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Narcan Can Save your Loved One: Designing Messages for the Opioid Crisis Using the Extended Parallel Process Model

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NARCAN CAN SAVE YOUR LOVED ONE: DESIGNING MESSAGES FOR THE OPIOID CRISIS USING THE EXTENDED PARALLEL PROCESS MODEL

by

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ABSTRACT

In 2017, the United States Department of Health and Human Services (HHS) declared the opioid epidemic a public health emergency. The opioid epidemic has become widespread because of over prescription and extreme addiction. In recent years, the crisis has become dire because of the staggering annual death toll from overdoses. Although the number of opioid-related deaths has risen, so too have the innovations designed to combat opioid abuse and overdoses. The use of naloxone is a safe and reliable option for treating overdose victims. In fact, many first responders are primarily relying on the medication in such emergencies. This study explored message-design components for persuading individuals to purchase Narcan nasal spray (a Nalaxone product). Guided by the Extended Parallel Process Model, the project employed three message framing techniques, including gain-frame/loss-frame, labeling and medical stigmatization through language, and linguistic agency assignment. 304 participants read one of eight messages and completed a corresponding survey. The first measure of behavioral intent, which was acceptance or refusal of the coupon code for the Narcan nasal spray, was predicted only by susceptibility and system-efficacy. The second measure, intent to seek additional information regarding Narcan, was predicted by severity, susceptibility, and system-efficacy. The third measure, intent to own Narcan in the future, was predicted by susceptibility and response-efficacy. Optimistic bias and self-efficacy did not predict any of the three behavioral intent variables. However, when separate from the other independent variables, optimistic bias predicted all three behavioral intent variables.

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DEDICATION

This dissertation is dedicated to six very important people in my life. To my parents, Marvin and Sheralyn, for their genuine love and support. To Harper, for keeping our home full of love at all times. To Duke, for keeping our home full of comedic relief at all times. To Ruby, for joining us right at the end with a big sweet smile. Finally, to Mandi. I could write a second dissertation on all the sacrifices you have made over our three years in Mississippi, and you did it all with the best attitude and mindset. You are the reason we will always look back at our PhD experience with such joy and fondness. I love you.

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LIST OF ABBREVIATIONS

AAC	American Addiction Centers
CDC	Centers for Disease Control and Prevention
CFI	Comparative Fit Index
EFA	Exploratory Factor Analysis
EPPM	Extended Parallel Process Model
FDA	Food and Drug Administration
HHS	Department of Health and Human Services
IFI	Incremental Fit Index
IMF	Illicitly-manufactured Fentanyl
MTurk	Amazon Mechanical Turk
NCI	National Cancer Institute
NFI	Normal Fit Index
NIDA	National Institute on Drug Abuse
PCA	Principle Component Analysis
PMT	Protection Motivation Theory
PRM	Parallel Response Model
RMSEA	Root-mean Square Error of Approximation
SAMHSA	Substance Abuse and Mental Health Services Administration
SEM	Structural Equation Modeling
SEU	Subjective Expected Utility Theory

CHAPTER I - INTRODUCTION

The Opioid Crisis

In 2017, the United States Department of Health and Human Services (HHS) declared the opioid epidemic a public health emergency (HHS, 2018a). Alex Azar, Secretary of HHS, described the opioid crisis in this way:

> The opioid misuse and overdose crisis touches everyone in the United States. In 2016, we lost more than 115 Americans to opioid overdose deaths each day, devastating families and communities across the country. Preliminary numbers in 2017 show that this number continues to increase with more than 131 opioid overdose deaths each day. The effects of the opioid crisis are cumulative and costly for our society—an estimated $504 billion a year in 2015—placing burdens on families, workplaces, the health care system, states, and communities. (HHS, 2018b, p. 1).

The general knowledge of opioids is growing as the number of people dependent on the medications increases. According to the American Psychiatric Association (2018), nearly one in three Americans knows at least one person addicted to opioids. Opioids are a class of pain-relieving drugs that interact with opioid receptors in the body to calm nerves, sometimes creating a feeling of euphoria for the recipient that can become very addictive, according to the National Institute on Drug Abuse (2018a). Again, this sharp rise in the abuse of opioids and overdose deaths is what led the HHS and other government agencies to declare the trend an epidemic.

The Centers for Disease Control and Prevention (CDC) attribute the rise of the epidemic to three distinct waves of opioid use and abuse. First, there was an initial rise in

medical providers prescribing opioids in the 1990's (CDC, 2017a). According to Liu, Pei, and Soto (2018) "the increase in opioid prescriptions was influenced by reassurances given to prescribers by pharmaceutical companies and medical societies claiming that the risk of addiction to prescription opioids was very low" (para. 1). The second uptick in the use of opioids resulted from a rapid increase in deaths from heroin around 2010. The increase in heroine-related deaths partially originated from regulatory efforts making prescription opioids harder to obtain; instead, individuals struggling with addiction sought means other than prescriptions to obtain opioids (CDC, 2017 a).

Finally, the most recent wave of the epidemic is due to an increase in deaths due to illicitly-manufactured opioids, such as fentanyl, in 2013 (CDC, 2017a). Fentanyl is typically used for treating advanced cancer pain and is 50 to 100 times more potent than morphine (CDC, 2017b). This third wave is particularly dangerous as "the illicitly-manufactured fentanyl (IMF) market continues to change, and IMF can be found in combination with heroin, counterfeit pills, and cocaine" (CDC, 2017a, para. 6). According to the U.S. Drug Enforcement Agency (n.d.), "many users believe that they are purchasing heroin and actually don't know that they are purchasing fentanyl – which often results in overdose deaths" (para. 1). As the market for opioids continues to grow and evolve, it is critical to address the crisis to prevent a fourth, deadlier wave in the future.

Opioid addiction

The opioid epidemic has become widespread because the drugs are overprescribed and are also extremely addictive (CDC, 2017c). The American Addiction Centers (2019) report that 9.7% of women and 12% of men admit to using Oxycontin or

Vicodin while at work. An additional 1% of women and 1.5% of men admit to using heroin while at work (AAC, 2019). Although heroine is an illicit drug, other forms of opioids like Oxycontin or Vicodin are regulated prescriptions that can be obtained from physicians. Not surprising then that the CDC reports that one in four patients receiving long-term opioid therapy will struggle with an addiction to the drug (CDC, 2017c).

Pharmaceutical companies have benefited greatly from the widespread prescribing of opioids, and in some cases, they engaged in legally questionable actions to keep them on the shelves. In fact, Purdue Pharma, the company that manufactures the opioid product OxyContin, lied to the public and other stakeholders about the true addictive nature of the drug (Mole, 2018). After pleading guilty in a lawsuit, the family that owned Purdue Pharma then quietly started a second company called Rhodes Pharma, manufacturing generic brands of the same product. In 2019, both companies are being sued by New York and other states for "putting hunger for profits over patient safety" (Associated Press, 2019, par 1). The state of New York alone is asking for tens of millions of dollars, as well as requiring the companies to establish a fund to curb the crisis in the state. Oklahoma settled its lawsuit with Purdue Pharma for $270 million (Wildeman, 2019).

The opioid crisis has become so dire that the Food and Drug Administration (FDA) has warned veterinarians to be aware of people trying to get opioid prescriptions for their pets with the intention of using the pills or distributing them to others (FDA, 2018). As the number of those addicted grows, users will go to great lengths to obtain more opioids. In some cases, theft behavior evolves in parallel with the development of compulsive drug use behavior. As casual experimentation gives way to full-blown

addiction, the need to obtain and use that substance takes priority over everything else in life. People don't behave like themselves and will go to great lengths to get more of the drug – even if that means stealing from friends and family (AAC, n.d., para 12).

The overprescribing of opioids cannot be understated in its contribution to the crisis. In 2017, more than 191 million prescriptions were dispensed in the United States alone, or nearly 1.5 prescriptions per household annually (CDC, 2017d). In 2011, the opioid medication hydrocodone was the most prescribed pharmaceutical with 131.2 million prescriptions. The second most prescribed drug in 2011, a cholesterol-lowering medication, was prescribed nearly 40 million times less than hydrocodone (DeNoon, 2011). Seven years later, even after a nationwide-push for physicians to treat pain in ways other than prescribing opioids, hydrocodone remained the highest prescribed medication in several states, including Alabama, Alaska, Georgia, Idaho, Indiana, Illinois, Mississippi, Nebraska, Oklahoma, and South Carolina (Goetz, 2018). Additionally, in Tennessee, the top prescribed drugs are buprenorphine and naloxone, medications used to help those with opioid addiction (Goetz, 2018).

Complicating the overprescribing of opioids is the finding that approximately 28.5% of prescriptions are distributed without any pain-related justification from the prescribing providers (Sherry, Sabety, & Maestas, 2018). Based on the number of prescriptions cited above, in 2017 alone, approximately 955,000 opioid prescriptions were given without any clinical justification. Further, pharmaceutical industry marketing has spent large sums of money specifically targeting physicians, a practice that has directly resulted in higher overdose rates (Hadland, Rivera-Aguirre, Marshall, & Cerdá, 2019). The marketing tactics include providing meals for physicians, a practice that has

led to increased prescribing (Gershman, 2019). Although marketing drugs to physicians is very common, Purdue Pharma understood the extremely addictive nature of opioids as early as 1999 (Keshner, 2018). The company failed to disclose the information to physicians and regulators while continuing to market the drugs (Meier, 2007).

While prescription opioids have garnered much attention, heroin is also extremely potent and addictive. It is also more likely that people will misjudge the amount of heroin being consumed because of its unregulated production and distribution (AAC, 2018a). While some pervasive cultural assumptions point to minorities and lower socio-economic persons as primary users, recent surges in heroin use has been attributed more to women, non-Hispanic whites, and people with private health insurance (Jones, Logan, Gladen, & Bohm, 2015). Both legal and illegal opioid addiction can destroy lives of people from all races, genders, and classes.

To curb the opioid crisis, the US House of Representatives passed a bill directing the National Institutes of Health to develop non-addictive painkillers, change the way prescription pills are distributed, and require the inclusion of addiction history in patient medical records as of June of 2018. The bill also provides agencies with additional tactics for preventing the transport of opioids into the United States (Sotomayor, 2018).

The CDC also released a new set of opioid prescription guidelines for chronic pain (CDC, 2018). Although some lawmakers advocated for a hard cap to the amount of prescriptions physicians can prescribe, there are drawbacks to this type of regulation. For example, chronic pain sufferers fear that strict regulations for opioid prescribing practices may worsen their quality of life (Joyce, 2018). There are two competing needs at play: The need to address the growing opioid epidemic and the need to provide care for people

with chronic pain. As one chronic pain patient stated, “It's the difference between laying [SIC] in bed crying and getting up and going kayaking” (Joyce, 2018, para. 1). “We are not criminals, we are just in pain” (para. 5).

Opioid related deaths

In recent years, the crisis has become dire because of the staggering annual death toll from opioid overdose (NIDA, 2018b). Over two million people in the United States currently suffer from an opioid dependency (Wolf, 2019), and this opioid dependency increases their risk of experiencing an early death by 19.8% (Hser et al., 2017). An overdose occurs when too many opiates attach to the opioid receptors in the brain, and breathing is suppressed to a dangerously low rate, or even stopped completely (White & Irvine, 1999). According to the CDC (2017a), the number of opioid-related deaths in 2016 soared above 63,600. Opioids are now cited as one of the top contributing factors for the unprecedented life expectancy decline in the United States (Thompson, 2018). While the unregulated nature of heroin has contributed to deaths, an estimated 40% of overdose cases result from prescription opioids (CDC, 2017c).

Interestingly, the elderly population experiences a high risk of opioid overdose. “As the baby boomer generation ages and the population of older adults in the United States grows, opioid misuse among older Americans is becoming an increasingly urgent public health concern” (SAMHSA, 2017a, p. 1). While Malec and Shega (2015) reveal that the addiction risk is lower in the elderly population, older patients are often overprescribed pain-relieving medication in quantities far surpassing manufacturer recommendations (AAC, 2018b). Finally, as people age, their memory can deteriorate, potentially increasing the risk of overdose. “[The elderly] might not fully hear their

doctor's instructions, they might take the wrong dose, or forget if they took it already—all of which can lead to misuse, significant negative side effects, or even overdose" (AAC, 2018b, para 3).

The CDC has focused on four tactics to prevent opioid overdose. The first tactic is to improve prescription practices through clearer clinical guidelines. "Recommendations focus on the use of opioids in treating chronic pain outside of active cancer treatment, palliative care, and end-of-life care" (CDC, 2017f, para 2). The second tactic is preventing opioid use disorder by preventing exposure to the drug through prescription monitoring programs, state prescription laws, formulary management strategies in insurance programs, provider education, patient education, quality improvement programs in health care systems, and generally raising awareness (CDC, 2017g). The third approach is treating those with opioid use disorder with evidence-based treatments such as medication-assisted therapy. Medication-assisted therapy is a comprehensive treatment that combines the use of medications such as methadone, buprenorphine, or naltrexone to assist individuals to stop using opioids. This approach is often coupled with counseling and behavioral therapy (CDC, 2017h). The final approach is to actively reverse overdose occurrences using Naloxone, the medication employed to immediately reverse the fatal results of opioid overdoses (CDC, 2017i).

Naloxone

Although the number of opioid-related deaths has risen, so too have the innovations designed to combat opioid abuse and overdoses. For instance, suboxone was designed to curb opioid addiction withdrawal as people attempt to stop using the drugs. However, likely the greatest weapon against opioid-related deaths is the drug Nalaxone,

which has been used by first responders and medical centers (Sauers, 2019) to rapidly reverse and block the adverse effects of an opioid overdose, thereby quickly returning the respiration rates of the victim to normal measures (NIDA, 2018c).

Nalaxone was originally discovered and patented in 1961 to treat constipation caused by chronic opioid use (Cordant Health Solutions, 2017). Second, the FDA approved the drug as an overdose treatment in 1971. Finally, the first take-home kits for laypersons were distributed as a pilot program in 1996. As of 2015, over 26,000 lives had been saved thanks to naloxone (Wheeler, Jones, Gilbert, & Davidson, 2015). Weiner, Baker, Bernson, and Schuur (2017) measured the overall success of the drug and revealed that naloxone saved the victim 93.5% of the time, and 84.3% of survivors were still alive one year later.

The use of naloxone is a safe and reliable option for treating victims of opioid overdose. In fact, many first responders are primarily relying on the medication in overdose emergencies (NPR, 2018). There are no life-threatening side effects to naloxone, only minor discomfort after being revived (NIDA, 2018c). However, certain stakeholders including various first responders and media outlets remain uneducated about the properties of Naloxone and its ease of use. This has unfortunately slowed the diffusion of this particular innovation (Bagley & Bright, 2018).

Because of the lack of available information regarding the life-saving drug, as well as the fear of potential consequences for requesting or possessing Naloxone (Green et al., 2017), some have expressed some uneasiness surrounding the medication. However, given the staggering number of opioid overdose-related deaths occurring every day in the United States, it is imperative that health communicators develop messages

that educate the public and first-responders as well as managing misinformation surrounding Naloxone. In other words, communicators must craft messages that inform the public about the drug while persuading them—especially those with friends or family members who have struggled with an opioid addiction—to carry it regularly.

The current study explores message-design components for persuading individuals to purchase the Narcan nasal spray (a Nalaxone product). Guided by the Extended Parallel Process Model (EPPM), the project employs three message framing techniques, including gain-frame/loss-frame, labeling and medical stigmatization through language, and the linguistic agency assignment. The following chapter provides an in-depth review of literature concerning the theoretical framework, message design components, and health communication campaign techniques.

CHAPTER II – LITERATURE REVIEW

Health Communication Campaigns

The National Cancer Institute (2002) developed a four-stage process for developing health communication campaigns. These stages include campaign planning, message design and testing, campaign implementation, and evaluation. The first two stages, campaign planning and message design and testing, are most pertinent to the current study. In terms of planning and strategy development, communication campaign designers should first conduct a conceptual analysis (Silk, Atkin, & Salmon, 2011) to better understand the public health concern. In this phase of planning, the target audience should be identified (Randolph & Viswanath, 2004) along with the focal segment(s) and focal behavior(s) (Silk, Atkin, & Salmon, 2011). Focal segmentation refers to distinct groups in the population that need to change a specific health behavior. For campaign purposes, focal segmentation parameters must be established. For example, a recent e-cigarette campaign experiment targeting three different groups (old smokers, reluctant smokers, and young smokers), established demographic, cognitive, and behavioral parameters before sampling (Yang, Liu, & Popova, 2018).

Focal behaviors are the health-related behaviors that need to be adopted or discontinued by the focal segment. The behavior focus should always be a specific, discrete action (Atkin, 2001). Campaign designers must decide whether to focus on encouraging target audiences to add or eliminate related behaviors (Perloff, 2010). For example, a campaign in Denver promoted the prevention of sexually transmitted diseases and identified male and female condom use as the main focal behavior for the campaign (Salyers Bull, Cohen, Ortiz, & Evans, 2002). The campaign focused specifically on

encouraging condom use for those not already engaging in the behavior. Once the focal segments and focal behaviors are established, campaign designers should identify the determinants, including attitudes, beliefs, knowledge, social influences, and environmental forces that contribute to health behaviors (Silk, Atkin, & Salmon, 2011). Identifying these social determinants can assist campaign designers in identifying the most promising pathways and developing campaign objectives (NCI, 2002; Silk, Atkin, & Salmon, 2011).

The second stage of the campaign process is pretesting concepts, messages, and materials. Developing the right message can make or break a campaign. When implemented poorly, health campaigns may fail to meet goals and can even lead to boomerang results, or outcomes directly opposed to intended goals (Dillard & Shen, 2005). Several variations of the campaign message(s) should be created and tested on a small sample of the focal segment. Knowing which messages will be most effective will save program campaign resources by ensuring that the process is not implemented with an ineffective message (NCI, 2002).

In health and risk message design, rigorous approaches "determine which variations matter for whom and in what contexts, with the ultimate goal of designing more effective persuasive messages to have a positive impact on health behavior" (Harrington, 2015, p. 103). O'Keefe (2015) argues that all message design choices should be evidence-based, specifying that evidence should come from replicated trials, effect sizes, and random-effects meta-analysis.

Another integral characteristic to any campaign is its credibility (Iyengar & Valentino, 2000). Message designers should ensure that the source of the message is

perceived as credible by the focal segment. Source credibility can be defined as "the extent to which the information and advice came from a knowledgeable source, was prepared by an expert, seemed impartial, and was readily available" (Briggs, Burford, De Angeli, & Lynch, 2002, p. 328). High perceptions of source credibility often lead to higher perceptions of self-efficacy, perceptions of threat severity, and behavioral intention rates (Phua, 2016; Haase, Betsche, & Renkewitz, 2015; Kareklas, Muehling, & Weber, 2015). Health-related messages must also include sufficient evidence to establish the seriousness of the threat. Additionally, special attention should be paid to the evidence employed in messages to ensure that the campaign messages do not backfire, resulting in unintended consequences for the campaign (Silk, Atkin, & Salmon, 2011).

The current project focuses on the message design components that may influence individuals' likelihood to alter their behavior for the safety of others, including their friends and family members. In most cases, someone experiencing an opioid overdose is unlikely to have the presence of mind or the physical ability to administer Narcan to themselves. Therefore, developing compelling messages that encourage others to carry Narcan, not simply individuals dependent on opioids, is the intent of the current study. While there are few examples of Narcan-centered health communication campaigns, there has been a recent surge of opioid-centered campaigns in the United States sparked by the widespread opioid crisis.

Opioid health communication campaigns

Attempts to address the opioid crisis using health communication campaigns have emerged at the national, state, and even local levels. At the national level, the CDC (2019) created its national campaign entitled "Rx Awareness," with a goal to "increase

awareness that prescription opioids can be addictive and dangerous and to decrease the number of individuals who use opioids recreationally or overuse them" (CDC, 2019, para. 1). The campaign employs stories from real people affected by opioids either directly or indirectly. The White House also released its own campaign called "The Crisis Next Door" that allows victims to upload their own videos to share their experiences with others in hopes of preventing addiction and providing help (Office of National Drug Control Policy, 2019).

