Dismantling The Art Of Deception: Using "inoculation" To Combat Misinformation From Misleading Cigarette Advertising

Stefanie Kristen Gratale

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Dismantling The Art Of Deception: Using "inoculation" To Combat Misinformation From Misleading Cigarette Advertising

Abstract

Dismantling the art of deception: using “inoculation” to combat misinformation from misleading cigarette advertising

Stefanie K. Gratale
Joseph N. Cappella

Misinformation is a growing concern in the public health realm, as it is persistent and difficult to correct. One strategy recently considered to address misinformation is “inoculation”, which leverages forewarning and refutation to defend against a subsequent persuasive message. Here, I aimed to assess whether inoculation can be harnessed to forestall implicitly arising misinformation such as that from misleading natural cigarette ads, which have been shown to prompt widespread misbeliefs. I conducted three randomized online experiments assessing means of inoculating against misinformation. The first tested inoculation tactics to determine whether particular message formats are more effective (i.e., exemplar, narrative, or exposition), and to assess whether inoculations must refute the exact arguments from the misinformation or can more generally match argument themes. The second study tested an attenuated generic versus a specific refutation, and explored results over time. The final study focused on a particular inoculation strategy – highlighting prior deceptive messaging by the persuasive source. Results indicate that inoculations can successfully defend against misinformation from misleading ads; further, they do not need to match exact arguments or even exact themes from the arguments in order to reduce misbeliefs. In fact, high level, generic refutations successfully reduced misbeliefs both immediately and with a time delay, and, crucially, so too did inoculations that included an explicit forewarning but only an implicit refutation. Furthermore, multiple inoculation message formats were successful, and the effectiveness of inoculations was enhanced, to a limited degree, by identifying prior deceptive messaging by the persuasive source. Finally, findings supported counterarguing as a potential mediator of effects of inoculation messages on misbeliefs. The significance of the results here lies in their support for key inoculation components – forewarning and refutation – as well as the much-hypothesized mechanism of counterarguing, when attempting to combat misinformation. The core contribution of these studies is the consistent finding that we can successfully inoculate against implicit misinformation without directly addressing the exact misinformation claims, which is particularly important with implicitly arising, often difficult-to-anticipate misbeliefs from misleading advertising.

Degree Type
Dissertation

Degree Name
Doctor of Philosophy (PhD)

Graduate Group
Communication

First Advisor
Joseph N. Cappella
Keywords
Advertising, Inoculation, Misinformation, Natural Cigarettes

Subject Categories
Communication

This dissertation is available at ScholarlyCommons: https://repository.upenn.edu/edissertations/4157
DISMANTLING THE ART OF DECEPTION: USING “INOCULATION” TO
COMBAT MISINFORMATION FROM MISLEADING CIGARETTE ADVERTISING

Stefanie Gratale

A DISSERTATION

in

Communication

Presented to the Faculties of the University of Pennsylvania

in

Partial Fulfillment of the Requirements for the

Degree of Doctor of Philosophy

2020

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ACKNOWLEDGMENT

This dissertation, as well as the supporting research conducted in my graduate studies, would not have been possible without the support of my colleagues, friends, family and my dissertation committee. I am grateful for the feedback and input of my research team, of the entire staff at Annenberg – especially Joanne, as well as that of the close friends whom I met at Annenberg and whose friendship I treasure. I have also been incredibly lucky to receive the support and encouragement of a large family including my in-laws and honorary in-laws (Sue, George, Mary, Joe, Wendy, Karol and Jodi). I am blessed to have my nieces Julie and Sienna, my sister Daniella and brother-in-law Ted, and my parents, Judy and Rocco, who have all provided support, laughter and companionship throughout this experience. Perhaps above all, Tim has been the most engaged, supportive and loving husband, and I’m forever grateful to have him by my side. We now share our sweet Ellie, the most beautiful gift and source of endless joy.

My studies, and my dissertation in particular, have benefited beyond measure from the influence of my committee. Dr. Lelkes has offered me humble guidance, a fresh perspective, and a generosity of thought and time that has enhanced my work. Dr. Hornik has been a source of trusted counsel, and he has challenged me with thoughtful questions and meaningful conversations that have enriched the caliber of my work as well as my time at Annenberg. And my advisor, Dr. Cappella, has been a guiding hand that has shaped my research, my understanding of what it means to be an academic, and the way I think. I deeply value our talks and our joking over the past five years. Dr. Cappella has supported me academically and personally, and I am honored to be his advisee. This dissertation is a tribute to his mentorship, for which I am forever grateful.

