effective public health campaigns. *Health Education and Behavior, 27*(5), 591-615.

World Health Organization (WHO). (2016a). The history of Zika virus. Retrieved from http://www.who.int/emergencies/zika-virus/history/en/

World Health Organization (2016b, September 6). Prevention of sexual transmission of Zika virus: interim guidance update. (Report No. 16.1, Rev. 3). Retrieved from

WHO website: http://www.who.int/csr/resources/publications/zika/sexual-transmission-prevention/en/

World Health Organization (2017, March 10). Zika virus and complications. Retrieved from: http://www.who.int/features/qa/zika/en/