As of June 2017, the Substance Abuse and Mental Health Services Administration (SAMHSA) had identified 15 state-wide communication campaigns addressing the opioid crisis in 12 different states (SAMHSAb, 2017). These state-wide opioid campaigns include the "Dose of Reality" campaign in Minnesota, the "Anyone, Anytime" campaign in New Hampshire, the "North Dakota Prescription Drug Abuse Campaign" in North Dakota, the "Prescription for Prevention" campaign in Ohio, the "OvedoseFreePA.org" campaign in Pennsylvania, the "Use Only as Directed" campaign in Utah, the "Vermont's Most Dangerous Leftover" campaign in Vermont, the "Sink or Swim" campaign in Virginia, and the "Dose of Reality" and "Good Drugs Gone Bad" campaigns in Wisconsin. Some of the campaigns established specific target audiences. Three campaigns specifically targeted young people, including public service announcements in Delaware targeting persons 12-25, the Generation RX Project in Georgia targeting persons 12-25, and public service announcements in Maryland aimed at persuading college students. Finally, the "Parent Up" campaign in Vermont targeted parents, and the "Don't Run, Call 911" campaign in Delaware targeted overdose victims. Finally, cities and municipalities have also increased communication campaign efforts to

curb the crisis, such as the Opioids Solutions RVA campaign in the Richmond Virginia area (Rojas, 2019).

Message design is critical for campaign success, and messages should increase people's knowledge surrounding a health threat while also encouraging them to modify their behavior through persuasive tactics (NCI, 2002). For example, in the CDC's Awareness RX campaign, one of the campaign messages features a picture of a pill bottle accompanied by the quote "Prescription opioids can be addictive and dangerous. It only takes a little to lose a lot" (CDC 2017e, para. 2). This message is intended to increase readers' knowledge more than modify their behavior by raising awareness to the inherent dangers of opioid use. In another campaign message, a picture of a woman is captioned with the quote "I'm not supposed to be the one to pick which sneakers I'm going to bury him in" (CDC, 2017d, para. 3). This message is intended to conjure mental images of the woman burying her son, and the message designers are trying to invoke the readers' emotions while persuading them of the danger posed by opioids.

Health campaign messages should increase the knowledge of the audience while persuading individuals that they are at risk for the given threat. The theoretical framework of the EPPM explains how constructing messages that cause people to feel susceptible to certain risks may serve as a catalyst for behavior change. The following section provides an overview of the theoretical tenets of the EPPM.

Extended Parallel Process Model

Developed by Kim Witte (1992), the EPPM was modeled to explain how people process fear appeal messages (Lewis, Watson, & White, 2013). The basic premise of the EPPM is that a message recipient is more likely to adopt a recommend behavior

change when both the perception of threat and the perception of efficacy are high. The EPPM has been used in many contexts, including the H1N1 virus and its corresponding vaccine (McGlone, Bell, Zaitchik, & McGlynn III, 2013), germs from urine and feces and hand-washing (Botta, Dunker, Fenson-Hood, Maltarich, & McDonald, 2008), cardiovascular disease and proper vitamin intake (McKay, Berkowitz, Blumberg, & Goldberg, 2004), radon and radon abatement systems (Dragojevic, Bell, & McGlone, 2014), and others (Witte & Allen, 2000).

Previous fear appeal models

For decades, scholars have investigated the role of fear on human behavior (Dillard, 1994; Witte, 1992). The first phase of fear appeal theories and research was focused on the drive models. The drive models situate fear as a "stimulus-producing response that has the functional properties of a drive" (Janis & Feshbach, 1953, p. 90). The drive models are a four-step process that begin with 1) the individual receiving a fear appeal message, 2) the individual experiencing an arousal of fear, 3) the individual wanting to reduce the level of fear, and 4) the individual changing his or her attitude or behavior (see figure 1; Dillard, 1994).

In early fear appeal literature, scholars assumed greater levels of fear resulted in a greater intent to control the danger. In other words, "One would predict that the group displaying the greatest degree of residual fear would be most strongly motivated to ward off those internal symbolic cues which [are] salient during and immediately after the communication" (Janis & Feshback, 1953, p. 90). However, there were problems with drive models that pushed scholars to develop a more comprehensive approach better in explaining the cognitive and emotional aspects of fear appeals (Dillard, 1994). Leventhal

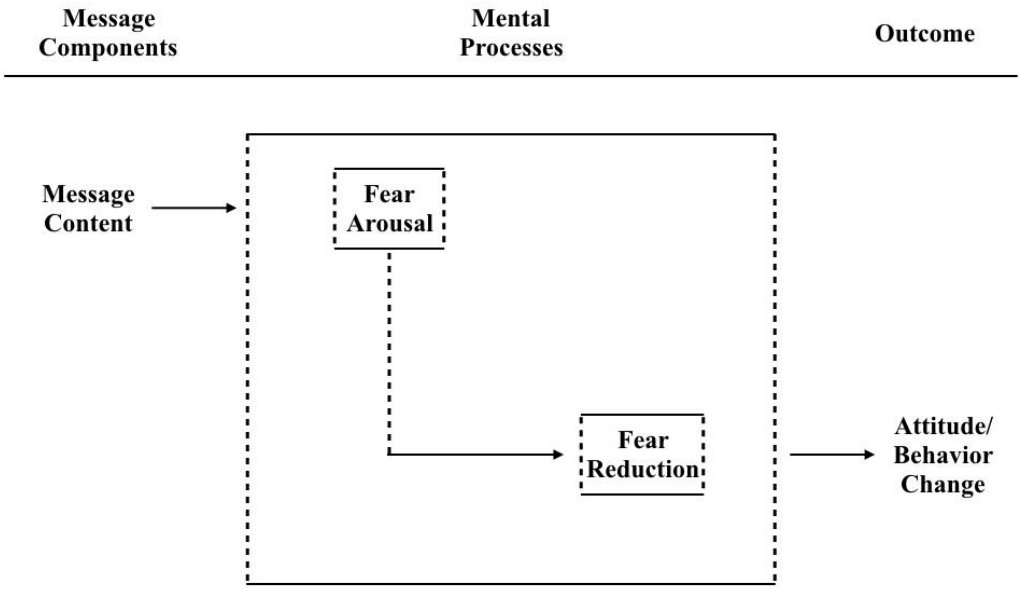

Figure 1. *Original Drive Model*

(Dillard, 1994)

(1970) offered several critiques of drive models, including the lack of scholarly evidence that fear is the mediator of attitude or behavior change, the lack of specific variables capable of changing the optimal level of fear, and the lack of research supporting the capability of drive models to function as anything beyond a low-order descriptive hypothesis.

To address his own objections to the drive models, Leventhal (1970) proposed the parallel response model (PRM) (see figure 2). The PRM posits that once a fear appeal is encountered, audiences will engage in two succinct reactions. First, an individual will simultaneously experience an awareness of danger and the creation of fear. Next, the individual will attempt to control both the danger and the fear. While distinct processes, the fear response and danger response may impact one another in either a facilitative (i.e. when danger-control efforts reduce fear) or disruptive (i.e. when fear-control efforts prevent danger-control efforts) manner.

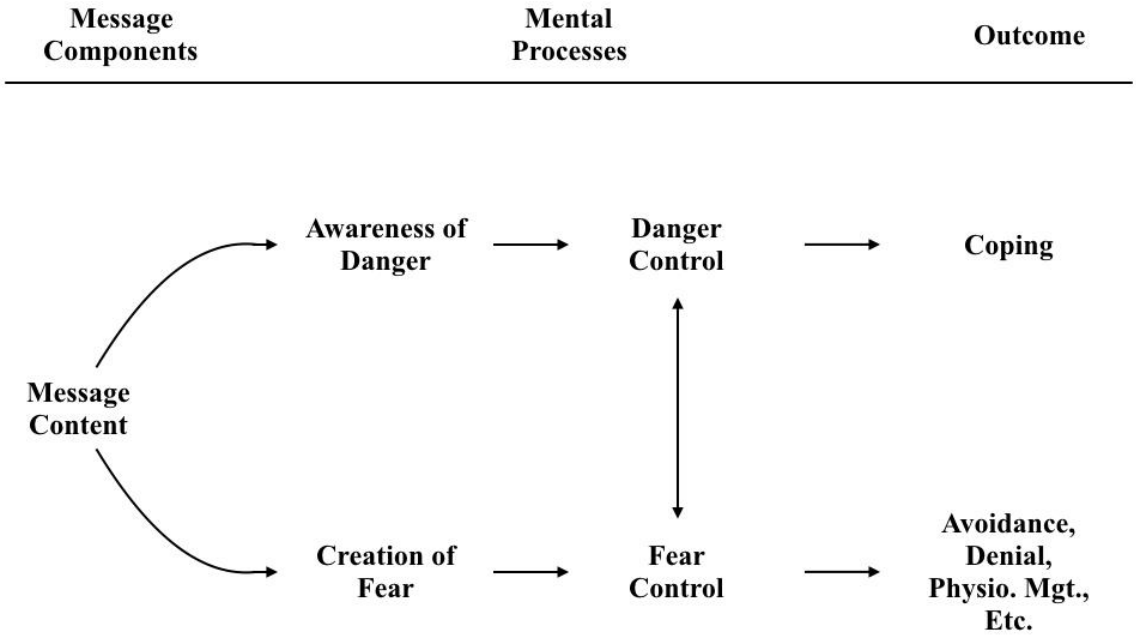

Figure 2. *Parallel Response Model*

(Dillard, 1994).

However, because of several shortcomings to the PRM, including its lack of precision "in specifying what conditions lead to danger or fear control processes" (Witte, 1992, p. 333), a new wave of fear appeal theories, known as the expectancy value theories, emerged. The most notable include the Protection Motivation Theory (PMT) (Rogers, 1975) and the Subjective Expected Utility Theory (SEU) (Sutton, 1982). These models "deemphasized the role of fear arousal in favor of cognition" (Witte, 1992, p. 334). Ultimately, decades of research on fear appeals would inform the creation of the Extended Parallel Process Model, a more comprehensive explanation of fear and danger control responses.

Fear appeals are often used in health communication campaigns, and they can be defined as, “persuasive communication that attempts to arouse fear in order to promote precautionary motivation and self-protective action” (Ruiter, Kessels, Peters, & Kok, 2014, p. 65). Health campaigns that employ fear appeals “are based on the assumption that by vividly demonstrating negative and life-endangering consequences of risk behaviors, people will be motivated to reduce their current risk behavior and adopt safer alternative behaviors” (Ruiter, Kessels, Peters, & Kok, 2014, p. 63).

Most fear appeals are employed to accomplish two purposes. First, an effective fear appeal should present a threat perceived to be dangerous by the message recipient. Second, the message should present a viable option for averting the threat (Witte, 1992; Witte & Allen, 2000; Ruiter, Kessels, Peters, & Kok, 2014). For example, a fear appeal message used in a texting and driving campaign would present the threat of people killing either themselves or someone else in a distracted driving incident. Next, an appropriate behavior for averting the threat, which could include mobile driving applications or simply a commitment to quit texting, would be presented. The success of this fear appeal would depend heavily on the audience’s perception of the threat presented in the message. Threat perception can be measured through perceived severity and susceptibility. When trying to persuade individuals to engage in the prescribed behaviors, messages should include strong efficacy components. Specifically, messages should convey strong perceptions of self-efficacy and response-efficacy for message recipients. In the presence of fear appeals, audience members need reinforced messages of efficacy to engage in the prescribed behaviors.

Perception of threat severity and threat susceptibility

Strong threat components in fear appeals produce high levels of both severity and susceptibility for message recipients (Witte & Allen, 2000). Witte and Allen (2000) define severity as "the magnitude of harm expected from the threat" (p. 592) and susceptibility as "the degree to which one feels at risk for experiencing the threat" (p. 592). The first proposition of the EPPM is that if the combination of these two components results in a low overall perception of threat then there will be no further processing of the message, ultimately resulting in a failed attempt to change behavior (Witte, 1992). While these components primarily focus on the perception of threat to one's self, research shows that threats to others can also motivate people to act (Sampson et al., 2001). This can be referred to as perceived threat to others (Roberto, Murray-Johnson, & Witte, 2011). For example, persuading a new mother not to put blankets or pillows in a crib with a newborn in order to avoid suffocating the child could be successful, not because the mother is afraid of suffocating, but because she is afraid of her newborn suffocating.

Ruiter, Kessels, Peters, and Kok (2014) argue that while severity is often the most visible component in fear appeals, it is also the least persuasive. A threat may appear to have very intimidating consequences, but if the message recipient does not feel susceptible, they are unlikely to experience a high level of fear (Witte, 1992). Thus, people are unlikely to change their behavior unless they feel susceptible to a particular risk. For the current study, threat severity measured participants' perception of the opioid crisis, and how harmful it could be to their loved ones. Threat susceptibility measured participants' perception of the likelihood that their loved ones could be a victim of the

opioid crisis. Both are measurements of perceived threat to others and not perceived threat to self.

Perception of self-efficacy and response-efficacy

Self-efficacy is defined as "people's beliefs about their capabilities for exercising control over their own level of functioning and over events that affect their lives" (Schreurs, Van Emmerik, Notelaers, & De Witte, 2010, p. 60). Response-efficacy is defined as "belief as to whether a response effectively prevents the threat" (Witte, 1992, p. 332). Together, these two components create an overall perception of efficacy. One of the main propositions of the EPPM is that a low perception of efficacy (when perception of threat is high) will result in a boomerang effect, ultimately resulting in the message recipient choosing not doing what is being advocated in the message (Witte, 1992). Therefore, a health campaign message that focuses only on the severity of the threat and the target population's susceptibility to it is likely to fail. There must also be a focus on efficacy.

In the current study, the recommended behavior change is persuading people to carry Narcan nasal spray (the brand name for the naloxone medication used in the message) so they are prepared in the event of a loved one overdosing. Therefore, self-efficacy will measure participants' perception that they themselves can help their loved ones in an overdose emergency. Likewise, response-efficacy will measure the participants' perception that Narcan nasal spray is an effective response to an opioid overdose.

Perception of system-efficacy

The current study also considers system-efficacy and how it contributes to individual behavioral intention. System-efficacy is defined as the belief that the society one belongs to can provide effective support and/or mitigate harm (Venette, 2008; Anthony, Venette, Pyle, Boatwright, & Reif, 2018; Macpherson et al., 2014). Fundamentally, if an individual lacks trust in some part of the system to which they belong (family or society for example), their lack of trust affects whether or not they regard or adhere to recommendations advocated by members of the system.

Having a low perception of system-efficacy might stem from several factors including a belief that an entity within the system (i.e., perceptions of Purdue Pharma among families dealing with opioid dependence) does not have the best intentions. For example, the core issue of an individual who questions the practice of vaccinating children might be their perception that the government or pharmaceutical companies do not have their best interest in mind. This low perception of system-efficacy might lead them to reject what is being advocated regardless of any other information or evidence. Alternatively, people may perceive that an entity may not have the necessary resources to help. For instance, the core issue of an individual who decides not to call a suicide prevention hotline may simply believe that the group responding does not have the ability or resources to help them overcome their situation. In both examples, while different, the individual does not have faith that the system that they belong to can help them overcome the threat they are facing. For the current study, system-efficacy will measure the participants' belief that first responders, pharmaceutical companies, family members,

friends, etc., can help mitigate the harm created by the opioid crisis for themselves and the people around them.

Danger-control response and fear control response

Response, the final concept in the EPPM, is the reaction to the fear appeal. Message recipients will respond in one of three ways: No response, fear-control response, or danger-control response (Witte, 1992). If the threat component of the message does not induce fear in the recipient, he or she will likely have no response to the message, rendering it ineffective. If the threat component does induce fear, but the recommended action is not efficacious to the listener, the recipient will likely experience a fear-control response. When individuals experience a fear-control response, they may rationalize the threat as not harmful to them. In essence, they are controlling their fear by convincing themselves that they are not in danger. This may result in individuals avoiding recommended actions or even concluding that the recommended behavior change is ineffective.

However, if the threat component of the message induces fear and the recommended action is perceived as efficacious, the recipient will be more likely to react with a danger-control response. A danger-control response often results in the message recipient engaging in the recommended action. Given this response, individuals decide that they are in real danger and need to act to weaken their susceptibility to the threat. They realize that they can take precautionary measures by adhering to the recommended behaviors. In other words, without clear messages promoting self-efficacy and response-efficacy, individuals may attempt to control their fear through rationalization rather than controlling the actual threat by changing their behavior.

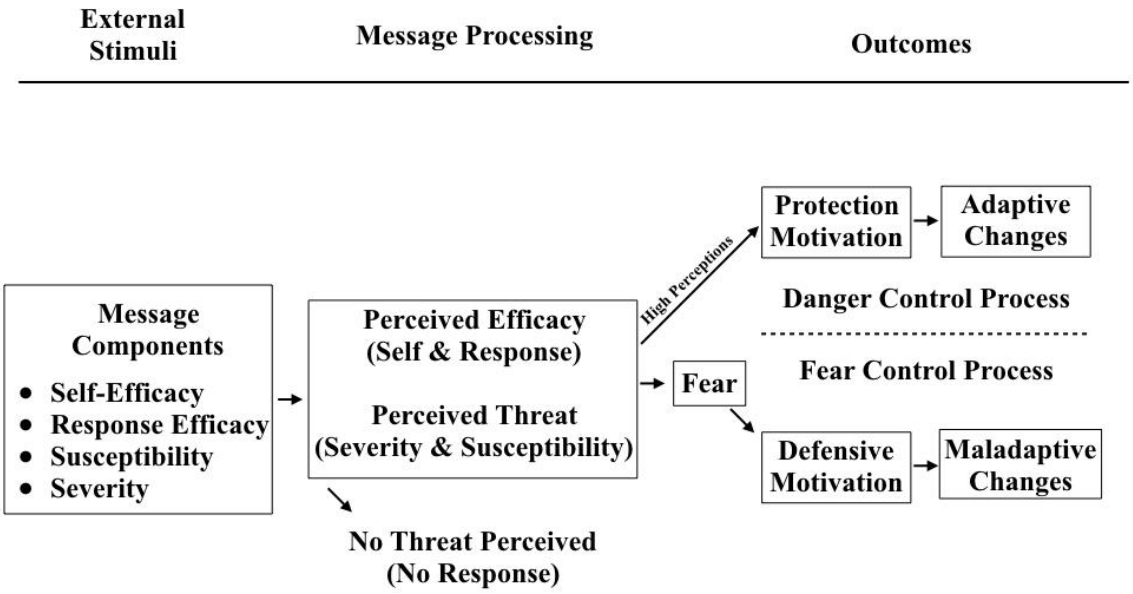

Figure 3. *Extended Parallel Process Model*

(Witte, 1992)

Optimistic Bias

Optimistic bias is the tendency for an individual to believe that he or she is less at risk of a threat than the average person; optimistic bias reveals the ways individual judgements of risk are subjective (Turner, Skubisz, & Rimal, 2011). For example, smokers and non-smokers alike believe that other people are more likely die from smoking cigarettes than they are themselves (Arnett, 2000). Interestingly, subjective judgements, like the smoking example, nearly always reveal lower—not higher—individual perceptions of susceptibility (Turner, Skubisz, & Rimal, 2011). Rogers (1998) argues that humans display optimistic bias not only when considering potentially negative outcomes (i.e., a greater likelihood that bad things will happen to others instead

of themselves), but also in considering potentially good outcomes (i.e., a greater likelihood they could win the lottery over others). The optimist bias phenomenon is apparent even in populations most at risk. For instance, African American teenagers report perceiving that they are less likely to become pregnant or cause pregnancy when being sexually active than the "average person" (Chapin, 2001); however, in actuality, African American teenagers consistently experience higher than average rates of teen pregnancy when compared to other demographic groups (HHS, 2019).

Although scholars as early as Lund (1925) investigated individuals' beliefs about future events, Weinstein (1980) first fully articulated the optimistic bias phenomenon. In this first study, when asked about the likelihood of future events, students rated their own likelihood of experiencing positively valanced events as higher than that of their classmates. For life events perceived to be negative, the students rated their classmates' likelihood of experiencing the events as higher than their own. Recently, scholars have shown that individuals experience optimistic bias with foodborne disease (Rossi, Stedefeldt, da Cunha, & de Rosso, 2017), investment outcomes (Wu, Liu, Han, & Yin, 2018), high blood pressure and obesity (White et al., 2017), cancer and cardiovascular disease (Masiero, Riva, Oliveri, Fioretti, & Pravettoni, 2018), bladder cancer (Riva, Masiero, Mazzocco, & Pravettoni, 2018), and others (see Table 1).