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ABSTRACT

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Misinformation is a growing concern in the public health realm, as it is persistent and difficult to correct. One strategy recently considered to address misinformation is “inoculation”, which leverages forewarning and refutation to defend against a subsequent persuasive message. Here, I aimed to assess whether inoculation can be harnessed to forestall implicitly arising misinformation such as that from misleading natural cigarette ads, which have been shown to prompt widespread misbeliefs. I conducted three randomized online experiments assessing means of inoculating against misinformation. The first tested inoculation tactics to determine whether particular message formats are more effective (i.e., exemplar, narrative, or exposition), and to assess whether inoculations must refute the exact arguments from the misinformation or can more generally match argument themes. The second study tested an attenuated generic versus a specific refutation, and explored results over time. The final study focused on a particular inoculation strategy – highlighting prior deceptive messaging by the persuasive source. Results indicate that inoculations can successfully defend against misinformation from misleading ads; further, they do not need to match exact arguments or even exact themes from the arguments in order to reduce misbeliefs. In fact, high level, generic refutations successfully reduced misbeliefs both immediately and with a time delay, and,
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CHAPTER 1: LITERATURE REVIEW

Misinformation is increasingly common in the public information environment of the “post-truth” era, arising from sources ranging from media and advertising, to social media and online communities, to political figures (Ecker, 2017; Lewandowsky, Ecker & Cook, 2017; Dixon & Clarke, 2013; Berger, 2011). The existence, persistence and correction of misinformation are questions that have long troubled scholars and public figures. While misinformation seems alarmingly simple to create, correcting it remains a far more elusive endeavor. Neutralizing the effects of misinformation is a difficult and complex process for a number of reasons, thereby making the perpetuation of health-related misinformation especially dangerous.

Here, I will provide a discussion of the underpinnings of misinformation and available evidence for best practices to correct it. I will explore empirical support for the stickiness of misinformation and the key variables that likely influence the efficacy of correctives. Ultimately, I will make a case for the potential of inoculation principles to combat misinformation from misleading health-related advertising, and will discuss three studies designed to assess this potential. The studies applied these considerations to the context of misinformation that arises implicitly from misleading natural cigarette advertising. They tested three key issues related to inoculation specifically in the context of misinformation, namely the necessity of countering the exact arguments contained in the misinformation, the role of counterarguing and threat when inoculating against misinformation, and the relevance of highlighting source credibility and prior deception by the persuasive message source.
An Overview of Misinformation

**Misinformation characteristics**

Misinformation is prevalent in a wide range of forms, including media dialogue, advertising, social media, political discussion, and more (Ecker, 2017; Lewandowsky, Ecker & Cook, 2017; Dixon & Clarke, 2013; Berger, 2011). Misinformation arises through misperceptions, or “cases in which people's beliefs about factual matters are not supported by clear evidence” (Nyhan & Reifler, 2010, p. 305), and should be understood to encompass situations in which false or misleading information produces inaccurate perceptions. Research about misinformation points to pernicious, lasting effects of debunked beliefs, as correcting misinformation is a complex, difficult process (Green & Donohue, 2011; Chan, Jones, Jamieson & Albarracin, 2017; Lewandowsky, et al., 2012).

Research has shown that the effects of misinformation are particularly persistent and can influence other belief, attitudinal and behavioral outcomes (Green & Donohue, 2011; Skurnik, Yoon, Park & Schwarz, 2005). Even when corrected, misinformation yields lingering effects on affective attitudes, inferences and judgments regarding the subject, as well as related behaviors (Thorson, 2016; Gilbert, Tafarodi & Malone, 1993; Johnson & Seifert, 1994; Wegner, Coulton & Wenzlaff, 1985). The effects of misinformation are concerning from a theoretical point of view, but misinformation is especially damaging when it pertains to complex issues and may provide a “basis for political and societal decisions that run counter to a society’s best interest” (Lewandowsky, et al., 2012, p. 107). Misinformation correction is complicated by a number of factors: belief persistence; belief perseverance/belief echoes; and motivated reasoning and reactance.
**Belief persistence.** In some cases, people refuse to accept a misinformation correction, known as belief persistence. Mere exposure to claims, even ones immediately identified as false, increases subsequent acceptance of the claims as true (Begg, Anas, and Farinacci 1992; Gilbert, Krull, and Malone 1990). People tend to process information on the assumption that it is true, and often still believe it despite it being identified as false (Anderson, Lepper, & Ross, 1980; Gilbert, Tafarodi & Malone, 1993; Johnson & Seifert, 1994; Wegner, Coulton, & Wenzlaff, 1985). Once an individual has a mental image of a concept (e.g., a negative view of the welfare system), it may be difficult to re-write that image in the absence of a contrasting personal account (Hasson, Simmons, & Todorov, 2005). The phenomenon of belief persistence has been borne out in numerous studies (Garrett, Nisbet & Lynch, 2013; Kuklinski et al., 2000), including, for instance, research about persistent beliefs that President Obama was not born in the United States (Berinsky, 2012).