Several explanations have been offered over the years as to why optimistic bias exists (Turner, Skubisz, & Rimal, 2011), including that optimistic bias serves as a tool to help alleviate anxiety from more realistic expectations of susceptibility (Kirscht, Haefner, Kegeles, & Rosenstock, 1966). Additionally, optimistic bias has been explained through the "Muhammad Ali Effect," or the idea that "people wish to hold positive beliefs about

Table 1 *Instances of Optimistic Bias found in the Current Literature*

Article	Threat	Population
Kim & Hancock, 2015	Negative Social and Psychological Outcomes of Facebook	Facebook Users
Park & Ju, 2016	Alzheimer's Disease	Adults 65 and older
Chapin & Coleman, 2017	Cyberbullying	7^{th}-12^{th} Graders
White, et al., 2017	High Blood Pressure and Obesity	African American Adolescents
Rossi, Stedefeldt, da Cunha, & de Rosso, 2017	Foodborne Disease	Food Handlers
Riva, Masiero, Mazzocco, & Pravettoni, 2018	Bladder Cancer	Young Adults
Masiero, Riva, Oliveri, Fioretti, & Pravettoni, 2018	Cancer and Cardiovascular Disease	Young Adults
Wu, Liu, Han, & Yin, 2018	Investment Outcomes	Analysts
Hwang, et al., 2019	COPD	Male Smokers
Drouin, Winickoff, & Thorndike, 2019	Tobacco Use and Obesity	Parents
Andrade, Rodrigues, Antongiovanni, & de Cunha, 2019	Foodborne Disease	Food Handlers and Consumers

themselves. These beliefs are often that they are at least average on important dimensions and possibly above average" (Allison, Messick, & Goethals, 1989, p. 289). However, a more recent explanation for optimistic bias posits that when asked to compare ourselves to others, we often believe that we experience less risk than others for certain negative consequences (Rimal & Morrison, 2006).

Finally, another recent and simpler explanation is that individuals feel more positivity about their own behaviors than the behaviors of others (Turner, Skubisz, & Rimal, 2011). Perhaps another way to understand this explanation is through the fundamental attribution error, which asserts that humans will blame negative actions of themselves on external factors while blaming negative actions of others on internal factors (Ross, 1977). For instance, if a person is asked to compare the likelihood of their family members dying in an automobile accident and an average family dying in an automobile accident, he or she might assume that his or her own family would only be in a car without a seatbelt if they were in a hurry (external explanation), but the average family would be in the car without a seatbelt because they were irresponsible (internal explanation). This flawed thinking results in an optimistic bias.

Interestingly, optimistic bias is not a cultural phenomenon; research suggests a bias towards unrealistic optimism spans across cultures (Peeters, Cammaert, & Czapinski, 1997; Ji, Zhang, Usborne, & Guan, 2004). North Americans, Argentines, and Japanese citizens alike reveal an optimistic bias in their perceived risk of experiencing natural and manmade disasters (Gierlach, Belsher, & Beutler, 2010). Further, Chang, Asakaw, & Sanna (2001) argued that even cultural groups may share a "pessimistic bias"

when rating the likelihood of events occurring to other cultural groups. For instance, a member of ‘group A’ will likely rate the probability of negative events affecting a member of ‘group B’ much higher than the probability of those same negative events affecting a member of his own group. Similarly, ‘group B’ participants would probably rate a member of ‘group A’ as more likely to experience the negative event than a member of her group.

Given the seemingly pervasive nature of optimistic bias at the individual and group level, understanding the perceptions of risk among individuals concerning the involvement of themselves or someone they know in an opioid overdose situation is central to the current study.

Gain-Frame/Loss-Frame

Another way that message designers can manipulate a message is by using a gain-frame/loss-frame technique. “A positive (gain) frame that emphasizes the advantages of compliance, or a negative (loss) frame that emphasizes the disadvantages of noncompliance” (O’Keefe & Jensen, 2006, p. 1-2). For example, a gain-frame message persuading people not to drink soda would emphasize weight loss and increased energy. A loss-frame message would warn people about diabetes and weight-gain.

In designing messages intended to make audience members consider threats posed to their loved ones, messages should emphasize advantages or disadvantages for the loved ones resulting in compliance (or lack of compliance) by the reader. For example, a campaign targeted at parents encouraging them to set better examples for their children by exercising more and inviting their children to join with them could either focus on potential gains (healthier children) or potential losses (juvenile diabetes).

Not only should message designers be conscious of gain-frame and loss-frame techniques, but whether the kernel state of the message is a desirable consequence or an undesirable consequence (O'Keefe & Jensen, 2009). A gain-frame message for instance can focus on either a desirable consequence or an undesirable consequence. For example, an anti-smoking campaign can employ a desirable kernel state such as pretty teeth and good hygiene, or an undesirable kernel state such as lung cancer. In a gain-frame message, if the undesirable kernel state were chosen, then the gain-frame message would emphasize the opportunity to avoid lung cancer by quitting smoking, and the loss-frame message would emphasize the consequence of raising one's lung cancer likelihood by continuing to smoke. Therefore, campaign designers have four options to choose from (gain/desirable, gain/undesirable, loss/desirable, and loss/undesirable) when creating a message.

One moderating factor that can help message designers determine when to employ gain-frame or loss-frame deals with whether the recommendation is prevention or detection-related. O'Keefe and Jensen (2006) found that when specifically talking about disease, disease prevention messages (i.e., you should eat healthy to avoid obesity) should employ gain-frame messages. However, when discussing disease detection (i.e. get your colon checked every ten years to screen for cancer), there is no significant difference between the two strategies. These framing decisions ultimately impact the response that message recipients will have toward the recommended behavior. Prospect theory (Tversky & Kahneman, 1981) for example, explains how people respond to risky propositions when framed around potential gains as opposed to potential losses. The theory suggests that if two equal choices are presented to an individual, one focused on

the potential gains and the other focused on the potential losses, the individual is most likely to choose the proposal focused on potential gains.

The relationship between efficacy and framing techniques is not crystal clear. For example, while three separate studies all conclude that the effects of framed-messages are moderated by self-efficacy, (Van't Riet, Ruiter, Werrij, & De Vries, 2008; Van't Riet, Ruiter, Werrij, & De Vries, 2010; Werrij, Ruiter, Van't Riet, & De Vries, 2011), two found a loss-frame advantage for those with high perceptions of self-efficacy (Van't Riet, Ruiter, Werrij, & De Vries, 2008; Van't Riet, Ruiter, Werrij, & De Vries, 2010), and the third found a gain-frame advantage (Werrij, Ruiter, Van't Riet, & De Vries, 2011).

For the purposes of the current study, the researcher employed an undesirable kernel state message in all messages with a gain-frame/loss-frame manipulation. The messages focus on the advantages or disadvantages that could be experienced by loved ones of the message recipient resulting directly from his compliance or noncompliance to the message recommendations. In the context of an opioid overdose, the gain-frame message focuses on the message recipient's loved one recovering from an overdose because of the recipient's compliance to the message recommendation. The loss-frame message focuses on the message recipient's loved one dying because of incompliance to the message recommendation. This study aims to identify any differences in reported compliance based on which type of message (gain-frame or loss-frame) is randomly assigned to each participant.

Labeling and Stigmatization through Language

The way in which certain message characteristics are framed, such as the names given to people or objects, can have a significant impact on the way a message is processed (Dillard & Pfau, 2002). One example of this was an experiment that tested two versions of descriptive materials to farmers (Menegaki, Mellon, Vrentzou, Koumakis, & Tsagarakis, 2009). The farmers that read materials that used the name "recycled water" were more likely to use and pay for the irrigation water than the farmers that read materials that used the name "treated wastewater." The clear preference for the term "recycled water" is directly related to the stigma attached to the term wastewater.

Certain words or phrases carry a negative stigma with them that can change the way people perceive an issue or individual (Link & Phelan, 2001). For example, referring to people living in a country without proper documentation as an "illegal aliens" may create more hostility towards that group of people than if they were referred to as "undocumented immigrants." In the medical field, there are many instances of terminology with attached negative stigma, including HIV-positive (Vanable, Carey, Blair, & Littlewood, 2006), mental illness (Gaebal, Zaske, & Baumann, 2006), and obesity (Bombak, McPhail, & Ward, 2016).

Link and Phelan (2001) provided a five-step explanation of the stigmatization through language process that includes labeling, stereotyping, separation, status loss, and discrimination. The scholars describe labeling as affixing a name to a person or group of people based on an identifiable difference. Scholars in disability discourse first described labeling as a driving force of stigmatization by identifying words like "handicapped" and "disabled" as potentially harmful (Kailes, 1985; Cortina, 2013). Similarly, the word

addict has earned a generally negative connotation (Cortina, 2013), with some calling on scholars and professionals to employ a new term when addressing substance use disorder patients (Hosea, 2014).

> The lack of effort to challenge the word "addict" has enabled its social acceptance in language without consideration to its role in dehumanizing people experiencing addiction. In news media, its use by "unbiased" reporters has almost become habitual. More concerning, however, is the use of "addict" by professionals who advocate against stigma. Although used naively, messages can become confusing when elicited stereotypes are incongruent to the larger goal of depicting addiction's humanity (Cortina, 2013, p. 105).

The current study aims to identify if the label of "addict" has an impact on an individual's perception of susceptibility, severity, and her behavioral intent. The study will directly consider the impact of the label "addict" in contrast to the label "victim" to understand which is more influential on perceptions and behavioral intentions.

Linguistic Agency Assignment

Duranti (2004) defines agency as "the property of entities that have some degree of control over their own behavior" (p. 453). McGlone and Pfiester (2009) revealed that typically people tend to ascribe agency to themselves in positive situations (i.e., "I did well on the test."). Alternatively, individuals are more likely to ascribe agency to external events or forces in negative situations (i.e., "We lost because my teammates let us down.").

However, when agency is assigned linguistically, an entity is ascribed the ability to act or change within the structure of the statement (Bell, McGlone, & Dragojevic,

2014). In messages designed to communicate information about health threats, message designers can structure statements in one of two ways, by assigning linguistic agency to the threat or to the potential victim (McGlone, Bell, Zaitchik, & McGlynn III, 2013). For example, McGlynn and McGlone (2018) demonstrated this concept well by assigning agency in one message to obesity (Obesity develops in men and women equally) and in another message to humans (Men and women are equally likely to grow obese).

McGlone, Bell, Zaitchik, & McGlynn III (2013) first investigated the effect of assigning agency linguistically on behavior change. The researchers gave participants one of two versions of a printed educational handout informing them of the dangers of the H1N1 virus and the efficacy of the H1N1 vaccine. The first message ascribed agency to the virus, and the second message ascribed agency to the reader. The results showed that participants who read the message ascribing agency to the virus reported higher perceptions of severity and personal susceptibility, as well as a higher intention to get the H1N1 vaccination.

In addition to obesity (McGlynn & McGlone, 2018) and the H1N1 virus (McGlone, Bell, Zaitchik, & McGlynn III, 2013), research performed in this area has tested linguistic agency assignment with a variety of health threats, including harmful bacteria (Bell, McGlone, & Dragojevic, 2014a), HPV (Bell, McGlone, & Dragojevic, 2014b; Zhang & McGlone, 2018), radon gas (Dragojevic, Bell, & McGlone, 2014), colon cancer (Chen, McGlone, & Bell, 2015), diabetes (Glowacki, McGlone, & Bell, 2016), cigarette smoking (Wartel, 2017), and depression (Kahn & Peña, 2017).

Further, individuals may perceive some threats differently than others. For example, a message about an external threat, such as a virus or bacteria, might be

processed differently than a message with an internal threat, such as obesity or depression. Some threats are more easily personified than others as well. For instance, a living bacterium may seem more frightening when assigned agency than a wildfire that is not a living entity. Opioids may represent a different type of threat altogether. For example, one could argue that the pill or the heroin itself is external while addiction is internal.

Table 2 Linguistic Agency Assignment Findings in Health Communication Literature

Article	Threat	Relevant Findings
McGlone, Bell, Zaitchik, & McGlynn III, 2013	H1N1	Threat agency led to higher severity and susceptibility perceptions, as well as higher behavioral intent.
Bell, McGlone, & Dragojevic, 2014a	Harmful bacteria	Threat agency led to higher severity and susceptibility perceptions.
Bell, McGlone, & Dragojevic, 2014b	HPV	Threat agency led to higher severity perception.
Dragojevic, Bell, & McGlone, 2014	Radon gas	Sentient threat agency led to higher severity perception.
Chen, McGlone, & Bell, 2015	Colon cancer	Human agency led to higher susceptibility perception.
Glowacki, McGlone, & Bell, 2016	Diabetes	Threat agency led to higher severity perception.

Agency can be assigned linguistically to opioid messages in two ways; Threat (opioid) agency and human agency. For example, a threat agency message could state, "opioids could kill somebody you love." A human agency message, on the other hand, could say, "somebody you love could die from negligent use of opioids." In the former message, opioids appear to have control over whether they will kill somebody close to the message recipient. In that latter message, the recipient's loved ones seem to have control over whether opioids will take their life. These small but important distinctions in sentence structure have been shown to have an effect on message recipients' perceptions of threat severity and threat susceptibility (McGlone, Bell, Zaitchik, & McGlynn III, 2013).

Hypotheses and Research Question

EPPM

In the current study, purchasing and using Narcan is argued to be a highly effective behavior for combatting the opioid crisis. The messages created for the current study specifically encourage the reader to purchase Narcan. Indirectly, readers may experience the need to seek more information about Narcan or to use Narcan in the future. Based on the tenets and structure of the EPPM and message design literature, the following hypotheses guided analysis of the model.

H1a: Perception of threat severity, perception of susceptibility, perception of self-efficacy, and perception of response-efficacy will positively predict the respondents' likelihood to accept the discount coupon for Narcan nasal spray.

H1b: Perception of threat severity, perception of susceptibility, perception of self-efficacy, and perception of response-efficacy will positively predict the respondents' likelihood of seeking more information about Narcan nasal spray.

H1c: Perception of threat severity, perception of susceptibility, perception of self-efficacy, and perception of response-efficacy will positively predict the respondents' belief they will own Narcan nasal spray in the future.

Optimistic bias

In the current study, respondents' optimistic bias toward loved ones overdosing on opioids is considered. Specifically, the current study measures respondents' perceived likelihood of their loved ones overdosing versus the likelihood of the average person overdosing. Based on the optimistic bias scholarship, the following hypotheses are posited:

H2: When considering the likelihood of loved ones overdosing on opioids, respondents will display optimistic bias.

H3a: Optimistic bias concerning loved ones overdosing on opioids will lead to significantly lower odds of accepting the discount coupon for Narcan.

H3b: Optimistic bias concerning loved ones overdosing on opioids will lead to significantly lower odds of seeking more information about Narcan.

H3c: Optimistic bias concerning loved ones overdosing on opioids will lead to significantly lower odds of believing that they will own Narcan in the future.

Gain-frame/loss-frame

It was suspected that gain-frame messages, or those that emphasize the opportunity to save the lives of friends and family by being equipped with Narcan, and

loss-frame messages, or those that may emphasize the potential death of friends and family if not prepared for an overdose emergency, would result in varying behavioral responses. Based on the message design and Prospect Theory literatures, the following hypotheses guided the analysis:

H4a: Self-efficacy will be a stronger predictor of behavioral intent for respondents who receive the gain-frame message than those who receive the loss-frame message.

H4b: Response-efficacy will be a stronger predictor of behavioral intent for respondents who receive the gain-frame message than those who receive the loss-frame message.

Labeling and stigmatization through language

This study included a linguistic variation on labeling individuals with an opioid dependence. The manipulation framed individuals in two different ways: addict or victim. Because of the negative effect stigmatized labeling has on message processing (Menegaki, Mellon, Vrentzou, Koumakis, & Tsagarakis, 2009), the researcher predicted that labeling individuals as addicts will result in a lower likelihood to adhere to message recommendations. Therefore, the following hypotheses are offered:

H5a: The variables of the EPPM (severity, susceptibility, self-efficacy, and response-efficacy) will be stronger predictors of intention to purchase Narcan in the messages labeling people as "victims" rather than "addicts."

H5b: The variables of the EPPM (severity, susceptibility, self-efficacy, and response-efficacy) will be stronger predictors of intention to seek information in the messages labeling people as "victims" rather than "addicts."

H5c: The variables of the EPPM (severity, susceptibility, self-efficacy, and response-efficacy) will be stronger predictors of intention to own Narcan in the messages labeling people as "victims" rather than "addicts."

Linguistic agency assignment

Based on the linguistic agency literature that shows perceptions of severity and susceptibility are most often higher when reading threat agentic messages, the following hypotheses are proposed:

H6a: Severity will be a stronger predictor of behavioral intention for respondents who receive the threat agency message than those who receive the human agency message.

H6b: Susceptibility will be a stronger predictor of behavioral intention for respondents who receive the threat agency message than those who receive the human agency message.

System-efficacy

Self-efficacy and response-efficacy were included in the original EPPM framework, and these variables have received much scholarly attention. While the breadth of literature and empirical data concerning system-efficacy are much smaller, the construct of system-efficacy may offer some additional explanative power for the EPPM, particularly as individuals consider the greater organizations, entities, or forces at play that may affect whether a threat can be overcome. For these reasons, the following hypotheses were included to better understand system-efficacy:

H7: The perception of system-efficacy will positively predict behavioral intent.

H8a: The perception of system-efficacy will be a better predictor of behavioral intent in gain-frame messages than it will be in loss-frame messages.

H8b: The perception of system-efficacy will be a better predictor of behavioral intent in the "victim" group messages than it will be in the "addict" group messages.

H8c: The perception of system-efficacy will be a better predictor of behavioral intent in threat agentic messages than it will be in human agentic messages.

Unintended interactions

Finally, given the breadth of the current study, there may exist some unintended main effects or interactions between variables. To identify these instances, the following research question is posited:

RQ1: Do any significant main effects or interactions exist for the three message manipulations (gain-frame/loss-frame message manipulation, victim/addict labeling manipulation, and linguistic assignment of agency).

Summary

This chapter provides an extensive review of existing literature concerning the EPPM, optimistic bias, and the message-design elements employed in the study (message framing, labeling, and linguistic agency assignment). Based on the hypotheses offered, the proposed model for the study is demonstrated visually in figure 4 below. The following chapter will detail the research methods of the study in-depth.

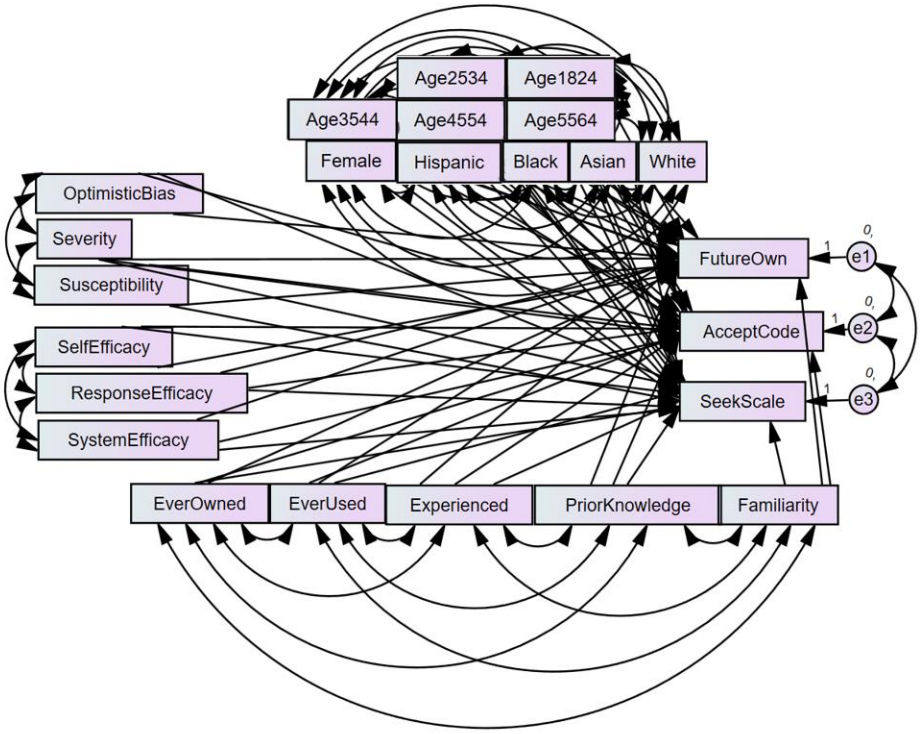

Figure 4. *Proposed Model*

CHAPTER III - METHOD

Participants

An a priori power analysis using G*Power version 3.1 was first conducted to identify the appropriate number of participants. According to the power analysis, 280 respondents were needed to achieve a 90% power for detecting a small to medium-size effect (0.25) when employing the standard .05 criterion for statistical significance (Cohen, 1992). Participants were randomly assigned to one of eight message conditions (see figure 5). Each message was manipulated according to three independent variables: linguistic agency assignment, gain-frame/loss-frame, and stigmatizing "addict"/non-stigmatizing "victim" labels (Tables 3-5).