**Belief perseverance/belief echoes.** With belief perseverance, or continued influence, misinformation affects subsequent inferences even when it is recognized as false (Ecker, Lewandowsky, Fenton, & Martin, 2014; Lewandowsky et al, 2012; Ross, Lepper, & Hubbard, 1975). Inferences from misinformation still affect worldviews because the story of the misinformation forms a mental model that may be automatically activated and retains familiarity (Ecker et al., 2011; Anderson, Lepper & Ross, 1980; Wilson & Park, 2008; Henkel & Mattson, 2011). For this reason, misinformation presented in narrative format may be especially difficult to correct because the compelling causal structure of narratives promotes engagement and reduces counterarguing (Johnson & Seifert, 1994; Green & Brock, 2000; Slater & Rouner, 2002).
For instance, prior research has shown that participants hold more negative beliefs about political candidates when they have seen damaging stories about such candidates, even after they learn the information was fabricated (Bullock, 2007). Similarly, residual effects of positive information sometimes remain after the information is discredited, though corrected positive information is less persistent (Cobb, Nyhan & Reifler, 2013).

A seminal study of the persistent effects of misinformation proposed the concept of belief echoes, or lingering affective residue of corrected misinformation (Thorson, 2016). The study exposed participants to fake articles with misinformation about a fictitious candidate, and then corrected the misinformation for some participants. While the beliefs of participants who saw corrected misinformation did not differ from control (indicating correction success), these participants had significantly more negative attitudes toward the candidate than did the control group, representing affective residue, or a “belief echo”. The existence of belief echoes “challenges a major assumption… that once a piece of information has been discredited, it will cease to affect attitudes and preferences” (Thorson, 2016, p. 476).

**Motivated reasoning.** While the provision of (mis)information can shape attitudes, prior attitudes themselves can also color the manner in which we process information and our willingness to accept it (Lodge, Taber, & Weber, 2006). As motivated reasoners, people are more prone to accept misinformation (and reject associated correctives) consistent with their own worldview. Specifically, individuals who are closely involved with an issue process issue-related information differently (Lodge & Taber, 2006; Redlawsk, 2002; Taber, Cann & Kucsova, 2009). This can result in biased processing, motivated acceptance or rejection of information and the
subconscious maintenance of inaccurate perceptions (Johnson & Eagly, 1989; Petty & Cacioppo, 1979; Slater & Rouner, 1996; Alcott & Gentzkow, 2016; Prior, Sood & Khanna, 2015). Thus, correctives are less effective and more likely to be rejected when they contain information that may be disagreeable to the audience or contrary to their attitudes (Kuklinski et al., 2000). For instance, while Republicans are more likely to believe discredited “birther” claims, Democrats are more likely to dismiss evidence-based claims about negative effects of high oil prices (Nisbet, Maibach & Leiserowitz, 2011; Berinsky, 2012). Motivated reasoning has also been borne out with regard to belief echoes. Specifically, in the 2016 study, when participants were instructed to take time to deliberatively reflect on the corrected facts, their belief echoes disappeared, but only if the correction pertained to a candidate of the same political party as the participant, consistent with motivated reasoning. Research regarding political issues shows that corrections frequently do not reduce inaccurate perceptions in the target ideological group, and in some cases actually exacerbate misconceptions (Nyhan & Reifler, 2010); “this backfire effect has been attributed to a process by which people implicitly counter-argue against any information that challenges their worldview” (Lewandowsky, et al., 2012, p. 119). As a result, correcting misinformation is more difficult when the correction runs counter to the individuals’ attitudes or other beliefs (Garrett, Nisbet & Lynch, 2013).