For validation purposes, respondents' IP addresses were used to screen for duplicate individual responses. Additionally, respondents who completed the survey in less than 100 seconds were automatically removed from the sample. Finally, one item was included to check the respondents' attention to the survey (e.g., I am paying attention to this survey), and three additional items were included to monitor how closely each respondent read the message. Participants who did not indicate paying close attention to the survey or reading the message were removed from the sample.

The minimum age of respondents was 18, and they were required to reside within the United States at the time of the survey. Participants were recruited through Amazon's online crowdsourcing platform, Amazon Mechanical Turk (MTurk), with a $1.00 incentive for participating. MTurk has been recognized as an appropriate data collection

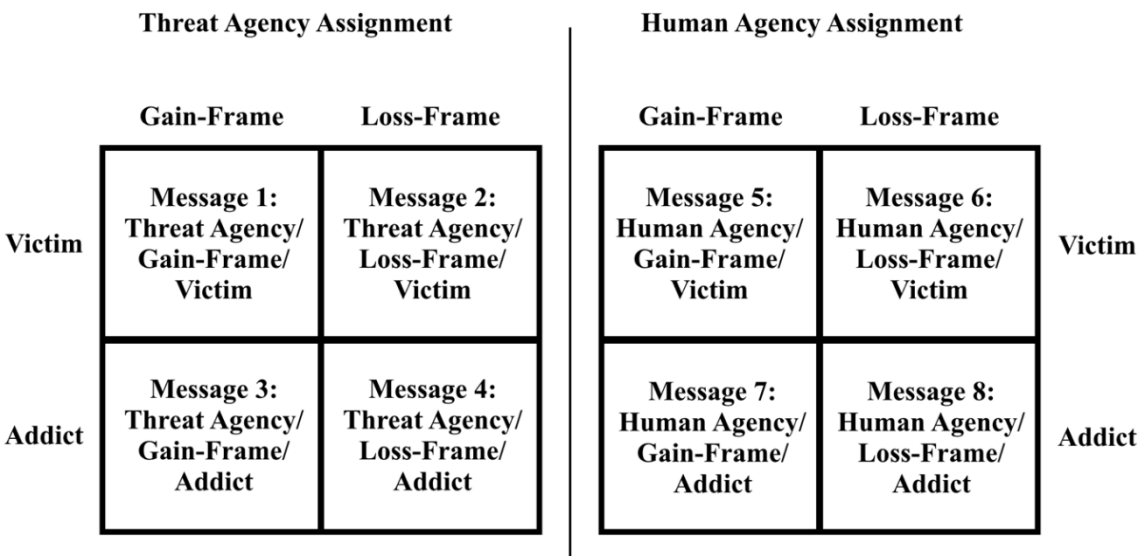

Figure 5. *Message Conditions for Participants*

Table 3 *Gain-Frame/Loss-Frame Message Conditions*

Gain-Frame	Loss-Frame
You can save them!	Your loved ones could be next!
You can help!	The crisis is real…
NARCAN saves lives	NARCAN
immediately saving their life!	he or she will likely die!
… coupon and save a life!	… coupon or you may lose a loved one!

Table 4 *Victim/Addict Message Manipulations*

Victim	Addict
Opioids addicts…	Victims of the opioid crisis…
63,000 victims	63,000 addicts
Who are the victims?	Who are the addicts?

Table 5 *Linguistic Agency Assignment Message Manipulations*

Threat Agency	Human Agency
Opioids are killing people	People are dying
Opioids killed over 63,000 victims	63,000 victims died
People are overdosing	Opioids are killing
NARCAN restores the victim's breathing	The victim begins breathing
Opioids suffocate	Victim ingests

tool because of its ability to obtain high-quality and demographically diverse samples (Buhrmester, Kwang, & Gosling, 2011; Sheehan, 2017).

In the early stages of MTurk, scholars questioned the ability of the platform to provide a true random sample and valid responses. Primarily, researchers were concerned with the data collection technique as survey respondents tend to miss validity checks more often and complete surveys more quickly than participants recruited in traditional ways (Aruguete et al., 2019). To combat this concern, the current study implemented several validity checks and duration timers, as mentioned above, to monitor respondents more closely. Second, MTurk respondents are also internet users and may be more technologically savvy than the actual population. However, despite this potential difference, the ability of crowdsourcing platforms like MTurk to produce a random sample of the general population is unmatched by most traditional methods.

Between March 20, 2019 and March 28, 2019, the researcher gathered 388 original responses through MTurk. However, not all responses were included in the final data set. Using participants' Internet Protocol (IP) address, the researcher identified 12

respondents who completed the survey twice. The twelve duplicate responses were removed from the data. 22 surveys were completed in under two minutes, an amount of time determined insufficient by the researcher to fully complete the questionnaire, and these responses were also omitted from the data. Another 23 surveys were not completed fully and were therefore excluded from the data. Finally, 27 participants responded unsatisfactorily to attention and reading checks (i.e., they failed to follow basic commands created to ensure they were playing close attention to the message and survey); these responses were also deleted. After deleting questionable responses, the final data set included 304 participants, which was 78.4% of original responses. This number exceeded the recommendation of the a priori power analysis by 24.

Of the 304 participants, 52.6% (n=160) were male, 46.1% (n=140) were female, and 1.3% (n=4) reported "other" or did not disclose their biological sex. 78.6% (n=239) identified as white, 8.2% (n=25) identified as Black or African American, 7.2% (n=22) identified as Asian, 2.3% (n=7) identified as American Indian or Alaska Native, and 3.6% (n=11) identified as "other." 15.1% (n=46) of participants identified themselves as Hispanic. Sex and racial diversity reflected actual population estimates closely (U.S. Census, 2018), suggesting MTurk to be a useful tool for data collection and random sampling. Respondents' ages are reported in table 6. The age group with the most participants was 25-34. This happens to be the age group with the largest percentage of opioid overdoses from 2017 (Kaiser Family Foundation, 2019).

Table 6 *Age of Respondents*

Age	% (N)
18 - 24	6.9% (n=24)
25 - 34	40.7% (n=124)
35 - 44	29.2% (n=89)
45 - 54	11.5% (n=35)
55 - 64	9.2% (n=28)
65 - 74	2.6% (n=8)
75 or older	0% (n=0)

Data Collection Procedure

After respondents agreed to participate in the study, they were presented with instructions on the MTurk assignment page. The instructions explained the steps needed to complete the survey and receive the incentive while also explaining that duplicate responses would not be accepted. A URL led the participants to a survey on the Qualtrics website. Once a participant gave informed consent, he or she was randomly assigned to one of the eight messages about Narcan nasal spray (see Figure 6 for an example and Appendix B for all eight messages). After reading the message, respondents completed the accompanying survey questionnaire (Appendix A). After the respondents answered all questions, they were instructed to type a code of their choosing into a corresponding dialogue box and to also type the same code into the MTurk assignment page. This code was used to verify completion of the assignment to provide incentives to participants.

Figure 6. *Message with Victim, Threat Agency, and Gain-Frame Manipulations*

Instruments

Validity and reliability

An exploratory factor analysis (EFA) was conducted to assess the validity of the scales used in this study. EFA is "a widely utilized and broadly applied statistical technique in the social sciences" (Costello & Osborne, 2005, p. 1). EFA assists scholars in reducing a set of items into a smaller set of factors, establishing underlying dimensions, and providing construct validity for self-reporting scales (Williams, Onsman, & Brown, 2010). For the current study, extraction was based on a fixed number of 5 eigenvalues derived from the theoretical underpinnings of the study variables and constructs. A principle components analysis (PCA) was employed with a Varimax rotation. Reliability was determined using a Cronbach's (1951) coefficient alpha to assess

the inter-relatedness of the items in each scale. Each variable met the minimally acceptable reliability standard of 0.70.

Measures

The following section discusses each of the variables used in the study. The specific items that correlate with the measures discussed here can be found on the full instrument in Appendix A. Results from the EFA and reliability analyses are also found in this section.

Perception of threat severity. Perception of severity was measured using a modified version of a three-item scale used by McGlone, Bell, Zaitchik, & McGlynn III, (2013) that exhibited high reliability (α=0.82). It was modified to reflect the respondents' perceptions of whether overdosing on opioids may be a threat to friends and family members. An additional fourth item was added. Example items for the severity scale include "Opioids pose a serious risk my loved ones" and "Opioids are a severe threat to my loved ones." All items were measured by a six-point Likert type scale ranging from 1 (strongly disagree) to 6 (strongly agree). After reliability analysis, one item was removed from the scale to increase the final Cronbach's alpha. Loadings from the EFA and Cronbach's alpha are reported in table 7.

Perception of threat susceptibility. Perception of susceptibility was measured using a modified version of a three-item scale used by McGlone, Bell, Zaitchik, & McGlynn III, (2013) that exhibited high reliability (α=0.81). It was modified to reflect the respondents' perception that their loved ones are susceptible to the opioid crisis. An additional fourth item was added. Example items for the susceptibility scale include "It is possible that one of my loved ones will overdose on opioids" and "I believe that one of

my loved ones could be a victim of the opioid crisis." All items were subjected to a six-point Likert type scale ranging from 1 (strongly disagree) to 6 (strongly agree). Loadings from the EFA and Cronbach's alpha are reported in table 8.

Perception of self-efficacy. Perception of self-efficacy was measured using a modified version of a three-item scale used by McGlone, Bell, Zaitchik, & McGlynn III, (2013) that exhibited high reliability (α=0.82). The self-efficacy scale was modified to reflect the respondents' perceptions of whether they have the personal ability to successfully use Narcan. An additional fourth item was added. Example items for the self-efficacy scale include "Narcan nasal spray is easy to use" and "There is nothing preventing me from successfully using Narcan nasal spray." All items were subjected to a six-point Likert type scale ranging from 1 (strongly disagree) to 6 (strongly agree). After reliability analysis, one item was removed from the scale in order to increase the final Cronbach's alpha. Loadings from the EFA and Cronbach's alpha are reported in table 9.

Perception of response-efficacy. Perception of response-efficacy was measured using a modified version of a three-item scale used by McGlone, Bell, Zaitchik, & McGlynn III, (2013) that exhibited high reliability (α=0.77). The response-efficacy scale was modified to reflect the respondents' perceptions of whether Narcan is believed to be an effective remedy for opioid overdose experiences. An additional fourth item was added. Example items for the response-efficacy scale include "Narcan nasal spray will prevent the death of a loved one who has overdosed" and "Narcan nasal spray is effective in ending the threat of a friend or family member dying from an overdose." All items were subjected to a six-point Likert type scale ranging from 1 (strongly disagree) to 6 (strongly agree). Loadings from the EFA and Cronbach's alpha are reported in table 10.

Perception of system-efficacy. A four-item scale was created to measure system-efficacy. The system-efficacy scale was built to reflect the respondents' perceptions of how well the system that they belong to protects their loved ones from the opioid crisis. Example items for the system-efficacy scale include "I believe there are organizations or agencies that want to protect me from the opioid crisis" and "Pharmaceutical researchers and scientists want to protect me from the opioid crisis." All items were subjected to a six-point Likert type scale ranging from 1 (strongly disagree) to 6 (strongly agree). Loadings from the EFA and Cronbach's alpha are reported in table 11.

Table 7 *Validity and Reliability for Perception of Threat Severity Scale*

Item	EFA Factor Loading
Opioids pose a serious risk to my loved ones.	0.52
Opioids are potentially harmful to my loved ones.	0.66
Opioids are a severe threat to my loved ones.	0.61

Note: Cronbach's alpha was 0.91

Table 8 *Validity and Reliability for Perception of Threat Susceptibility Scale*

Item	EFA Factor Loading
My loved ones are at risk for being an opioid overdose victim.	0.89
It is possible that one of my loved ones will overdose on opioids.	0.91
I believe that one of my loved ones could be a victim of the opioid crisis.	0.92
An opioid overdose could happen to one of my loved ones.	0.91

Note: Cronbach's alpha was 0.95

Table 9 *Validity and Reliability for Perception of Self-Efficacy Scale*

Item	EFA Factor Loading
Narcan nasal spray is easy to use	0.68
There is nothing preventing me from successfully using Narcan nasal spray.	0.85
I have the ability to use Narcan nasal spray if required.	0.83

Note: Cronbach's alpha was 0.82

Table 10 *Validity and Reliability for Perception of Response-Efficacy Scale*

Item	EFA Factor Loading
Narcan nasal spray will prevent the death of a loved one who has overdosed.	0.73
My loved ones are less likely to die from an overdose if I have Narcan nasal spray.	0.77
Narcan nasal spray is effective in ending the threat of a loved one dying from an overdose.	0.79
If someone has overdosed on opioids, I believe Narcan nasal spray can save them.	0.83

Note: Cronbach's alpha was 0.83

Table 11 *Validity and Reliability for Perception of System-Efficacy Scale*

Item	EFA Factor Loading
I believe there are organizations or agencies that want to protect me from the opioid crisis.	0.40
The government will help me respond to the opioid crisis.	0.79
My friends and family will protect me from the opioid crisis.	0.76
Pharmaceutical researchers and scientists want to protect me from the opioid crisis.	0.68

Note: Cronbach's alpha was 0.73

Optimistic bias. In order to calculate an individual score for optimistic bias, this study followed a three-step process. First, respondents were asked "What are the odds that one of your loved ones will overdose on opioids or heroin?" Answers were collected on an 11-point scale ranging from "0 = not likely at all" to "10 = extremely likely." Second, respondents were asked "What are the odds that the average person will overdose on opioids or heroin?" The same 11-point scale was used. Finally, the difference between the two scores was used for each respondent, representing their optimistic bias score.

Accept Code. Respondents were asked if they would like a 75% off coupon for Narcan nasal spray at the end of the survey. Their response to this offer ('yes' or 'no') was used as a dependent measure of behavioral intent.

Intent to Own. A second measure of behavioral intent, respondents were also asked if they think they will ever own Narcan nasal spray in the future. The difference between this dependent variable and the dependent variable "Accept Code", is urgency. Those who wish to purchase now, or soon, will be more likely to accept the discount code. Those who intend to purchase, but not necessarily in the near future, may indicate intent to own but refuse the discount offer.

Intent to Seek Information. Finally, for a third behavioral intent dependent variable, participants were asked if they plan on seeking more information about opioids or Narcan nasal spray. Their response to this item, "Accept Code", and "Intent to Own" were used to measure behavioral intent. The three items were used independently from each other in the analysis.

Correlates. A series of items were used to measure anticipated extraneous variables. These items included "Have you ever owned Narcan nasal spray?", "Have you ever used Narcan nasal spray?", "Has someone close to you ever overdosed on opioids or heroin?", "Before taking this survey, did you know what Narcan nasal spray was?", and "How familiar were you with Narcan nasal spray prior to taking this survey?"

Table 12 *Means and Standard Deviations of Variables and Correlates*

Item	M	SD
Optimistic Bias	1.41	2.51
Perception of Severity	3.80	1.41
Perception of Susceptibility	3.49	1.43
Perception of Self-Efficacy	4.67	0.95

Table 12 Continued

Perception of Response-efficacy	4.72	0.87
Perception of System-efficacy	4.11	0.94
Accept Discount Code	0.32	0.47
Belief of Owning Narcan Nasal Spray in the Future	2.13	0.88
Intention to Seek Information (Yes or No)	0.41	0.49
Intention to Seek Information (Likelihood Scale)	3.75	2.12
Has Owned Narcan Before	1.46	0.93
Has Used Narcan Before	1.48	0.93
Has Experienced Someone Close Overdose	1.82	1.23
Has Prior Knowledge about Narcan	2.53	1.28
Is Familiar with Narcan	2.43	1.34

Data Analysis

Missing data

Because of the small frequency of missing data, mean imputation was employed to replace the missing values. This technique is frequently used (Batista & Monard, 2003), and mean imputation often performs better than other methods such as multiple imputation and random selection (Shrive, Stuart, Quan, & Ghali, 2006) because of its "attractive balance of both accuracy and conceptual simplicity" (p. 9).

Assumptions

The standard skewness value of ±2, and the standard kurtosis value of ±3 were not met for any of the variables tested (Field, 2013). However, in datasets with large

sample sizes, violating normality has a very small and often insignificant impact on the analysis (Tabachnick & Fidell, 2012; Joanes & Gill, 1998). KMO and Bartlett's Test of Sphericity revealed a KMO score of .883 while the Bartlett's Test of Sphericity was significant ($p<.001$). The high KMO value indicated that the sample was adequate, and the significance of Bartlett's Test of Sphericity revealed that the assumption of sphericity was met. Finally, assumptions of linearity were tested by graphing the relationships among relevant study variables, revealing appropriate linear relationships. The assumption of multicollinearity was met as all tolerance values were above the standard of 0.2 (Field, 2013).

Table 13 *Collinearity Statistics*

Item	Tolerance	VIF
Optimistic Bias	.786	1.27
Perception of Severity	.398	2.51
Perception of Susceptibility	.363	2.75
Perception of Self-Efficacy	.784	1.28
Perception of Response-efficacy	.669	1.50
Perception of System-efficacy	.716	1.40

Structural Equation Modeling

Using AMOS 24.0, SEM was conducted to address the hypotheses and research questions. SEM is "a statistical methodology that takes a confirmatory (i.e., hypothesis-testing) approach to the analysis of a structural theory bearing on some phenomenon" (Byrne, 2016, p. 3). Typically, SEM includes the items for each structure in the model. In

this study, an EFA was conducted prior to building the model, and the resulting constructs were employed. Byrne (2016) argues SEM accomplishes four tasks that separate it from other multivariate procedures. First, its confirmatory approach provides better inferential analysis that makes hypothesis testing easier. Second, SEM provides explicit estimates of error that minimize inaccuracies. Third, SEM can incorporate unobserved or latent variables within a model. Fourth, SEM easily models multivariate relations.

Once the proposed model (figure 4) was constructed, several fit-indices measured how well the data fit the model. Normal fit index (NFI) indicates the fit relative to the null model (Kenny, 2015) Comparative fit index (CFI) is not sensitive to sample size and compares the fit of the target model to the fit of an independent model (Kenny, 2015). Incremental fit index (IFI) is analogous to R^2 (Kenny, 2015). Finally, the root-mean square error of approximation (RMSEA) was used, as it is an absolute measure of fit dependent on the non-centrality parameter (Kenny, 2015).

In the proposed model, optimistic bias, severity, and susceptibility were covaried because of their theoretical relationship to threat perception. Self-efficacy, response-efficacy, and system-efficacy were also covaried because of their theoretical relationship with to efficacy perception. The proposed model also controlled for all demographics, including age, sex, ethnicity, and gender. Each of the demographics were covaried with one another. Finally, the five correlates, including one's familiarity with Narcan, whether an individual has owned Narcan, whether an individual has used Narcan, whether he or she has prior knowledge of Narcan, and whether he or she has experience with an overdose event were controlled for and covaried to one another. The fit indices for the

proposed model are shown in table 14, with the covariance estimates in table 15, and the regression weights in table 16.

Table 14 *Fit Indices for the Proposed Model*

Index	Result
NFI	.875
IFI	.915
CFI	.912
RMSEA	.077

Table 15 *Covariance Estimates for the Proposed Model*

Variables			*Estimate*	*S.E.*	*C.R.*	*p*
Age2534	<-->	Age1824	-.028	.007	-3.828	<.001*
Age1824	<-->	Age3544	-.020	.007	-2.998	.003*
Age1824	<-->	Age4554	-.008	.005	-1.699	.089
Age1824	<-->	Age5564	-.006	.004	-1.502	.133
Age2534	<-->	Age3544	-.119	.015	-8.181	<.001*
Age2534	<-->	Age4554	-.047	.009	-4.979	<.001*
Age2534	<-->	Age5564	-.037	.008	-4.437	<.001*
Age3544	<-->	Age4554	-.033	.009	-3.926	<.001*

Table 15 Continued

Age3544	<-->	Age5564	-.027	.008	-3.486	<.001*
Age4554	<-->	Age5564	-.011	.005	-1.983	.047*
Female	<-->	Hispanic	.000	.010	-.006	.995
Female	<-->	Black	.015	.008	1.881	.060
Female	<-->	Asian	.000	.007	-.044	.965
Female	<-->	White	.003	.012	.234	.815
Hispanic	<-->	Black	.017	.006	2.982	.003*
Hispanic	<-->	Asian	-.004	.005	-.834	.404
Hispanic	<-->	White	-.033	.009	-3.846	<.001*
Black	<-->	Asian	-.006	.004	-1.448	.148
Black	<-->	White	-.064	.007	-8.682	<.001*
Asian	<-->	White	-.057	.007	-8.234	<.001*
Age1824	<-->	Female	.001	.007	.163	.870
Age1824	<-->	Hispanic	.003	.005	.506	.613
Age1824	<-->	Black	-.002	.004	-.593	.553
Age1824	<-->	Asian	.008	.004	2.152	.031*
Age1824	<-->	White	-.002	.006	-.289	.772
Age2534	<-->	Female	-.052	.014	-3.636	<.001*
Age2534	<-->	Hispanic	.020	.010	1.977	.048*
Age2534	<-->	Black	.003	.008	.355	.723
Age2534	<-->	Asian	.003	.007	.475	.635

Table 15 Continued

Age2534	<-->	White	-.022	.012	-1.858	.063
Age3544	<-->	Female	.017	.013	1.295	.195
Age3544	<-->	Hispanic	.002	.009	.263	.792
Age3544	<-->	Black	.006	.007	.781	.435
Age3544	<-->	Asian	-.001	.007	-.204	.838
Age3544	<-->	White	.000	.011	-.010	.992
Age4554	<-->	Female	.016	.009	1.767	.077
Age4554	<-->	Hispanic	-.014	.007	-2.156	.031*
Age4554	<-->	Black	.000	.005	.086	.932
Age4554	<-->	Asian	-.002	.005	-.364	.716
Age4554	<-->	White	.002	.007	.201	.841
Age5564	<-->	Female	.010	.008	1.247	.212
Age5564	<-->	Hispanic	-.007	.006	-1.167	.243
Age5564	<-->	Black	-.004	.005	-.933	.351
Age5564	<-->	Asian	-.007	.004	-1.540	.124
Age5564	<-->	White	.016	.007	2.379	.017*
OptimisticBias	<-->	Susceptibility	-1.526	.223	-6.854	<.001*
SelfEfficacy	<-->	SystemEfficacy	.209	.053	3.962	<.001*
PriorKnowledge	<-->	Familiarity	1.284	.122	10.481	<.001*
Familiarity	<-->	Experienced	.483	.087	5.544	<.001*
Familiarity	<-->	EverUsed	.518	.077	6.711	<.001*

Table 15 Continued

Familiarity	<-->	EverOwned	.491	.076	6.433	<.001*
PriorKnowledge	<-->	Experienced	.357	.081	4.384	<.001*
PriorKnowledge	<-->	EverUsed	.217	.069	3.138	.002*
PriorKnowledge	<-->	EverOwned	.233	.069	3.375	<.001*
Experienced	<-->	EverUsed	.376	.061	6.134	<.001*
Experienced	<-->	EverOwned	.426	.062	6.851	<.001*
EverUsed	<-->	EverOwned	.712	.064	11.109	<.001*
SelfEfficacy	<-->	ResponseEfficacy	.382	.052	7.298	<.001*
SystemEfficacy	<-->	ResponseEfficacy	.359	.051	6.991	<.001*
OptimisticBias	<-->	Severity	-.954	.210	-4.549	<.001*
Susceptibility	<-->	Severity	1.529	.145	10.571	<.001*

Table 16 *Regression Weights for the Proposed Model*

Path	*Estimate*	*S.E.*	*C.R.*	*p*
System-efficacy → Intent to Seek	.271	.121	2.236	.025*
System-efficacy → Accept Code	.041	.027	1.531	.126
System-efficacy → Intent to Own	-.058	.044	-1.318	.187
Response-efficacy → Intent to Seek	.018	.143	.128	.898
Response-efficacy → Accept Code	-.004	.032	-.127	.899
Response-efficacy → Intent to Own	.110	.052	2.103	.035*
Self-efficacy → Intent to Seek	-.012	.122	-.097	.922

Table 16 Continued

Self-efficacy → Accept Code	-.013	.027	-.483	.629
Self-efficacy → Intent to Own	.062	.044	1.398	.162
Susceptibility → Intent to Seek	.388	.119	3.257	.001*
Susceptibility → Accept Code	.052	.026	1.988	.047*
Susceptibility → Intent to Own	.157	.044	3.604	<.001*
Severity → Intent to Seek	.237	.113	2.094	.036*
Severity → Accept Code	-.018	.025	-.702	.483
Severity → Intent to Own	-.004	.041	-.106	.916
Optimistic Bias → Intent to Seek	-.038	.045	-.835	.404
Optimistic Bias → Accept Code	.006	.010	.564	.572
Optimistic Bias → Intent to Own	.013	.017	.756	.450
Familiarity → Intent to Seek	.125	.130	.966	.334
Familiarity → Accept Code	.042	.029	1.455	.146
Familiarity → Intent to Own	.071	.047	1.505	.132
Prior Knowledge → Intent to Seek	-.134	.125	-1.071	.284
Prior Knowledge → Accept Code	-.022	.028	-.778	.437
Prior Knowledge → Intent to Own	.009	.046	.201	.841
Overdose Experience → Intent to Seek	-.078	.108	-.724	.469
Overdose Experience → Accept Code	.032	.024	1.340	.180
Overdose Experience → Intent to Own	.059	.039	1.509	.131
Ever Used → Intent to Seek	.046	.201	.229	.819

Table 16 Continued

Ever Used → Accept Code	.125	.044	2.827	.005*
Ever Used → Intent to Own	.074	.073	1.005	.315
Ever Owned → Intent to Seek	.234	.202	1.160	.246
Ever Owned → Accept Code	.043	.045	.961	.337
Ever Owned → Intent to Own	.340	.074	4.596	<.001*
White → Intent to Seek	.117	.461	.253	.800
White → Accept Code	.083	.102	.818	.413
White → Intent to Own	.043	.169	.254	.800
Asian → Intent to Seek	.229	.592	.388	.698
Asian → Accept Code	.175	.131	1.335	.182
Asian → Intent to Own	.106	.216	.491	.623
Black → Intent to Seek	.721	.565	1.275	.202
Black → Accept Code	.117	.125	.936	.349
Black → Intent to Own	.009	.207	.042	.967
Hispanic → Intent to Seek	-.037	.306	-.119	.905
Hispanic → Accept Code	.076	.068	1.125	.261
Hispanic → Intent to Own	-.029	.112	-.260	.795
Female → Intent to Seek	.314	.215	1.462	.144
Female → Accept Code	.067	.047	1.419	.156
Female → Intent to Own	.207	.078	2.642	.008*
Age 55-64 → Intent to Seek	.249	.719	.346	.729

Table 16 Continued

Age 55-64 → Accept Code	-.080	.159	-.501	.617
Age 55-64 → Intent to Own	-.212	.263	-.808	.419
Age 45-54 → Intent to Seek	-.046	.704	-.065	.948
Age 45-54 → Accept Code	-.275	.155	-1.768	.077
Age 45-54 → Intent to Own	-.225	.257	-.873	.383
Age 35-44 → Intent to Seek	.071	.666	.107	.915
Age 35-44 → Accept Code	-.203	.147	-1.380	.167
Age 35-44 → Intent to Own	-.113	.244	-.466	.641
Age 18-24 → Intent to Seek	-.132	.275	-.478	.633
Age 18-24 → Accept Code	-.343	.166	-2.060	.039*
Age 18-24 → Intent to Own	-.345	.753	-.458	.647
Age 25-34 → Intent to Seek	-.100	.243	-.412	.680
Age 25-34 → Accept Code	-.179	.147	-1.223	.221
Age 25-34 → Intent to Own	-.134	.665	-.201	.840

Once the proposed model was tested, the researcher adjusted the model by following the modification indices, covariance estimates, and regression weights. Optimistic bias was removed from the model because it was not a predictor of any behavioral intent variable and because the model fit increased upon its removal. Kenny (2011) suggests that this type of model trimming is appropriate if there is theoretical justification for doing so. Because optimistic bias is not a theoretical construct of the EPPM, its exclusion was validated. Similarly, all demographic controls with the

exception of gender were removed from the model as they were not significant predictors of behavioral intent. Their removal increased the model fit. Three of the five correlates were also removed from the model, including prior knowledge, experience with an overdose event, and prior use. These were removed because of their inability to predict behavioral intent

The SEM modification indices recommended covarying the following sets of variables that were not originally covaried: 1) Severity and Ever Owned, 2) Severity and System-Efficacy, 3) Susceptibility and Ever Owned, 4) Susceptibility and System-Efficacy, and 5) System-Efficacy and Ever Owned. The remaining pairs of variables that were covaried in the proposed model remained significant and covaried in the final model (shown in figure 7). Fit indices (see table 17) covariance estimates (see table 18) and maximum likelihood estimates (see table 19) are reported. All fit indices indicated the data fit the model as the NFI, IFI, and CFI were all above .95 and the RMSEA was below .06 (Hooper, Coughlan, & Mullen, 2008).

The researcher created six groups corresponding to the model to test the hypotheses. These groups include a gain-frame group, a loss-frame group, a threat agency group, a human agency group, a victim label group, and an addict label group. Estimates within each group were compared to the corresponding groups based on the hypotheses. To conclude chapter three, this study was designed to test messages intended to persuade respondents to purchase Narcan nasal spray using the EPPM as a theoretical framework. The resulting survey data were used to address the study's guiding hypotheses and research question. These results are found in chapter four, and implications are discussed further in chapter five.

Table 17 *Fit Indices for Final Model*

Index	Result
NFI	.954
IFI	.982
CFI	.982
RMSEA	.044

Table 18 *Covariance Estimates for the Final Model*

Variables	*Estimate*	*S.E.*	*C.R.*	*p*
Severity <--> Susceptibility	1.529	.145	10.57	<.001*
Severity <--> System-efficacy	.358	.070	5.028	<.001*
Severity <--> Ever Owned	.255	.070	3.627	<.001*
Susceptibility <--> System-efficacy	.286	.071	4.028	<.001*
Susceptibility <--> Ever Owned	.378	.073	5.175	<.001*
Self-Efficacy <--> System-efficacy	.194	.049	3.947	<.001*
Self-Efficacy <--> Response-efficacy	.382	.052	7.298	<.001*
Response-efficacy <--> System-efficacy	.349	.048	7.237	<.001*
System-efficacy <--> Ever Owned	.207	.043	4.816	<.001*
Ever Owned <--> Familiarity	.402	.068	5.865	<.001*

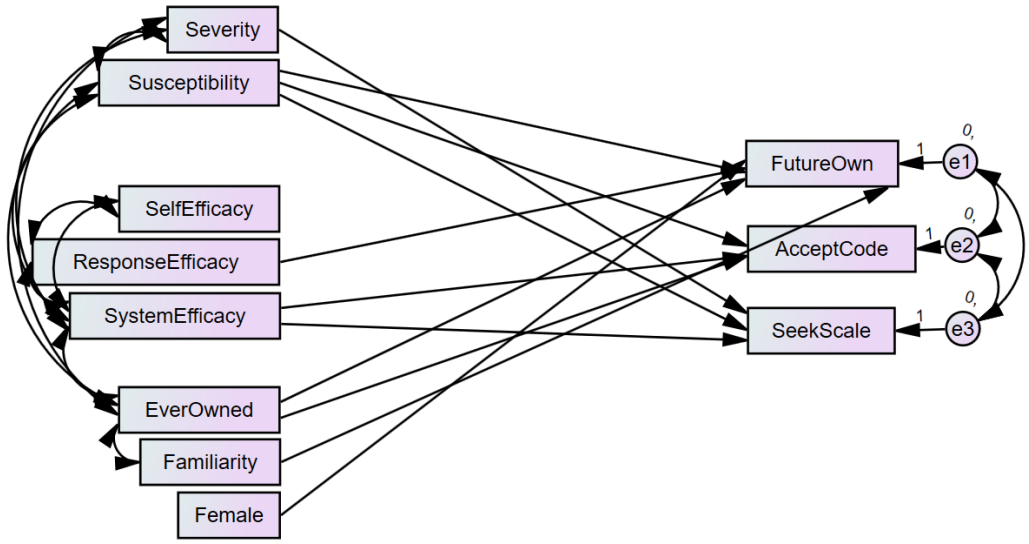

Figure 7. *Final Model*

CHAPTER IV – ANALYSIS

Chapter IV begins with analyses addressing the hypotheses posited in chapter II, followed by analysis responding to RQ1. The sections in this chapter correlate to each hypothesis and research question.

Hypothesis Testing

Hypothesis 1a

Hypothesis 1a stated that perception of 1.) severity, 2.) susceptibility, 3.) self-efficacy, and 4.) response-efficacy would positively predict the respondents' likelihood to accept the discount coupon code for Narcan nasal spray. This hypothesis was only partially supported because not all variables were significant predictors of participants accepting the code. Specifically, severity, self-efficacy, and response-efficacy did not significantly predict coupon code acceptance. However, susceptibility was a significant predictor of code acceptance in the overall model ($\beta = 0.06$, $SE = 0.02$, $p < .001$). Twenty percent of the variance is accounted for by susceptibility ($R^2=0.20$). Specifically, for every increase of a unit of susceptibility, there was a 0.064 unit increase in participants' code acceptance. Therefore, of the four EPPM predicting variables, only high perceptions of susceptibility predicted discount code acceptance.

Hypothesis 1b

Hypothesis 1b stated that perception of 1.) severity, 2.) susceptibility, 3.) self-efficacy, and 4.) response-efficacy would positively predict the respondents' likelihood of seeking more information about Narcan nasal spray. This hypothesis was also only partially supported. Both severity ($\beta = 0.25$, $SE = 0.10$, $p=.014$) and susceptibility ($\beta =$

0.46, SE = 0.11, p < .001) significantly predicted intent to seek more information; neither self-efficacy nor response-efficacy significantly predicted the intent to seek more information. Twenty-six percent of the variance was explained by susceptibility and severity (R^2=0.26). For every unit increase in perceived severity, there was a 0.25 unit increase in one's intent to seek information. Similarly, for every unit increase in susceptibility, there was a 0.46 unit increase in intent to seek information. Therefore, a high threat perception predicted intent to seek more information and a high efficacy perception did not.

Hypothesis 1c

Hypothesis 1c stated that, perception of 1.) severity, 2.) susceptibility, 3.) self-efficacy, and 4.) response-efficacy would positively predict the respondents' belief they will own Narcan nasal spray in the future. This hypothesis was also only partially supported as two of the four variables were not significant predictors. Specifically, susceptibility (β = 0.17, SE = 0.03, p<.001) and response-efficacy (β = 0.13, SE = 0.04, p<.001) were significant predictors of one's intent to own Narcan, while severity and self-efficacy were not significant predictors. Thirty-eight percent of the variance was explained by susceptibility and response-efficacy (R^2=0.38). For every unit increase in perceived susceptibility, there was a 0.17 unit increase in one's intent to own. For every unit increase in response-efficacy, there was a 0.13 unit increase in intent to own.

Table 19 *SEM Final Model Maximum Likelihood Estimates*

Path	*Estimate*	*S.E.*	*C.R.*	*p*
Susceptibility → Accept Code	.064	.017	3.650	<.001*
System-efficacy → Accept Code	.053	.024	2.214	.027*
Ever Owned → Accept Code	.149	.026	5.859	<.001*
Severity → Intent to Seek	.251	.102	2.460	.014*
Susceptibility → Intent to Seek	.461	.105	4.367	<.001*
System-efficacy → Intent to Seek	.355	.107	3.311	<.001*
Susceptibility → Intent to Own	.173	.028	6.224	<.001*
Response-efficacy → Intent to Own	.133	.038	3.479	<.001*
Female → Intent to Own	.132	.065	2.030	.042*
Ever Owned → Intent to Own	.376	.042	8.886	<.001*
Familiarity → Intent to Own	.062	.026	2.393	.017*

Hypothesis 2

Hypothesis 2 stated that when considering the likelihood of loved ones overdosing on opioids, respondents will display optimistic bias. This hypothesis was supported as there was a significant difference (t=9.808, p<.001, d=0.54) between the perceived likelihood of loved ones overdosing (M=3.93, SD=2.84) and the perceived likelihood of external others overdosing (M=5.34, SD=2.40). The results indicate a medium effect size according to Cohen's (1992) suggested standards.

Hypothesis 3a

Because the variable optimistic bias was removed from the overall model, a separate regression analysis was conducted for hypotheses 3a-3c. Hypothesis 3a stated that optimistic bias concerning loved ones overdosing on opioids would lead to significantly lower odds of respondents accepting the discount coupon for Narcan. This hypothesis was supported as the model was significant ($F(1,303)=7.141$, $p<.008$, $R^2=.02$). Optimistic bias was a significant predictor of accepting the discount coupon ($\beta=-.028$, $p=.008$). Specifically, for every unit of optimistic bias, a participant was .028 units less likely to accept the code.

Hypothesis 3b

Hypothesis 3b stated that optimistic bias concerning loved ones overdosing on opioids would lead to significantly lower odds of seeking more information about Narcan. This hypothesis was supported ($F(4,300)=11.759$, $p < .001$, $R2=.14$). Optimistic bias was a significant predictor of a person's intent to seek information ($\beta=-.132$, $p=.006$). Specifically, for every unit increase in optimistic bias, there was a 0.132 unit decrease in intent to seek information concerning Narcan. Additionally, previous ownership of Narcan ($\beta=.567$, $p<.001$) significantly increased one's intent to seek information by 0.567 units. Certain demographic characteristics were also more significant predictors than others. For instance, being African American ($\beta=.962$, $p=.022$) significantly increased one's intent to seek information by 0.962 units. Being female ($\beta=.563$, $p=.016$) significantly increased intent to seek by 0.563 units.

Hypothesis 3c

Hypothesis 3c stated that optimistic bias concerning loved ones overdosing on opioids would lead to significantly lower odds of respondents believing they will own Narcan in the future. This hypothesis was supported as the model was significant ($F(1,303)=15.213$, $p<.001$, $R^2=.05$). Optimistic bias was a significant predictor of respondent's belief that they will own Narcan in the future ($\beta=-.077$, $p<.001$). Specifically, for every unit increase in optimistic bias, there is a 0.077 unit decrease in intent to own Narcan.

Hypothesis 4a

Hypothesis 4a stated that self-efficacy would be a stronger predictor of behavioral intent for respondents receiving the gain-frame message than those receiving the loss-frame message. Self-efficacy was not a significant predictor in either the gain-frame group or the loss-frame group. Therefore, to distinguish between the groups, an independent samples t-test was conducted. The test was not significant ($t=1.207$, $p=.228$) as the gain-frame group ($M=4.74$, $SD=0.96$) did not lead to significantly higher self-efficacy scores than the loss frame group ($M=4.60$, $SD=0.94$). As a result, hypothesis 4a was not supported.

Hypothesis 4b

Hypothesis 4b stated that response-efficacy would be a stronger predictor of behavioral intent for respondents receiving the gain-frame message over those receiving the loss-frame message. Response-efficacy was only a predictor of one behavioral intent variable (intent to own Narcan nasal spray in the future). The hypothesis was not supported. In fact, the opposite of what was predicted occurred. Response-efficacy was a

predictor of intent to own in the loss-frame group (β = 0.64, SE = 0.06, p = .005, R2=0.39), but not in the gain-frame group (β = 0.91, SE = 0.05, p = .077, R2=0.37). The results for gain-frame and loss-frame groups are presented in table 20.