Reactance. Relatedly, the possibility of reactance to a corrective also complicates misinformation correction. Psychological reactance theory purports that persuasive attempts may actually arouse motivations to reject the advocated position (Brehm, 1966). Anything that seeks to limit an individual’s ability to exercise freedom to make decisions
and freely adopt attitudes may be perceived as a threat (Brehm & Brehm, 2013); psychological reactance thereby represents a motivational state that is prompted by a threat to one’s freedom (Brehm & Brehm, 2013). Because of the threat, the individual is motivated to restore the freedom, by doing the opposite of the recommendation, increasing liking of the threatened attitude/behavior, or engaging in derogation of the persuasive message’s source (Dillard & Shen, 2005). People may experience reactance when faced with a correction, as they resent being told how to think, especially in the case of authoritative retractions (Lewandowsky, et al., 2012). For instance, research indicates that when jurors are told information is inadmissible, they are more likely to convict (implying they considered the inadmissible evidence) if the judge provides an authoritative, legal explanation of the inadmissibility (Wolf & Montgomery, 1977; Lieberman & Arndt, 2000). Similarly, a study showed that even when a corrective message reduces misconceptions about the supposed vaccine-autism correlation, it may not increase intentions to vaccinate, and may even decrease intentions among some participants. These results underscore the possibly negative effects of corrected misinformation, and the risks of perpetuating misinformation by repeating it with a correction (Nyhan, et al., 2014).

The above phenomena, taken together, signal that it is incredibly difficult to fully correct misinformation. Simple corrections of facts may be possible, but fully eliminating their influence proves challenging. Even when individuals update their beliefs in accordance with a correction, the influence of misinformation may still linger. Thus, it is important to examine specific aspects of correctives that contribute to their success.
Promising avenues for correction

Due to the complexity and persistence of misinformation, the success of a corrective depends on a number of factors related to the message itself as well the audience. Among the more prominent moderators of effects are message factors including timing and ability to construe a new narrative.

Timing. The timing of the initial issuance of a corrective as well as the frequency of its delivery may moderate success. Two key principles are warnings and repetitions. Warning that information may be suspect helps individuals to “tag” it before it is encoded (Chambers & Zaragoza, 2001; Ecker, Lewandowsky & Tang, 2010; Jou & Foreman, 2007); warnings are more effective if they specifically communicate the damaging effects of misinformation (Marsh & Fazio, 2006). People take longer to process information about which they have been warned, signaling a potential role of skepticism. Warnings issued immediately after exposure to misinformation may still be effective, as misinformation may still be automatically retrieved but more deliberately assessed (Ecker, Lewandowsky & Tang, 2010). Nevertheless, a meta-analysis on misinformation concluded that in some cases, forewarnings may be less effective than rebuttals, but the sample of studies using forewarnings was very small, showing the importance of further research in this area (Walter & Murphy, 2018).

Like warning, repetition may also be a useful tool, to a degree. Repeated retractions can be particularly effective in cases where there was strong encoding of the initial misinformation. Specifically, if misinformation has several different mental markers around it, repeated retractions can, in essence, address different markers upon each instance of the retraction (Ecker, Lewandowsky, Swire & Chang, 2011; Wilson &
Brekke, 1994). Yet if retractions are repeated often, they can produce a backfire effect by serving to repeat the misinformation too much (Schwarz, Sanna, Skurnik & Yoon, 2007). For instance, as a consequence of the corrective efforts of fact-checking organizations, they also serve to expand the reach of associated misinformation (Thorson, 2016). Consequently, repetition of correctives should be done with care and in such a way as to emphasize the truth rather than repeat misinformation.

**Correction narrative.** Misinformation often stimulates a strong affective response, one that a factual correction cannot match. Explaining the way in which the misinformation originated can help to reduce its subsequent influence on judgment (Lewandowsky, et al., 2012). Rather than just reciting the initial information but in the negative, a correction should instead provide a plausible, internally consistent explanation of the true account, much in the same way that narratives draw in their audience through a compelling causal structure and flow (Green & Brock, 2000; Nabi & Green, 2015). It should also account for the causal explanations in the initial (false) report, and explain why the misinformation was first believed true but what the correct case actually is (Johnson-Laird, 2012; Pennington & Hastie, 1993). The success of a corrective may hinge on the degree to which it effectively frames a counter-narrative; misinformation “may be minimized through corrections that not only state that the misinformation is wrong, but also describe why it emerged in the first place, offering a competing causal explanation for the “where there’s smoke, there’s fire” chain of reasoning” (Thorson, 2016, p. 476).

Specifying the motivation behind the misinformation (e.g., the intent of the source) can also help to increase the acceptability of a correction (Lewandowsky,
Stritzke, Oberauer & Morales, 2005, 2009). The new account of truth should be integrated with facts provided by the original source, if possible, and it should be simple and clear; providing too many explanations/counters or asking people to generate too many counter-arguments can actually backfire (Sanna, Schwarz & Stocker, 2002; Johnson & Seifert, 1994). In general, then, correctives may be strengthened by phrasing information in the affirmative rather than the negative, and by offering a competing causal explanation; success may be moderated by the perceived plausibility of the alternative narrative (Thorson, 2016).