Table 20 *Gain-Frame and Loss-Frame Group Results*

Path	*Estimate*	*S.E.*	*C.R.*	*p*
Gain-Frame				
Susceptibility →Accept Code	.041	.023	1.792	.073
System-efficacy →Accept Code	.035	.032	1.095	.273
Ever Owned →Accept Code	.211	.032	6.527	<.001*
Severity →Intent to Seek	.195	.149	1.313	.189
Susceptibility → Intent to Seek	.333	.154	2.161	.031*
System-efficacy → Intent to Seek	.441	.141	3.123	.002*
Susceptibility → Intent to Own	.157	.037	4.288	<.001*
Response-efficacy → Intent to Own	.091	.051	1.769	.077
Ever Owned → Intent to Own	.344	.053	6.558	<.001*
Familiarity → Intent to Own	.089	.036	2.506	.012*
Female → Intent to Own	.093	.085	1.093	.274
Loss-Frame				
Susceptibility → Accept Code	.094	.026	3.589	<.001*
System-efficacy → Accept Code	.064	.036	1.796	.072
Ever Owned → Accept Code	.075	.040	1.869	.062
Severity → Intent to Seek	.332	.136	2.444	.015*
Susceptibility → Intent to Seek	.570	.142	4.027	<.001*
System-efficacy → Intent to Seek	.317	.158	2.011	.044*
Susceptibility → Intent to Own	.193	.043	4.527	<.001*

Table 20 Continued

Response-efficacy → Intent to Own	.160	.056	2.835	.005*
Ever Owned → Intent to Own	.401	.069	5.847	<.001*
Familiarity → Intent to Own	.048	.037	1.297	.195
Female → Intent to Own	.150	.098	1.538	.274

Hypothesis 5a

Hypothesis 5a stated that the variables of the EPPM (severity, susceptibility, self-efficacy, and response-efficacy) would be stronger predictors of intent to accept the discount code for Narcan in the messages labeling people as "victims" rather than "addicts." Because susceptibility was the only EPPM variable that significantly predicted Narcan code acceptance in the overall model, it was the only variable tested in this hypothesis. Regardless, the hypothesis was not supported; when comparing the regression weights for the two groups, the results were nearly the same for the victim label (β = 0.06, SE = 0.02, p=.010, R^2=0.15) as they were for the addict label (β = 0.07, SE = 0.03, p=.008, R^2=0.24).

Hypothesis 5b

Hypothesis 5b stated that the variables of the EPPM (severity, susceptibility, self-efficacy, and response-efficacy) would be stronger predictors of intent to seek information in the messages labeling people as "victims" over messages labeling them "addicts." Because severity and susceptibility were the only EPPM variables that significantly predicted intent to seek in the overall model, they were the only variables tested for this hypothesis. Regarding severity, the hypothesis was supported. Severity was

a significant predictor of intent to seek more information in the message labeling people "victims" (β = 0.30, SE = 0.15, p=.036, R^2=0.28) and was not a predictor in the message labeling people "addicts" (β = 0.20, SE = 0.14, p=.172, R^2=0.25). With susceptibility, the hypothesis was not supported. Although the regression weights were very close between the two groups, susceptibility was a better predictor in the addict message (β = 0.46, SE = 0.14, p=.001, R^2=0.25) than it was the victim message (β = 0.45, SE = 0.16, p=.004, R^2=0.28). However, the differences are too small to interpret anything meaningful from this finding. Therefore, the hypothesis was only supported regarding the perception of severity.

Hypothesis 5c

Hypothesis 5c stated that the variables of the EPPM (severity, susceptibility, self-efficacy, and response-efficacy) would be stronger predictors of intent to own Narcan in the messages labeling people as "victims" rather than "addicts." This time, only susceptibility and response-efficacy were employed to test the hypothesis because they were the only significant predictors of intent to own Narcan in the overall model. Susceptibility was a significant predictor of intent to own Narcan regardless of how people were labeled. The estimate was slightly higher, albeit not in a statistically meaningful way, in the "addict"-labeled message (β = 0.17, SE = 0.04, p<.001, R^2=0.42) than it was the "victim"-labeled message (β = 0.17, SE = 0.04, p<.001, R^2=0.33).

For response-efficacy, there was a significant difference between labels, but opposite to what was predicted. Response-efficacy was a significant predictor of intent to own Narcan in the group receiving the "addict" message (β = 0.18, SE = 0.05, p<.001, R2=0.42), but response-efficacy was not a predictor in the group receiving the "victim"

message (β = 0.08, SE = 0.05, p=.152, R^2=0.33). Therefore, the hypothesis was not supported, but the finding for response-efficacy was meaningful. The results of the victim/addict labeling models are included in table 21.

Table 21 *Victim Label and Addict Label Group Results*

Path	*Estimate*	*S.E.*	*C.R.*	*p*
Victim Label				
Susceptibility →Accept Code	.061	.024	2.568	.010*
System-efficacy →Accept Code	.056	.032	1.786	.074
Ever Owned →Accept Code	.117	.037	3.142	.002*
Severity →Intent to Seek	.303	.145	2.098	.036*
Susceptibility → Intent to Seek	.447	.155	2.878	.004*
System-efficacy → Intent to Seek	.305	.149	2.043	.041*
Susceptibility → Intent to Own	.166	.040	4.147	<.001*
Response-efficacy → Intent to Own	.078	.054	1.432	.152
Ever Owned → Intent to Own	.418	.065	6.470	<.001*
Familiarity → Intent to Own	.026	.037	0.700	.484
Female → Intent to Own	.052	.091	0.573	.567
Addict Label				
Susceptibility → Accept Code	.067	.025	2.652	.008*
System-efficacy → Accept Code	.049	.036	1.362	.173
Ever Owned → Accept Code	.172	.035	4.859	<.001*
Severity → Intent to Seek	.196	.143	1.366	.172

Table 21 Continued

Susceptibility → Intent to Seek	.464	.143	3.253	.001*
System-efficacy → Intent to Seek	.412	.152	2.722	.006*
Susceptibility → Intent to Own	.168	.039	4.319	<.001*
Response-efficacy → Intent to Own	.183	.053	3.458	<.001*
Ever Owned → Intent to Own	.355	.055	6.407	<.001*
Familiarity → Intent to Own	.081	.035	2.307	.021*
Female → Intent to Own	.188	.091	2.055	.040*

Hypothesis 6a

Hypothesis 6a stated that severity would be a stronger predictor of behavioral intent for respondents receiving the threat agency message than those receiving the human agency message. Because severity was only a significant predictor for intent to seek information about Narcan in the overall model, this relationship was used to test the hypothesis. Hypothesis 6a was supported. Severity was a significant predictor of intent to seek in the threat agency group ($\beta = 0.39$, SE = 0.15, p=.008, R^2=0.29). However, severity was not a predictor in the human agency group ($\beta = 0.18$, SE = 0.14, p=.205, R^2=0.24).

Hypothesis 6b

Hypothesis 6b stated that susceptibility would be a stronger predictor of behavioral intent for respondents receiving the threat agency message than those receiving the human agency message. All three behavioral intent variables were significantly predicted by perception of susceptibility in the overall model and were used

to address this hypothesis. Regarding the Narcan coupon code acceptance, the estimates were extremely close in both groups, with the human agency group (β = 0.07, SE = 0.03, p=.007, R^2=0.16) only slightly higher than the threat agency group (β = 0.06, SE = 0.02, p<.008, R^2=0.26). However, the statistical differences were too small to make a meaningful interpretation. For intent to seek information about Narcan, susceptibility was a stronger predictor in the human agency group (β = 0.52, SE = 0.14, p<.001, R^2=0.24) than the threat agency group (β = 0.34, SE = 0.16, p=.030, R^2=0.29). With intent to own Narcan, perception of susceptibility was slightly higher in the threat agency group (β = 0.14, SE = 0.05, p<.001, R^2=0.35) than it was in the human agency group (β = 0.11, SE = 0.04, p=.006, R^2=0.41). Differences were minimal.

The results are mixed as susceptibility was a stronger predictor of Narcan code acceptance and intent to seek information about Narcan in the human agency group, but a stronger predictor of intent to own in the threat agency group. However, the only intent variable in which there was a large enough difference to make a statistically meaningful interpretation was intention to seek information about Narcan; intention to seek information favored the human agentic message, contradicting the predicted hypothesis. Therefore, hypothesis 6b was not supported. The results for the linguistic agency assignment groups are displayed in table 22.

Table 22 *Linguistic Agency Assignment Group Results*

Path	*Estimate*	*S.E.*	*C.R.*	*p*
Threat Agency				
Susceptibility → Accept Code	.060	.023	2.645	.008*

Table 22 Continued

System-efficacy → Accept Code	.095	.032	2.953	.003*
Ever Owned → Accept Code	.257	.050	5.113	<.001*
Severity → Intent to Seek	.394	.148	2.659	.008*
Susceptibility → Intent to Seek	.344	.159	2.165	.030*
System-efficacy → Intent to Seek	.322	.145	2.215	.027*
Susceptibility → Intent to Own	.225	.038	5.856	<.001*
Response-efficacy → Intent to Own	.141	.052	2.724	.006*
Ever Owned → Intent to Own	.381	.082	4.671	<.001*
Familiarity → Intent to Own	.047	.035	1.359	.174
Female → Intent to Own	.152	.089	1.708	.088
Human Agency				
Susceptibility → Accept Code	.070	.026	2.706	.007*
System-efficacy → Accept Code	.023	.035	0.646	.518
Ever Owned → Accept Code	.116	.031	3.750	<.001*
Severity → Intent to Seek	.180	.142	1.267	.205
Susceptibility → Intent to Seek	.517	.142	3.647	.001*
System-efficacy → Intent to Seek	.399	.158	2.522	.012*
Susceptibility → Intent to Own	.108	.039	2.745	.006*
Response-efficacy → Intent to Own	.129	.055	2.358	.018*
Ever Owned → Intent to Own	.403	.053	7.624	<.001*
Familiarity → Intent to Own	.089	.037	2.419	.016*

Table 22 Continued

Female → Intent to Own	.026	.091	0.289	.773

Hypothesis 7

Hypothesis 7 predicted the perception of system-efficacy would be a positive predictor of behavioral intent. This hypothesis was partially supported. In the final model, the perception of system-efficacy positively predicted both the intent to accept the Narcan discount code ($\beta = 0.05$, SE = 0.02, p=.027, R^2=0.20) and the intent to seek additional information regarding Narcan ($\beta = 0.35$, SE = 0.11, p<.001, R^2=0.26). Specifically, for every unit increase in system-efficacy, there was a 0.05 unit increase in Narcan coupon code acceptance and a 0.35 unit increase in intent to seek more information. The perception of system-efficacy did not predict the intention to own Narcan in the future ($\beta = 0.04$, SE = 0.03, p<.130, R^2=0.05).

Hypothesis 8a

Hypothesis 8a predicted that system-efficacy would be a stronger predictor in the gain-frame group when compared to the loss-frame group. This hypothesis was not supported. There was no meaningful difference in how system-efficacy predicted acceptance of the coupon code between the gain-frame group ($\beta = 0.04$, SE = 0.03, p=.273, R^2=0.27) and the loss-frame group ($\beta = 0.06$, SE = 0.04, p=.072, R^2=0.16). There was also no meaningful difference in how system efficacy predicted intent to seek additional information between the gain-frame group ($\beta = 0.44$, SE = 0.14, p=.002, R^2=0.21) and the loss frame group ($\beta = 0.32$, SE = 0.16, p=.044, R^2=0.34).

Hypothesis 8b

Hypothesis 8b predicted that system-efficacy would be a stronger predictor in the group receiving the message with the "addict" label when compared to the group receiving the "victim" label message. This hypothesis was not supported. There was no meaningful difference in how system-efficacy predicted acceptance of the coupon code between the "victim" group ($\beta = 0.06$, SE = 0.03, p=.074, R^2=0.15) and the "addict" group ($\beta = 0.05$, SE = 0.04, p=.173, R^2=0.24). There was also no meaningful difference in how system efficacy predicted intent to seek additional information between the "victim" group ($\beta = 0.31$, SE = 0.15, p=.041, R^2=0.28) and the "addict" group ($\beta = 0.41$, SE = 0.15, p=.006, R^2=0.25).

Hypothesis 8c

Hypothesis 8c predicted that system-efficacy would be a stronger predictor in the group receiving the threat agency message when compared to the group receiving the human agency message. This hypothesis was partially supported. Perception of system-efficacy significantly predicted Narcan code acceptance in the threat agency group ($\beta = 0.10$, SE = 0.03, p=.003, R^2=0.26) but not in the human agency group ($\beta = 0.02$, SE = 0.04, p=.518, R^2=0.16). This was the only instance where perception of system-efficacy was significantly impacted by a message manipulation. There was no meaningful difference in how system-efficacy predicted intent to seek additional information between the threat agency group ($\beta = 0.32$, SE = 0.15, p=.027, R^2=0.29) and the human agency group ($\beta = 0.40$, SE = 0.16, p=.012, R^2=0.24). All system-efficacy statistics are displayed in table 23.

Table 23 *Results for System-efficacy in Overall Model and Each Group*

Path	*Estimate*	*S.E.*	*C.R.*	*p*
Overall Model				
System-efficacy → Accept Code	.053	.024	2.211	.027*
System-efficacy → Intent to Seek	.355	.107	3.307	<.001*
Gain-Frame				
System-efficacy → Accept Code	.035	.032	1.095	.273
System-efficacy → Intent to Seek	.441	.141	3.123	.002*
Loss Frame				
System-efficacy → Accept Code	.064	.036	1.796	.072
System-efficacy → Intent to Seek	.317	.158	2.011	.044*
Victim Label				
System-efficacy → Accept Code	.056	.032	1.786	.074
System-efficacy → Intent to Seek	.305	.149	2.043	.041*
Addict Label				
System-efficacy → Accept Code	.049	.036	1.362	.173
System-efficacy → Intent to Seek	.412	.152	2.722	.006*
Threat Agency				
System-efficacy → Accept Code	.095	.032	2.953	.003*
System-efficacy → Intent to Seek	.322	.145	2.215	.027*
Human Agency				
System-efficacy → Accept Code	.023	.035	0.646	.518

Table 23 Continued

System-efficacy → Intent to Seek	.399	.158	2.522	.012*

Research Question 1

Research question 1 asked if any other main effects or significant interactions exist for the three message manipulations (gain-frame/loss-frame message manipulation, victim/addict labeling manipulation, and linguistic assignment of agency). Results revealed that the interaction between gain/loss and victim/addict for intent to own were significant ($F(1,297)= 6.510$, $p=.011$). Specifically, participants who read a message with the gain-frame and the "addict" labeling manipulations had significantly higher intent to own Narcan than other combinations (Figure 8).

Results also revealed that the interaction between the "victim/addict" labels and linguistic agency for Narcan coupon code acceptance and intent to own Narcan in the future were significant ($F(1,297)=3.858$, $p=.050$; $F(1,297)=4.166$, $p=.042$). Specifically, participants who received a message with the "addict" label and human agency manipulations were significantly more likely to accept the Narcan discount code (figure 9) and indicate intent to own Narcan nasal spray (figure 10). Finally, the interaction between all three manipulations for system efficacy was significant ($F(1,297)=4.524$, $p=.034$) (Figure 11). Specifically, the message with the loss-frame manipulation, "addict" label, and threat agentic message was significantly higher than the gain-frame, "victim" label, human agentic message.