**Summary of recommendations.** Individuals designing correctives should seek to warn the audience before misinformation when possible, to avoid acceptance of misinformation simply due to familiarity. Practitioners may also want to issue repeated corrections in order to counter the continued influence effect, but should avoid unnecessarily repeating the misinformation itself (Lewandowsky, et al., 2012; Thorson, 2016). Moreover, they should try to establish a motive behind the misinformation, provide a causal, narrative account of the truth that is focused on relaying a compelling story and not just on negating misinformation (Sanna, Schwarz & Stocker, 2002; Thorson, 2016; Lewandowsky, Stritzke, Oberauer & Morales, 2005, 2009). With recognition of the factors that can promote corrective success, one seemingly promising avenue for addressing misinformation may be the application of inoculation principles. In the following section, I discuss the potential relevance of inoculation theory to misinformation, and explore particularly important aspects of inoculation as well as its mechanisms of effect.
The Nexus of Misinformation and Inoculation

Our understanding of the role of timing and re-writing the narrative when attempting to correct misinformation points to the promise of inoculation strategies for addressing misinformation. Inoculation theory is based on the premise that forewarning against a future persuasive attempt and offering counterarguments to the expected persuasion can promote resistance to the attempt. The perpetuation of misinformation— or of misleading information that promotes inaccurate beliefs— could be considered the persuasive attempt itself. By warning about future misinformation, and planting a seed about the intended misinformation narrative, inoculation correctives could encapsulate both the warning and narrative components thought to enhance the success of correctives. Below, the key principles of inoculation, and the potential relevance of highlighting deception as part of a narrative, are discussed in consideration of inoculating against misinformation, followed by an exploration of nascent research on the application of inoculation techniques to misinformation.

Inoculation overview

Inoculation theory establishes a theoretical basis for conferring resistance to persuasive attempts. The premise of inoculation theory is that warning people of an impending persuasive appeal and providing them with a means to counteract it will induce resistance to attitude change (McGuire, 1961). In this manner, inoculated cognitive structures are safe from future persuasive attacks, much in the same way that inoculated immune systems are protected from disease. Over five decades, inoculation theory has been borne out in a variety of mediated and interpersonal contexts, over topics ranging from health to politics to commercial behavior (Compton & Pfau, 2005), proving
superior to more general “supportive” treatments seeking to bolster pre-existing attitudes without conferring resistance (Banas & Rains, 2010). Inoculation theory was originally applied specifically to pre-existing favorable attitudes about cultural truisms, with the assumption that specific counter-arguments should be refuted. Researchers have made several extensions and updates of the theory. One major extension specified that inoculation theory need not only apply to cultural truisms with virtually universal support; rather, it could be extended to controversial issues, or ones in which the audience did not hold a strong favorable attitude (see Compton & Pfau, 2005; Prior & Steinfatt, 1978); for instance, inoculation research has been applied to prevent negative affect or slippage in political support for candidates or issues, and to protect against attack advertising (Pfau, Park, Holbert & Cho, 2001).

**Key theoretical constructs.** The key constructs within inoculation theory are warning of a forthcoming persuasive message – or threat to attitude – and the provision of information to refute the appeal and support one’s attitude (McGuire & Papageorgis, 1961; Pfau, 1996; Pfau, et al., 2005; Wood, 2007). Threat forewarns of an imminent attack on an attitude, which motivates resistance to the attack by cueing attention to the vulnerability of one’s existing positions. Threat is considered a distinguishing feature of inoculation (McGuire, 1961; Compton & Pfau, 2005). The operationalization of threat by telling the audience about a future attitudinal attack is a key component in the design of inoculation messages (i.e., forewarning). Yet, inoculation can apply to any attempt at attitude manipulation through persuasive messages, not just attacks on pre-existing attitudes (Niederdeppe, Heley & Barry, 2015; Richards & Banas, 2015). Moreover, some research asserts that threat to attitude is not the only – or the most significant – conveyor.
of resistance, but instead threat to freedom (Niederdeppe, Heley & Barry, 2015). Highlighting the threat to freedom to make up one’s own mind may serve to confer resistance by making the audience sensitive to any threats to freedom, not just those consistent with the direction of previously held attitudes; this approach has been found to increase resistance to subsequent persuasive efforts and engender derogation of the source of the opposing message. Nevertheless, research is ambivalent about the role of elicited feelings of threat, as traditional inoculation messages have not always produced high scores on threat measures (Banas & Rains, 2010; Godbold & Pfau, 2000; Pfau, van Bockern & Kang, 1992).