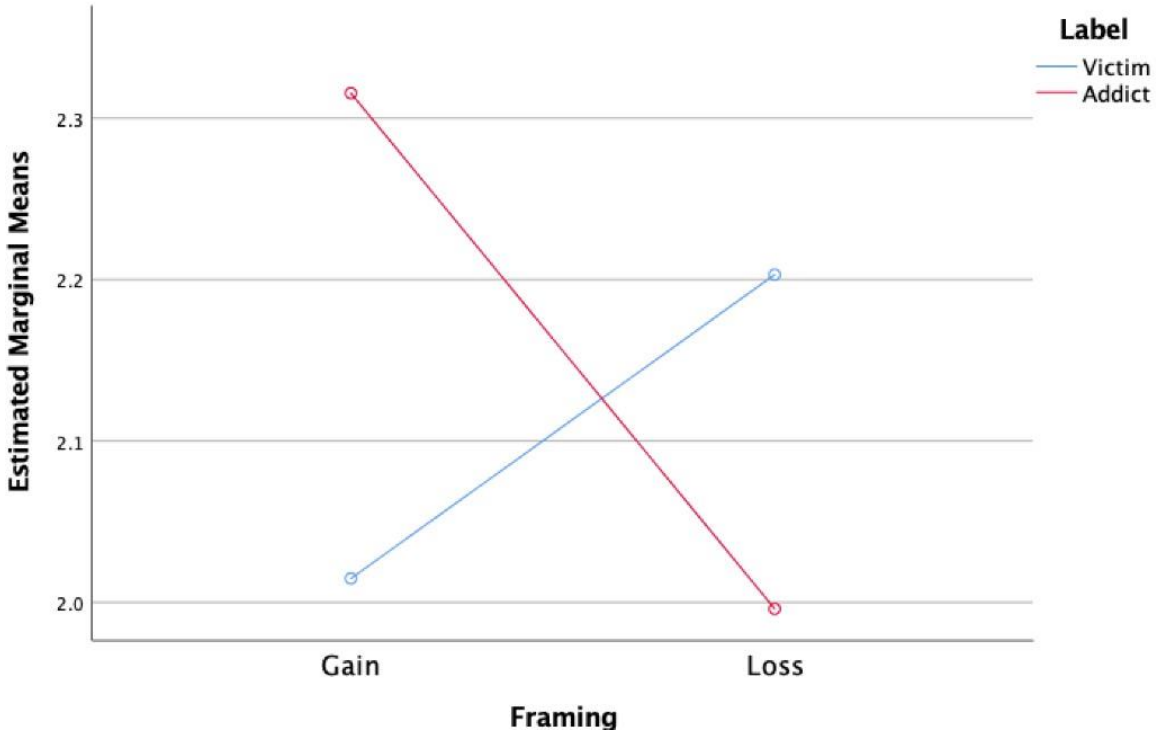

Figure 8. *Framing and Label Interaction Effect on Intent to Own*

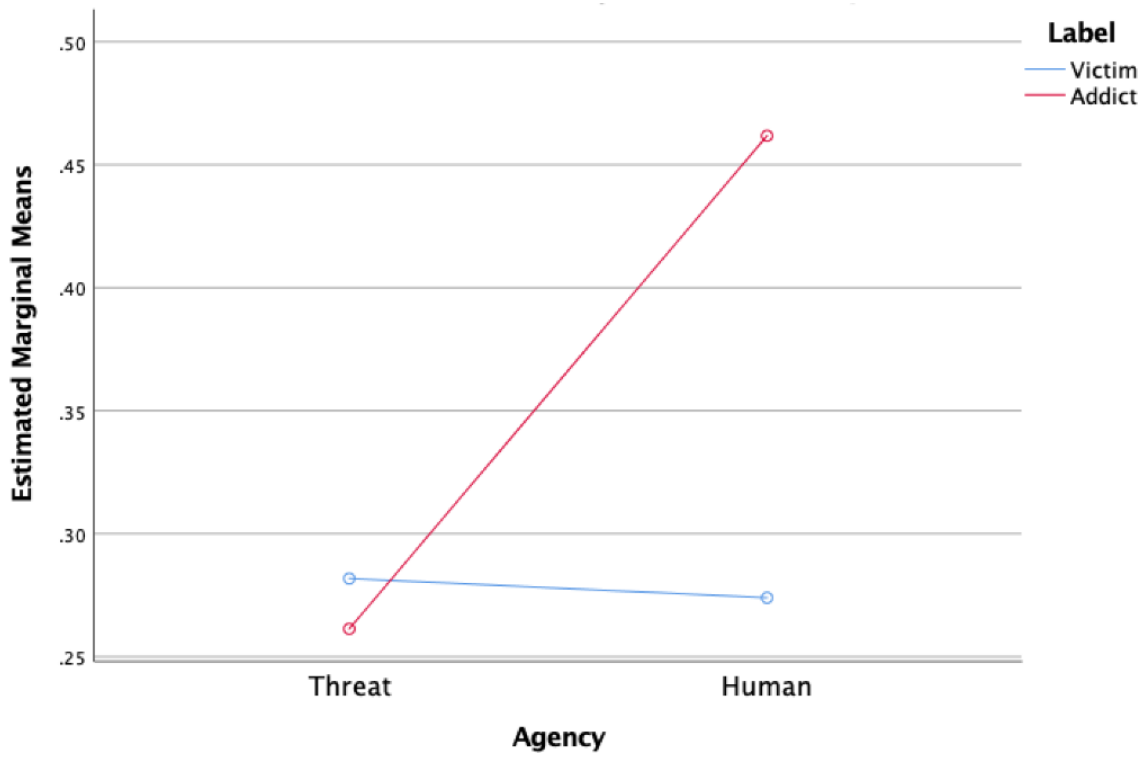

Figure 9. *Label and Linguistic Agency Interaction Effect on Code Acceptance*

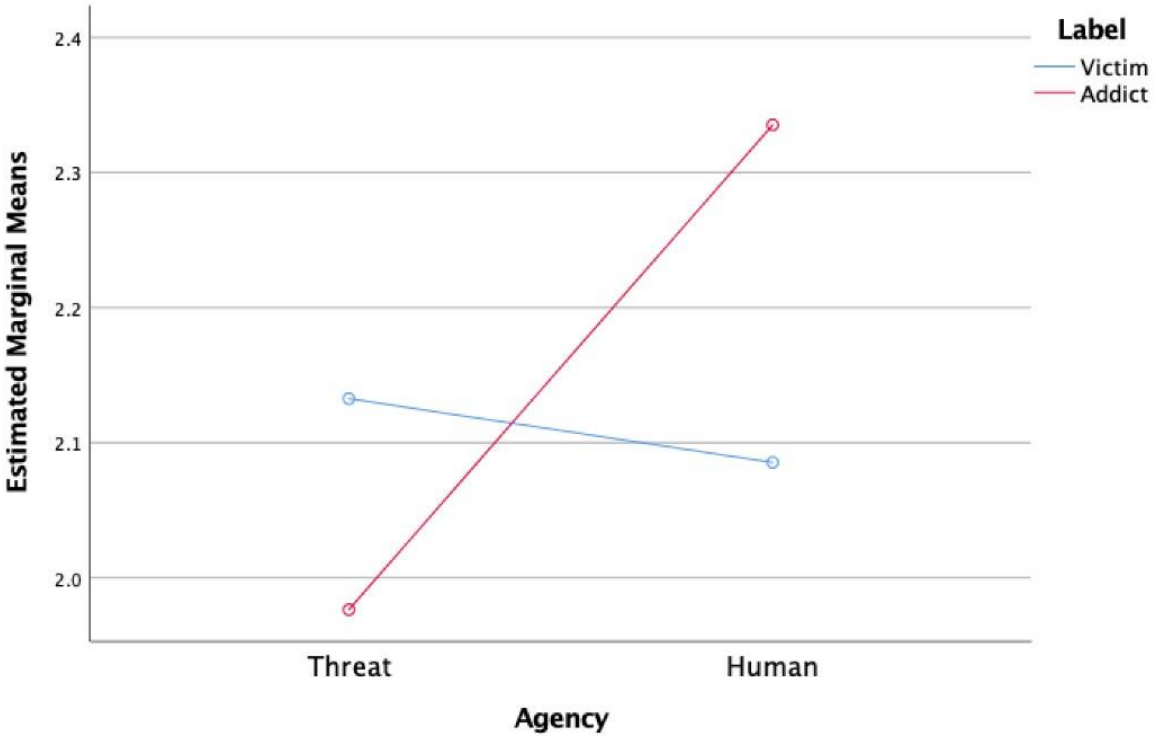

Figure 10. *Label and Linguistic Agency Interaction Effect on Intent to Own*

Several other findings unrelated to the hypotheses emerged when comparing the gain-frame and loss-frame groups. Perception of susceptibility significantly predicted participants' Narcan code acceptance in the loss-frame group ($\beta = 0.87$, SE = 0.26, $p<.001$, $R^2=0.13$) but not in the gain frame group ($\beta = 0.31$, SE = 0.02, $p=.181$, $R^2=0.09$). Also, perception of severity significantly predicted intent to seek more information concerning Narcan in the loss-frame group ($\beta = 0.32$, SE = 0.13, $p=.015$, $R^2=0.27$), but not in the gain-frame group ($\beta = 0.18$, SE = 0.14, $p=.194$, $R^2=0.14$).

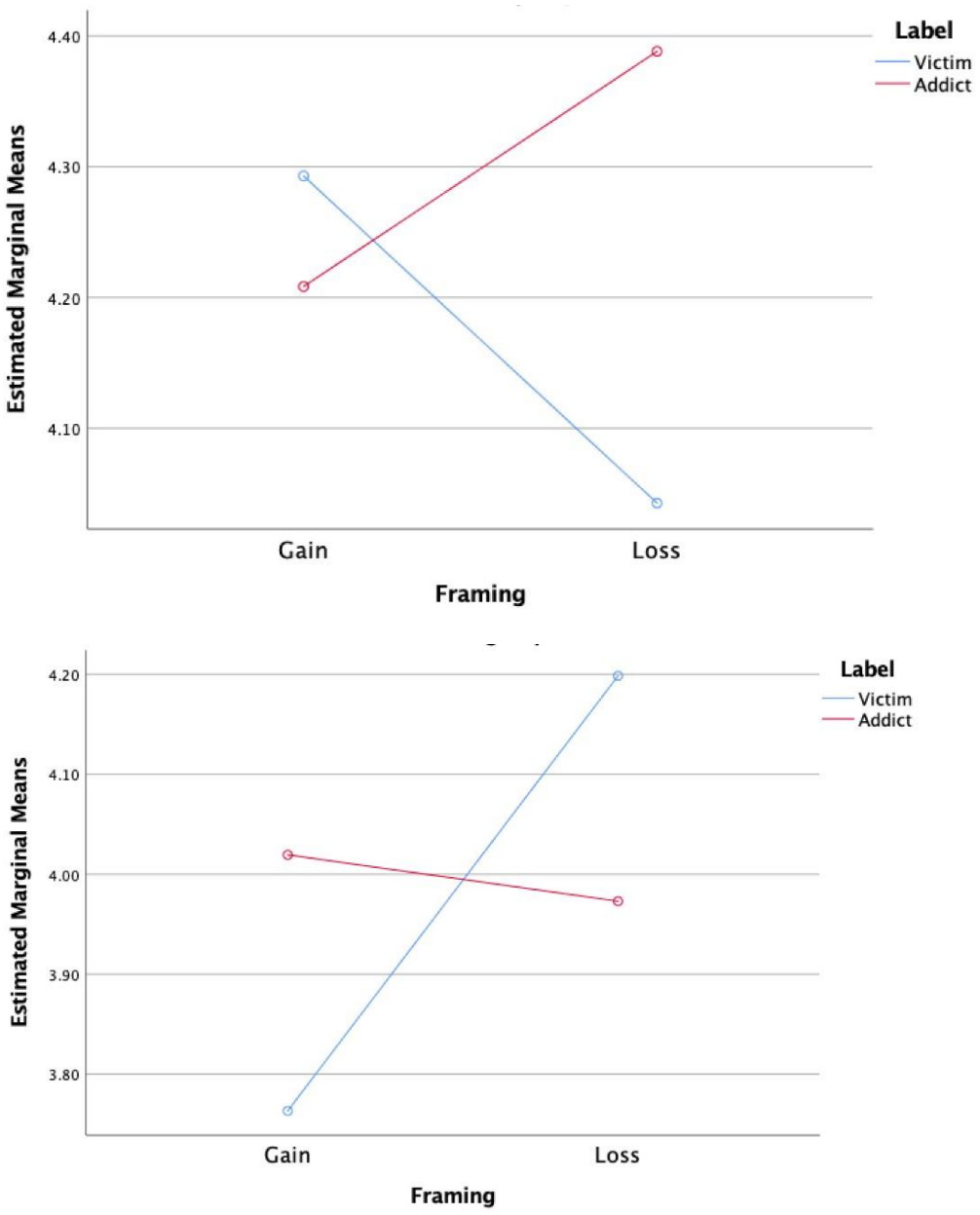

Figure 11. *Label and Gain-Loss Interaction Effect on Agency Plots for System-Efficacy*

Extraneous Variables

Demographics

In the final model, only one demographic (gender) served as a significant predictor. Specifically, female respondents were more likely to indicate a belief that they would own Narcan in the future ($\beta = 0.13$, SE = 0.07, p=.043, R^2=0.38). Other

demographics including age, race, and ethnicity were not significant predictors of any dependent variable, nor did they improve overall model fit.

Correlates

This study controlled for five separate correlates that the researcher anticipated having high likelihood of predicting the dependent variables. Of these, two correlates did in fact significantly predict behavioral intent. Specifically, previous ownership of Narcan predicted intent to own Narcan in the future ($\beta = 0.38$, SE = 0.04, $p<.001$, $R^2=0.38$), as well as discount code acceptance ($\beta = 0.15$, SE = 0.03, $p<.001$, $R^2=0.20$). Also, familiarity with Narcan significantly predicted intent to own Narcan in the future ($\beta = 0.06$, SE = 0.03, $p=.017$, $R^2=0.38$).

CHAPTER V – DISCUSSION

The purpose of this project was to test messages that persuaded people to purchase Narcan nasal spray using the EPPM as the guiding framework. The messages were manipulated three ways, including message framing, labeling, and linguistic agency assignment techniques. Additionally, optimistic bias and system-efficacy were measured and tested alongside the constructs of the EPPM. The discussion of the study results is summarized in the following sections (EPPM, optimistic bias, gain-frame/loss-frame, labeling, linguistic agency assignment, and message manipulation interactions). An exploration of limitations, future research, and concluding thoughts are also included.

The first measure of behavioral intent, which was acceptance or refusal of the coupon code for Narcan nasal spray, was predicted only by susceptibility and system-efficacy. The second measure, intent to seek additional information regarding Narcan, was predicted by severity, susceptibility, and system-efficacy. The third measure, intent to own Narcan in the future, was predicted by susceptibility and response-efficacy. Optimistic bias and self-efficacy did not predict any of the three behavioral intent variables. However, when separate from the other independent variables, optimistic bias predicted all three behavioral intent variables. Message manipulations effects are summarized in table 24.

Table 24 *Message Manipulation Effects*

	Group in which variable is stronger predictor		
Path	Framing	Label	Agency
Susceptibility→Accept Code	Loss-frame	-	-
Susceptibility→Seek	-	-	Human agency
Susceptibility→Future Own	-	-	-
Severity→Seek	Loss-frame	"Victim"	Threat agency
Response Efficacy→Future Own	Loss-frame	"Addict"	-
System Efficacy→Accept Code	-	-	Threat agency
System Efficacy→Seek	-	-	-

EPPM

Susceptibility as the key predictor

Of the predicting variables, only susceptibility was a predictor of all three behavioral intent indicators. System-efficacy successfully predicted two of the three variables, and severity and response-efficacy predicted just one of three. Therefore, susceptibility remains an integral, and perhaps the most integral, part of crafting messages for health communication campaigns. Because an individual is unlikely to heed a recommendation to avoid a danger that they do not think is threatening to them or to their loved ones, messages should focus on perceived susceptibility. As the number of opioid overdoses has risen since the nineties, it is possible that one reason for this

increase is the lack of perceived susceptibility Americans have, especially towards others such as loved ones.

The first proposition of the EPPM claims that a failure to increase threat perceptions will prevent further processing of the message, rendering efficacy perceptions irrelevant (Witte, 1992). Not surprisingly, because susceptibility was the strongest predictor, response-efficacy and self-efficacy were the weakest predictors. This finding also supports Ruiter and colleagues' (2014) argument that susceptibility is more important to overall threat perception than severity. The current study also reveals that perceived threat to others motivates people to act in a similar way as a perceived threat to self (Sampson et al., 2001). In this case, although the message does not focus on the death of the individual receiving the message, it is still effective at motivating them to accept the recommended behavior change.

Threat perception as a predictor of information seeking behavior

The intention to seek additional information about Narcan nasal spray was predicted by high perceptions of both severity and susceptibility. Self-efficacy and response-efficacy were not significant predictors of intention to seek more information. One explanation for this result is that respondents' who already perceived Narcan nasal spray as an efficacious response did not need additional information before deciding whether to heed the recommendation. However, those respondents reporting heightened threat perceptions who were not convinced that Narcan nasal spray was an effective response were left wanting more information than what was given them in the message. This finding reiterates that in order for a message to be completely effective, respondents

should have high perceptions of response efficacy. Simply convincing a person that he is in danger is ineffective by itself.

Response-efficacy as a predictor of intent to own Narcan nasal spray

Response-efficacy was a significant predictor of intent to own Narcan. However, response-efficacy was not a significant predictor of accepting the Narcan discount coupon code. Although participants indicated an intention to own Narcan after reading the messages, the insignificant finding for accepting the Narcan discount code reveals a lack of urgency among respondents who intended to purchase the drug. A possible explanation for this lack of urgency may be weaker perceptions of severity among respondents who reported feeling susceptible. Perceived susceptibility was a significant predictor of intent to own Narcan and intent to accept the Narcan discount code. However, perceived severity predicted neither of the behavioral intention indicators. Therefore, many participants perceived their loved ones susceptible to opioid overdoses while also perceiving Narcan nasal spray as an effective response; however, respondents did not view the threat so severe as to want to purchase the drug immediately. The lack of urgency is problematic because fear appeal messages tend to have weaker impact on long-term behavior (Hastings & Stead, 2004). Participants who reported both an intent to purchase Narcan but a subsequent refusal to purchase immediately will likely never obtain the life-saving medication unless they encounter additional pro-Narcan messages later.

The absence of self-efficacy as a predictor of behavior

The inability of self-efficacy to predict behavioral intention was an unexpected finding, particularly because the EPPM positions self-efficacy as a direct antecedent of

behavioral intention. However, the current study deviates from other studies that measure the relationship between self-efficacy and behavioral intention. In the current study, the danger communicated (loved ones overdosing) was likely perceived as a threat to others and not a perceived threat to self. Although the message attempts to raise the awareness that opioids could harm ‘your loved ones’ and not 'you,’ the unique message manipulation likely affected participants’ perceptions of self-efficacy in an unintended way. These results seem to indicate that if a threat does not impact a person directly, self-efficacy may not play a significant role in his or her behavioral intentions.

Optimistic Bias

The overly optimistic perception of loved ones

Results of the current study confirm what much of the optimistic bias literature posits, which is an overwhelmingly optimistic feeling that loved ones will not overdose on opioids. The unique finding in this study is that optimism was not a perception about oneself, but rather a perception toward others. Therefore, what is the relational “closeness” required for people to feel optimistic bias for others? Do people feel optimistic bias for only loved ones, or can optimistic bias also be experienced for coworkers or simple acquaintances? Instead of viewing optimistic bias as simply ‘me compared to everyone else,’ there may be merit in considering the role of optimistic bias in our relationships with others. Maybe the strongest feelings of optimism are for one’s self, followed by close family, then friends, etc. There is likely some degree of relationship strength (perhaps a simple acquaintance) where we no longer feel optimistic about that person’s susceptibility to a threat.

The exclusion of optimistic bias from the EPPM

When included with the variables of the EPPM (severity, susceptibility, response-efficacy, and self-efficacy), optimistic bias was not a significant predictor of any behavioral intention items. However, optimistic bias by itself significantly predicted all three items rather conclusively. Based on the current study, optimistic bias does not fit in the structure of the EPPM, likely because of its theoretical similarity to susceptibility. In fact, Turner, Skubizs, and Rimal (2011) describe optimistic bias as a difference in perceptions of susceptibility. Therefore, the inclusion of optimistic bias in the EPPM is redundant and unwarranted.

Perhaps the only time that optimistic bias should be used in lieu of the perception of susceptibility is if there is a distinct comparison being made between two individuals or groups. For example, if the purpose of a message was to convince the female population that they are as susceptible to opioid addiction as the male population, then optimistic bias could be used to measure the effectiveness of the message instead of simply the perception of susceptibility. However, when this is not the case, a measurement of optimistic bias is unnecessary.

Optimistic bias as a predictor of behavior

Regardless of its exclusion from the EPPM, optimistic bias alone serves as a significant predictor of behavioral intent. Just as the perception of susceptibility significantly predicted of all three intent variables, so too did optimistic bias when alone. When discussing the opioid crisis., those tasked with communicating the seriousness of the epidemic must convince message recipients that negative side effects of opioids could very well affect them and their loved ones. Additionally, message designers should go a

step further in convincing members of the public that they are not less overdose susceptible when compared with the average person.

Gain-Frame/Loss-Frame

Loss-frame increases response-efficacy perceptions but not self-efficacy perceptions

This study predicted a significant difference in regard to efficacy perceptions between participants receiving a gain-frame message and those receiving a loss-frame message. Previous scholarship indicated that perceptions of efficacy, and self-efficacy in particular, are impacted by whether messages are gain-framed or loss-framed (Van't Riet, Ruiter, Werrij, & De Vries, 2008; Van't Riet, Ruiter, Werrij, & De Vries, 2010; Werrij, Ruiter, Van't Riet, & De Vries, 2011). However, self-efficacy did not predict behavioral intention in the current study; only the path from response-efficacy to intention to seek additional information was statistically significant. Perhaps if self-efficacy had remained a statistically significant predictor in the model, message framing may have impacted its predictive strength. Regardless, the results of this study show that framing a message in terms of potential losses will increase the predictive power of response-efficacy.

Using a loss-frame impacts perceptions of threat

One important finding that resulted from the framing manipulation was that threat perceptions predicted behavioral intent better in the loss-frame group. Specifically, the path from perceived susceptibility to Narcan coupon code acceptance and the path from severity to intent to own Narcan were statistically significant only in the loss-frame group. One explanation for this finding is that loss-frame messages may have made death seem like a more likely outcome because it emphasized the likelihood of it actually happening (i.e. "he or she will likely die"). Also, a sense of urgency was likely

communicated better in the loss-frame message as well (i.e. “Your loved one could be next”). When attempting to increase the perception of danger concerning opioids, a message designer should have more success if he or she emphasizes potential losses rather than the possibility of avoiding the loss. It is important to note here that this may not have been the case if a desirable kernel state had been used in the messages as opposed to the undesirable kernel state.

The model fit is better in the loss-frame message

Overall, the model was more effective at predicting behavioral intent in the loss-frame message. This finding may be explained through considering message kernel states. The researcher decided to only employ an undesirable consequence as the kernel state in both the gain-frame and loss-frame messages. The result of purchasing or not purchasing Narcan nasal spray resulted in either a negative event happening (loved one dying) or a negative event not happening (loved one not dying). A desirable consequence was never used as the kernel of the message, as there are practically no desirable consequences of purchasing Narcan other than the avoidance of negative consequences.

However, looking past the potential limitation of only having one kernel state, the EPPM posits that if threat perceptions are low, then no further processing of the message will occur. The threat perceptions were significantly worse predictors of behavioral intent in the gain-frame message. Therefore, many respondents who received the gain-frame message likely did not completely process the fear appeal. At first glance, this appears to run contrary to the assumptions of prospect theory which posit that people will choose options that present the potentials gains rather than potential losses (Tversky & Kahneman, 1981). However, the potential gains likely need to be more compelling than

simply avoiding negative consequences. Perhaps an absence of loss does not constitute a gain. If this is true, then a message focused on saving a life, like the gain-frame messages used in this study, should not be considered a gain-frame message because it does not have tangible gains. Maybe instead, it should be considered a framing technique that focuses on maintaining the norm.

Labeling

The ability of the 'victim' label to increase severity perceptions

Severity was a significant predictor of behavioral intent only in messages employing the term "victim" rather than "addict." Of the two labels, "victim" appears to be less stigmatizing; being deemed a "victim" implies a lack of control over the situation. Pragmatically, "victim" is a word usually employed only in serious situations of harm or injury. For example, persons suffering from domestic abuse are often called victims, but a child kicked by another child at recess would likely not be described as a "victim." Therefore, messages employing the "victim" label will likely lead to higher perceptions of severity.

The Ability of the 'Addict' Label to Increase Response-Efficacy Perceptions

Although messages employing the term "victim" were helpful in increasing perceived severity, response-efficacy was only a predictor of behavioral intention in messages employing the term "addict." The label "addict" was intended to be a more stigmatizing label. Being labeled an "addict" implies both personal responsibility and a lack of individual control. Interestingly, the "addict" label appeared to cause the audience to perceive that Narcan nasal spray was an effective response to an overdose, more so than the "victim" label. This may be because of the sense of finality that the word victim

connotes. As discussed above, the term victim is usually reserved for serious incidents that likely have already taken place. A victim may be perceived as already being dead for instance. Narcan, in this case, would not be an effective remedy. However, labeling someone an addict does not similarly indicate that it is too late, or that he has already passed away. If the addict is still alive, then being prepared with Narcan in case he does overdose would appear to be an efficacious response.