Besides threat, the main psychological process theorized to underpin the elements of forewarning and preemption is counterarguing, which is the process of refuting opposing arguments (Niederdeppe, Heley & Barry, 2015). Inoculation provides refutational information (“refutational preemption”), or specific arguments the audience can use to counterargue against the persuasive appeals they subsequently encounter, thereby stimulating resistance (McGuire, 1961; Compton & Pfau, 2005; Richards & Banas, 2015). Refutational preemption involves the provision of content that subjects can use to strengthen their attitudes against change and help them practice defending their beliefs (Banas & Rains, 2010). Arguments can be refutational same (inoculation contains the same arguments as the subsequent attack) or refutational different. In general, “refutational preemption is also thought to interact with threat to stimulate, exercise, and reinforce resistance during what — again drawing from the medical analogy — might be thought of as an incubation period. During this time, counterarguments, like cognitive antibodies, may be developed” (Miller, et al., 2013, p. 130).
Moderators of inoculation effects. Researchers have hypothesized several key moderators in the influence of inoculation, including such factors as threat level, delay between inoculation and attack, audience involvement, argument type and other message strategies. With regard to misinformation, particularly pertinent moderators are argument type and involvement. Specifically, some scholars have theorized that bolstering inoculation messages with the exact same arguments (i.e., argument type) expected in the subsequent persuasive appeal should enhance inoculation effects, as compared to inoculation messages with more general or different arguments on the topic. Interestingly, though, many studies have shown the effectiveness of inoculation treatments in both cases (Pfau & Burgoon, 1988; Pfau, et al., 2001, 2004; see Compton & Pfau, 2005). In fact, some researchers emphasize the importance of effective refutational-different strategies: “If the construct were limited to preemptive refutation, it would afford limited utility since communicators would need to prepare specific preemptive messages corresponding to each and every anticipated attack” (Pfau et al., 1990, p. 75).

Still, different studies have revealed conflicting conclusions regarding whether refutational-different arguments are as strong at conferring resistance as refutational-same arguments, but meta-analytic findings support that inoculation effects generalize beyond the specific arguments used in the inoculation (Banas & Rains, 2010). Broadly, research indicates that inoculation effects are relatively robust over time, and that refutational-different arguments may take longer to be effective but may actually stimulate greater resistance that is less susceptible to decay over time (Pfau, et al., 2004; Pfau, et al., 1990). Probing this question with regard to health-related misinformation
would be especially significant because of the nature of misinformation, which often entails repeated exposure to different and sometimes implicit, misleading claims. The repetitive (potentially changing) nature of health misinformation makes it particularly important to find a corrective method with lasting efficacy; that resistance conveyed through inoculation may actually grow stronger with time and supersede argument specificity indicates great potential for inoculation to address misinformation.

Generally, research has also been inconsistent about the role of issue involvement. Issue involvement is specifically relevant with regard to inoculation against misinformation, because of the aforementioned role of motivated reasoning in the acceptance of misinformation. A hypothesized curvilinear relationship between involvement and inoculation resistance has not borne out, but some research supports that greater levels of involvement do enhance resistance. Specifically, only issues for which the audience has some personal/outcome-relevant involvement (Johnson & Eagly, 1989; Petty & Cacioppo, 1979) will the audience care enough to counterargue and to protect vulnerable attitudes (Pfau, et al., 1997; Petty & Cacioppo, 1986). Similarly, some research has found that involvement is actually enhanced by inoculation and threat, which facilitates counterarguing, attitude accessibility and resistance (Pfau, et al., 2004). The role of personal involvement in the inoculation process is particularly pertinent with health-related misinformation, which often pertains to health issues with high levels of personal involvement, thereby making inoculation especially appropriate.

**Potential mechanisms of inoculation.** Considering the mechanisms of inoculation may be important to determining how it can best be harnessed to protect against misinformation. The inoculation process has been theorized to operate through
mediators like perceived threat and counterarguing, (see, for example, McGuire, 1961, 1962; Pfau et al., 1997, 2001, 2004). Specifically, for individuals to resist a persuasive attack on their attitudes, they must perceive threat to that attitude and thereby desire to protect it; in turn, when they encounter refutation of the anticipated attack, they are motivated to counterargue the attack (Compton & Pfau, 2005; Pfau et al., 1997). Yet causal models in several studies of inoculation “have repeatedly revealed a sizable, direct, and unexplained path from inoculation to resistance that operates independent of the specific mechanisms” associated with inoculation theory (Pfau, et al., 2005, p. 434). For instance, various studies have found that inoculation can confer resistance without mediation of active cognitive processes such as counterarguing (Pfau, Holbert, et al., 2000; Pfau et al., 2001). Without explicit counterarguing, inoculation treatments may confer resistance by increasing attitude accessibility and attitude certainty, both of which may foster resistance to persuasive appeals (Pfau et al., 2004, 2005). Yet while this may be the case when inoculations are designed to protect attitudes from change, the traditional processes of threat and counterarguing may be more relevant with regard to misinformation, because the inoculation must prompt resistance to a persuasive attack, even if that attack is consistent with an individual’s attitude or beliefs.

One other explanation for the mechanisms of inoculation has suggested that reactance could account for the path of effect from inoculation to resistance, when inoculations are able to promote reactance to the subsequent persuasive attack (Banas & Miller, 2013). Psychological reactance theory puts forth that when individuals perceive threats to their behavioral freedoms, they experience aversive arousal that motivates them to try to protect that freedom; the level of reactance depends upon the personal
importance of the subject and the degree of awareness of the freedom (Brehm, 1966). When reactance occurs, individuals may respond by rejecting the message, adopting the opposite of the advocated position (boomerang), and/or derogating the message source (Miller, et al., 2013). Reactance can occur at the source level. For instance, refutational messages may help to promote resistance to attacks by increasing persuasive source derogation and negatively influencing perceived credibility of the source (Tannenbaum & Norris, 1965; An & Pfau, 2004; Pfau et al., 1990). In this matter, inoculation messages may be able to surmount a typical hurdle of misinformation correctives, which is that the corrective messages themselves sometimes prompt reactance.

While scholars typically consider ways to avoid reactance to persuasive messaging, research about reactance in the context of inoculation theory actually seeks to harness reactance to achieve intended goals. In this case, reactance may work in concert with traditional mechanisms of inoculation like threat and counterarguing. Exploiting reactance within inoculation messaging may help to enhance the character and level of the threat in such a way as to motivate more counterarguing (to the subsequent persuasive appeal) and more attitudinal resistance (Miller, et al., 2013). In line with this logic, prior research has indicated that inoculation treatments on various issues (e.g., censoring violence on TV) may prompt reactance to the attack message by framing the issues and the impending persuasive appeal in the context of threat to freedom (Pfau, et al., 2005; Miller, et al., 2013). Interestingly, in one particular study researchers were actually able to harness inoculation to prevent reactance to the researcher’s own positive health message (i.e., a health campaign message; Richards & Banas, 2015). Participants saw a message designed to convince them that the upcoming health message (an anti-drinking
appeal) did not threaten their freedom; results indicated that the inoculation indirectly (negatively) predicted behavioral intention through a mediation of effects on perceived threat to freedom and reactance. This study pushed the prior bounds of inoculation theory application by examining (and supporting) the approach’s ability to inoculate against internal reactions. Ultimately, when designing messages to inoculate against health-related misinformation, it would be important to explicitly assess whether inoculations with particular features can elicit reactance not to the inoculation but to the impending misinformation.

**Relevant applications of inoculation**

**Inoculation and health advertising.** Researchers have successfully applied inoculation theory to a wide range of issues, including those related to health. For instance, some studies have harnessed inoculation to guide against persuasion from negative health-related advertisements and to instead promote healthful behavior, showing promise for strategies to combat health-related misinformation (Banas & Rains, 2010; Banerjee & Greene, 2007; McGuire & Papageorgis, 1961; Pfau, Van Bockern, & Kang, 1992; Pfau et al., 1997). Multiple studies have considered the use of inoculation in adolescent anti-drug/alcohol advocacy, with promising results (Godbold & Pfau, 2000). Inoculation principles have also been widely applied to other health issues, including testing the role of inoculation in resistance to smoking (see, for instance, Pfau & Van Bockern, 1994; Duryea, Ransom & English, 1990; Banerjee & Greene, 2007).

A relevant, large-scale study tested the effects of inoculation with regard to three health policy issues: smoking, sugar-sweetened beverages, and prescription drug abuse (Niederdeppe, Heley & Barry, 2015). Researchers explored the role of inoculation in
conferring attitudes resistant to industry counter-advertisements. Inoculation messages were able to prompt anticipated threats to freedom, counterarguing of the industry anti-policy messages, anti-industry beliefs, and greater policy support relative to control. Results of the study highlight the potential of what the researchers called ‘reactance-enhanced inoculation messages’, which emphasize the threat to freedom; this may sensitize audiences to any threats to freedom, not just ones consistent with prior attitude. Researchers also theorized a potentially important role of identifying deceptive industry practices to enhance the salience of anti-industry beliefs and attitudes. This consideration is one that merits more direct research attention, and could be particularly significant with regard to health-related misinformation. Overall, inoculation seems to be a promising approach for conveying resistance related to health attitudes, and health misinformation arising from misleading advertising should be no exception; in this pursuit, one important area to consider is the role of highlighting source deception, which will be discussed below.