Labels should be carefully considered based upon intended perception

With severity and response-efficacy having mixed results in terms of labeling, the question remains as to which label should be used when designing messages. The answer, according to the data from this study, is that they should be interchanged depending on the purpose of each statement within the message. Statements trying to invoke a sense of danger should use the "victim" label (i.e. everyone around you is a potential victim to the opioid crisis). Statements trying to invoke a sense of efficacy should use the "addict" label (i.e. Narcan nasal spray can revive addicts who have overdosed). For instance, a situation where the intended audience likely knows little about the dangers of opioids, such as adolescents, would need to be convinced of the severity of the threat. Conversely, first responders may need only to be convinced of the effectiveness of Narcan. The label used should be dependent on the purpose of the message and which audience perceptions are desired. Further research should confirm that this strategy is effective.

Linguistic Agency Assignment

The perception of severity is higher in threat agentic messages

As anticipated, severity was only predictive of behavioral intent when agency was assigned linguistically to the threat (i.e. "opioids killed" instead of "Americans died").

This adds to the body of literature that argues linguistically assigning a threat with agency, rather than a human, prompts readers to perceive the threat as more serious and will likely cause them to be more supportive of actions protecting the public from the threat (McGlone, Bell, Zaitchik, & McGlynn III, 2013; Bell, McGlone, & Dragojevic, 2014a; Bell, McGlone, & Dragojevic, 2014b; Dragojevic, Bell, & McGlone, 2014; Glowacki, McGlone, & Bell, 2016). This reinforces the argument that linguistic agency assignment is a significantly effective tactic at persuading people that a threat is harmful. This is very useful for agencies or communication practitioners who have the task of convincing others to act in potentially harmful situations. For example, communities that have experienced a high number of hurricane warnings may be harder to motivate to evacuate because of low threat severity perceptions (Anthony & Sellnow, 2011).

The perception of susceptibility in human agentic messages predicts information seeking behavior

While the current findings regarding severity align with past research, the current findings for susceptibility are at odds with many previous studies. In the current study. susceptibility was revealed a stronger predictor of behavioral intent in messages where agency was linguistically assigned to humans. Chen, McGlone, and Bell (2015) also found agency assignment to humans, rather than to colon cancer, elevated perceptions of susceptibility. Chen et al. (2015) argued, “This unexpected finding might be explained by the locus of the threats studied to date” (p. 984). They continue, “Bacteria, viruses, and radon gas emanate from outside people and come to them to produce harm. In contrast, colon cancer originates from within the person; indeed, the threat is the person’s own mutating cells” (p. 984).

The findings of the current study lend support to Chen et al.'s (2015) use of locus as the predictor of perceptions of susceptibility. While opioids do not originate in the human body like cancer cells, individuals make the decision to consume opioids, whether prescription or illicit. Addiction can also be considered an internal threat. Additionally, those who are addicted to opioids may take doses that they know are dangerous. The decision to use the drug recreationally or take a dosage higher than recommended is made internally. On the other hand, a bacterium, virus, or radon gas can endanger unsuspecting individuals without any action taken or consent provided by the person. Instead, the current study focuses on addiction and the conscious decision made by individuals who knowingly risk ingesting opioids.

System-Efficacy

The perception of system-efficacy is a strong predictor of behavior

Although not an original construct in Witte's (1992) EPPM, the perception of system-efficacy served as a strong predictor of behavioral intent in the current study. As discussed above, system-efficacy was significant in the final model while self-efficacy was not a significant predictor of behavioral intent. This finding is noteworthy for future EPPM studies. While the current study is not arguing for system-efficacy to replace self-efficacy as a staple construct in the EPPM, our findings suggest when a perceived threat is more likely to affect individuals external to the individual, such as loved ones, system-efficacy is a better predictor of behavioral intent than self-efficacy. For example, if the messages in this study had attempted to persuade readers to dispose of old opioid to avoid potential self-harm, perhaps self-efficacy would have been a stronger predictor of

behavioral intention than system-efficacy. However, because the potential threat was the death of a loved one, self-efficacy was no longer salient to the participants.

To better understand how system-efficacy affected the outcome variables in this study, it is imperative to understand what respondents perceived as "the system". The system in this case, based upon the items from the survey, represented several different entities that can serve to protect loved ones, including organizations or agencies that want to protect the public from the opioid crisis, the government, friends and family, pharmaceutical researchers, and scientists. It was respondents' perceptions of these entities, and their ability to protect the respondents' loved ones, that made up the perception of system-efficacy.

The lack of salience of self-efficacy among participants may have resulted from the little control individuals perceive they have in protecting loved ones. For instance, if a mother sends her child to school on the bus, she has lost the ability to protect the child from harm during the commute to school; she now must rely on a variety of others to protect the child, including the bus driver, school teachers, and even other children. The likelihood of the child's safe return home is completely out of the control of the mother, and her perception and confidence that her child will return safely can be operationally defined as system-efficacy. In the context of health communication campaigns, if the recommended behavior or attitude change is intended to protect others from a threat rather than oneself, an emphasis on system-efficacy in campaign messages may serve as a stronger predictor of intention to accept the recommendation than self-efficacy.

Threat agentic messages increase the power of system-efficacy perceptions

The threat agentic message rather than the human agentic message was the only message manipulation that significantly increased perceptions of system-efficacy. Giving opioids agency resulted in system-efficacy being a predictor of behavioral intent. Threat agency language removes the power of action from the individual, and as explained in the example of the mother sending her child to school, when a person perceives that she has lost personal control, she will tend to rely more heavily on the greater system. Therefore, the finding of threat agentic messages increasing system-efficacy perceptions further advances the importance of using system-efficacy over self-efficacy when the message communicates a threat to others.

Message Manipulation Interactions

System-efficacy thrives in the loss-frame/addict/threat agency message

Three significant interactions were found between message manipulations. The first interaction, and the only one that included a combination of all three manipulations, revealed that the loss-frame/"addict" label/threat agentic (LAT) message resulted in the highest perceptions of system-efficacy. This finding supports the argument for the inclusion of system-efficacy when the threat affects the individual indirectly. When the danger is a perceived threat to others and not to the self, system-efficacy is more important than self-efficacy in predicting behavioral intent. In the LAT message, all three manipulations take control away from the individual. While the loss-frame message likely produces images of overdosed, and even dead loved ones, the addict label likely conjures images of helpless loved ones. Additionally, using threat agency takes ability away from the human. All three message characteristics take power away from the

message recipient. Therefore, they must put their trust in the hands of the system, rather than themselves. This could explain why the LAT message led to the highest levels of perceived system-efficacy.

The 'addict' label in a gain-frame message significantly increases intent to own Narcan

The second interaction was between "addict" and "victim" labeling and gain-frame/loss-frame messages. Behavioral intent was significantly increased when the "addict" label was employed in a gain-frame message. An example phrase employing both tactics is, "you can save the life of an addict by using Narcan nasal spray." As mentioned above, response-efficacy was significantly increased in the "addict" labeled messages. The combination of the heightened response-efficacy perception (through the "addict" label) with the perception of a positive outcome (resulting from gain-framing) resulted in a significantly higher likelihood of intending to own Narcan nasal spray.

The interaction effects between the "addict" label and gain-frame messages deviates from the main effects of the study because on the whole, the loss-frame message was more likely to increase behavioral intent than the gain-frame message. When combined with the "addict" label however, the gain-frame message was more salient. There may be an incongruency between the "victim" and the gain-frame message. The "victim" label implies the negative event has already happened and saving him is less likely to happen. Alternatively, the "addict" can still be saved, and has not yet become a victim through overdosing on opioids, and possibly even death.

The 'addict' label in a human agency message significantly increases intent to own and accept the discount code for Narcan

The final significant interaction occurred in the messages employing the "addict" label in human agentic phrasing (i.e. when addicts ingest too many opioids, their breathing is suppressed, and they suffocate). The notion that opioids independently caused the overdose (threat agency) and the idea of the individual's addiction causing the overdose ("addict" label) are mutually exclusive. Giving opioids agency in suffocating a person positions the drugs as an active assailant and the individual as a victim rather than an addict. This contradiction of responsibility may negatively impact the processing of the message, and ultimately, the perceptions of threat and efficacy. To avoid this, a message that employs the victim label should be ascribing agency to the threat. Further research should seek to better understand this finding.

Demographics

Gender predicts intent to own Narcan

As the only demographic variable that predicted behavioral intent, female participants were significantly more likely to indicate an intent to own Narcan in the future. One potential explanation for this finding is gender and risk aversion. Rosen, Tsai, and Downs (2003), for example, found female participants to have significantly higher rates of risk aversion than male participants when imagining different health states. Therefore, a stronger desire to avoid health risks among female participants could certainly explain the higher intent to own Narcan.

Limitations

One limitation of the current study was that all messages had an undesirable consequence kernel state, regardless of whether a gain-frame or loss-frame was employed. This decision was made because loss of life (or preventing loss of life) is the primary reason that Narcan is ever used in overdose situations. Therefore, only the undesirable kernel state was used.

Second, although reading checks, attention checks, and time requirements were implemented to protect the dataset from "careless" participants, there still may have been a small number of respondents who took the survey with some degree of carelessness. There is a possibility that some participants read only the parts of the message that they needed to answer the reading check questions correctly. However, even if the minimal amount of reading was done, the checks ensured that all manipulations were read and processed.

Third, because participants across the United States were sampled, there was likely a difference in perception of the opioid crisis between participants prior to taking the survey. For example, participants from the Midwest or Southeast, areas of the country where the epidemic has hit the hardest, and participants from the West Coast may have had different initial perceptions of severity and susceptibility before reading the study message. Location was not controlled for in the analysis, and therefore could have impacted the results to some degree.

Fourth, only two labels were used to test stigmatization through language. While "victim" and "addict" certainly shed light on this discussion, several other labels could have been used such as "user", and "abuser", or even more extreme labels such as

"crackhead". There are many ways that individuals who abuse opioids can be negatively stigmatized through language, and each may affect message processing in a different way. In order to get a firm grasp on how stigmatizing labels impact perceptions of individuals who have overdosed, a broader pool of labels need to be tested.

Future Research

Based on the results of the current study, five areas for potential future research are offered. First, one of the primary findings of the current study is that system-efficacy is a better predictor of behavioral intention than self-efficacy when the danger is perceived more as a threat to others than a threat to oneself. Additional studies should further investigate the difference between perceptions of system-efficacy and self-efficacy, and in what circumstances system-efficacy may be a better predictor of behavior. For instance, two fear appeal messages focused on the same threat could be helpful in this endeavor. If one message positioned the threat as affecting others (external to the individual) while the other positioned the threat as directly affecting the individual, the researcher could then compare the two groups.

A second argument requiring further research focuses on the interplay of levels of optimistic bias and the degree of relationship. Based on the findings of the current study, if a less intimate relationship exists between the respondent and the person in danger, the optimistic bias should be lower. Alternatively, if the relationship is more intimate, individuals will experience higher levels of optimistic bias when confronted with potential threats to persons close to them. Future research should measure optimism for one's self, optimism for family members, optimism for friends, optimism for co-workers, and so on. Results could determine if optimistic bias increases with intimacy.

Third, the current study revealed the "addict" label increased perceptions of response-efficacy among respondents while the "victim" label increased perceptions of severity. It was argued in this study that both labels should be employed in the appropriate places throughout the message to increase both perceptions. However, it is unknown if there would be unintended consequences of doing so. For instance, if a message labeled people as victims in one sentence and addicts in another, the processing of both labels may interact negatively, decreasing behavioral intent likelihood. Therefore, a message should be created using this strategy to see if the results play out as anticipated, or if the negative interaction occurs.

Finally, the interaction between the "addict" label and the human agentic message resulted in a higher intent to change behavior. The two possible explanations hypothesized here include 1) the idea that addiction as the cause and opioid agency as the cause are mutually exclusive, and 2) that the "addict" label and the human agency message independently raised susceptibility. Further research should attempt to clarify which hypothesis is a better explanation. How these language variables interact needs to be parsed out further.

Conclusion

The purpose of the current study was to identify message strategies for persuading people to purchase Narcan. Based on the findings from this study, a final version of the message was created with the recommended characteristics (Figure 12). In instances where the message should increase threat perceptions, a loss-frame is employed (i.e. "opioid victims are dying"). The "victim" label is used in instances where perceptions of severity should be increased (i.e. "Opioid pills and heroin killed over 63,000 victims").

The “addict” label is used in instances where response-efficacy should be increased (i.e. “When an addict has overdosed, spray Narcan into their nostrils or they could die”). Threat agency assignments are made in instances where severity is to be increased (i.e. “An opioid overdose occurs when opioids take over the brain and suffocate the victim”). And human agency assignments are made in instances where susceptibility is to be increased (i.e. “People from all genders, races, and classes are overdosing on opioids”). This message represents the practical implications of this study.

Theoretical implications affect several areas of research. System-efficacy and its possible inclusion in the EPPM under certain circumstances is an impactful finding. This increases scholarly understanding of how risk messages are processed, and what communication variables impact behavior. The way people are labeled and stigmatized in messages does carry consequences for message processing as well. Finally, the study sheds additional light on the way linguistic agency assignments impact perceptions of susceptibility. Specifically, a threat’s perceived locus may prevent threat agentic assignments from increasing susceptibility.

In conclusion, the opioid crisis that has plagued America for over three decades has only become a larger problem with an increasing number of casualties. It will take a concentrated effort from every corner, including prescription and pharma regulation, addiction recovery, first response efforts, and more. What cannot be overlooked or understated is the importance that communication campaigns can have in reversing the epidemic. Education and awareness are at the heart of any public health initiative. The crisis will likely never be resolved without a better public understanding of the tools (such as Narcan) that are available to reconcile the issue. The results of this study can

inform message design for such campaigns. A knowledge of how small but important message characteristics, such as labels, agency, and framing, can impact threat and efficacy perceptions can significantly improve campaign outcomes. It will be attention to details, such as campaign messages and how they're presented, that can save lives and end the opioid epidemic.

Figure 12. *Final Message with Study Recommendations*

APPENDIX A – SURVEY INSTRUMENT

Reading Validity Check Questions

1. In the message above, what does the second line that is written in black say?

    Answer options dependent on message assigned

2. How many victims does the message say were killed by opioid pills and heroin in 2016?

    a. Over 12,000 b. Over 5,000 c. Over 63,000

3. In the message above, what does the first line that is written in pink say?

    Answer options dependent on message assigned

Attention Validity Check Question

1. I am taking a survey.

    1 (Strongly Disagree) – 6 (Strongly Agree)

Optimistic Bias Items

1. What are the odds that one of your loved ones will overdose on opioids or heroin?

    0 (Not likely at all) - 10 (Extremely likely)

2. What are the odds of that the average person will overdose on opioids or heroin?

    0 (Not likely at all) - 10 (Extremely likely)

Self-Efficacy Scale

1. Narcan nasal spray is easily available to me.

    1 (Strongly Disagree) - 6 (Strongly Agree)

2. I have the ability to use Narcan nasal spray if required.

    1 (Strongly Disagree) - 6 (Strongly Agree)

3. There is nothing preventing me from using Narcan nasal spray.

1 (Strongly Disagree) - 6 (Strongly Agree)

4. Narcan nasal spray is easy to use.

Response-efficacy Scale

1. Narcan nasal spray will prevent the death of a loved one who has overdosed.

1 (Strongly Disagree) - 6 (Strongly Agree)

2. My loved ones are less likely to die from an overdose if I have Narcan nasal spray.

1 (Strongly Disagree) - 6 (Strongly Agree)

3. Narcan nasal spray is effective in ending the threat of a loved one dying from an overdose.

1 (Strongly Disagree) - 6 (Strongly Agree)

4. If someone has overdosed on opioids, I believe Narcan nasal spray can save them.

1 (Strongly Disagree) - 6 (Strongly Agree)

System-efficacy Scale

1. I believe there are organizations or agencies that want to protect me from the opioid crisis.

1 (Strongly Disagree) - 6 (Strongly Agree)

2. The government will help me respond to the opioid crisis.

1 (Strongly Disagree) - 6 (Strongly Agree)

3. My friends and family will protect me from the opioid crisis.

1 (Strongly Disagree) - 6 (Strongly Agree)

4. Pharmaceutical researchers and scientists want to protect me from the opioid crisis.

1 (Strongly Disagree) - 6 (Strongly Agree)

Threat Severity Scale

1. Opioids pose a serious risk to my loved ones.

    1 (Strongly Disagree) - 6 (Strongly Agree)

2. Opioids are potentially harmful to my loved ones.

    1 (Strongly Disagree) - 6 (Strongly Agree)

3. Opioids are a severe threat to my loved ones.

    1 (Strongly Disagree) - 6 (Strongly Agree)

4. My friends could die from using opioids.

    1 (Strongly Disagree) - 6 (Strongly Agree)

Threat Susceptibility Scale

1. My loved ones are at risk for being an opioid overdose victim.

    1 (Strongly Disagree) - 6 (Strongly Agree)

2. It is possible that one of my loved ones will overdose on opioids.

    1 (Strongly Disagree) - 6 (Strongly Agree)

3. I believe that one of my loved ones could be a victim of the opioid crisis.

    1 (Strongly Disagree) - 6 (Strongly Agree)

4. An opioid overdose could happen to one of my loved ones.

    1 (Strongly Disagree) - 6 (Strongly Agree)

Behavioral Intent

1. Helprx.info is currently offering a 75% off coupon for Narcan. Would you like a link to this offer?

    Yes No

2. Do you think you will ever own Narcan nasal spray?

Definitely Not Probably Not Probably Yes Definitely Yes

3. Do you plan on seeking more information about opioids or Narcan nasal spray?

Definitely Not Probably Not Probably Yes Definitely Yes

4. How likely are you to seek information about Narcan nasal spray?

1 (Extremely unlikely) - 7 (Extremely likely)

Correlates

1. Have you ever owned Narcan nasal spray?

Definitely Not Probably Not Probably Yes Definitely Yes

2. Have you ever used Narcan nasal spray?

Definitely Not Probably Not Probably Yes Definitely Yes

3. Has someone close to you ever overdosed on opioids or heroin?

Definitely Not Probably Not Probably Yes Definitely Yes

4. Before taking this survey, did you know what Narcan nasal spray was?

Definitely Not Probably Not Probably Yes Definitely Yes

5. How familiar were you with Narcan nasal spray prior to taking this survey?

1 (Not familiar at all) - 5 (Extremely familiar)

Demographics

1. What best describes your sex?

Male Female Other or prefer not to disclose

2. What best describes your race?

White

Black or African American

Asian

American Indian or Alaska Native

Native Hawaiian or Pacific Islander

Other

3. What best describes your age?

18-24 25-34 35-44 45-54 55-64 65-74 75+

Figure A1. *Gain-Frame/Addict/Human Agency Message*

Figure A2. *Gain-Frame/Addict/Threat Agency Message*

Figure A3. *Gain-Frame/Victim/Human Agency Message*

Figure A4. *Gain-Frame/Victim/Threat Agency Message*

Figure A5. *Loss-Frame/Addict/Human Agency Message*

Figure A6. *Loss-Frame/Addict/Threat Agency Message*

Figure A7. *Loss-Frame/Victim/Human Agency Message*

Figure A8. *Loss-Frame/Victim/Threat Agency Message*

APPENDIX C – IRB APPROVAL LETTER

Office *of*
Research Integrity

THE UNIVERSITY OF SOUTHERN MISSISSIPPI

118 COLLEGE DRIVE #5125 • HATTIESBURG, MS | 601.266.6576 | USM.EDU/ORI

NOTICE OF INSTITUTIONAL REVIEW BOARD ACTION

The project below has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services regulations (45 CFR Part 46), and University Policy to ensure:

- The risks to subjects are minimized and reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered involving risks to subjects must be reported immediately. Problems should be reported to ORI via the Incident template on Cayuse IRB.
- The period of approval is twelve months. An application for renewal must be submitted for projects exceeding twelve months.

PROTOCOL NUMBER: IRB-18-192
PROJECT TITLE: Designing Messages for the Opioid Crisis using the EPPM.
SCHOOL/PROGRAM: School of COMM
RESEARCHER(S): Braden Bagley, Kathryn Anthony

IRB COMMITTEE ACTION: Exempt
CATEGORY: Exempt

Category 2. Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

APPROVED STARTING: March 7, 2019

Donald Sacco Jr.

Donald Sacco, Ph.D.
Institutional Review Board Chairperson

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