Inoculation and misinformation. More recently, researchers have started to apply inoculation theory to the prevention and debunking of misinformation. Scholars studying methods of countering misinformation have asserted that overcoming a deluge of misinformation with individual assertions of truth is virtually impossible (Ecker, 2017; Cook, Lewandowsky & Ecker, 2017; van der Linden, Leiserowitz, Rosenthal & Maibach, 2017). Instead, it may be more effective to “expose the manipulation, the hidden agenda, rather than attacking each individual falsehood… by exposing the tactics and the flawed argumentation strategies used by people spreading disinformation, we can inoculate people” (Ecker, 2017, p. 86).
Research in this area is largely concentrated around the topic of climate change, for example misinformation about scientific consensus around climate change (van der Linden et al., 2017). Emerging research in this context indicates the promise of inoculation messages that highlight the fallacious reasoning and argument structure among those who deny the existence of climate change (Cook, Lewandowsky & Ecker, 2017; Cook, Ellerton & Kinkead, 2018). Additional research has proposed the application of inoculation principles to “misconception-based” classroom learning, in which students learn scientific concepts refuting popular misconceptions and thereby increase scientific literacy (Borah & Cook, 2017). Relatedly, research on issues of public safety has found that effective inoculation messages specifically warn against the misleading nature of unchecked facts (Ecker, Lewandowsky & Tang, 2010). Broadly, trying to identify patterns in deceptive messaging appears to be a potentially promising avenue (Ecker, Lewandowsky & Tang, 2010; Cook, Lewandowsky & Ecker, 2017; Cook, Ellerton & Kinkead, 2018).

The Present Application: Misinformation Arising from Natural Cigarette Advertising

Considering our current media and political climate, misinformation and its pernicious effects will likely remain a fruitful topic for scholarly analysis throughout the foreseeable future. The influence of misinformation remains a prevalent concern in many areas, including with regard to misleading health advertising and messaging. This dissertation explores techniques for inoculating against health-related misinformation arising from “natural cigarette” advertising. Health issues represent a unique and challenging opportunity regarding misinformation and correction. There are several
distinct characteristics of health misinformation, including its repetitive exposure, sometimes implicit nature, ties to habitual behavior, and frequent link to industry deception. Specifically, health misinformation about a particular issue is often encountered repeatedly, and is sometimes even conveyed implicitly.

In the case of natural cigarettes, for example, misleading language in product marketing often implicitly sparks factual misinformation about the product. This may occur because the interaction of images and text utilized in product marketing – such as that for natural cigarettes – may serve to perpetuate unfounded assumptions about their healthfulness by activating implicit beliefs about the represented objects or products (Branthwaite, 2002; Schnotz, 2002). For instance, research has shown that packaging color, a “healthier” look and an organic label can all influence ideas about product healthfulness, and such perceptions are not limited to organic food (Bansal-Travers, et al., 2011; Hammond & Parkinson, 2009; Niewold, 2010). Prior studies have tied the inclusion of the word “natural” in product marketing to potentially misinformed beliefs about natural cigarettes, revealing that packs with descriptors such as natural, organic, and additive-free are perceived as less harmful and less likely to cause disease (Pearson, et al., 2016, 2019; Czoli & Hammond, 2014; Kelly & Manning, 2014).

Analysis of marketing for Natural American Spirit (NAS, the leading natural cigarette brand), in particular, has identified textual claims and natural imagery likely to perpetuate misconceptions about product healthfulness (Moran, et al., 2016; Epperson, Henriksen & Prochaska, 2017). In fact, multiple studies have found that both smokers and non-smokers believe NAS to carry fewer health risks than other cigarettes (Byron, Baig, Moracco & Brewer, 2016; O’Connor, et al., 2016; Pearson, et al., 2017). These
misconceptions are especially common and concerning among vulnerable groups including youth (Epperson et al., 2019; Kelly & Manning, 2014). Misbeliefs about NAS healthfulness have been tied to intentions to use the product (Gratale, Maloney, Sangalang & Cappella, 2018); specifically, individuals who believe the health implications of NAS advertisements in turn reflect greater intent to purchase NAS cigarettes (O’Connor et al., 2016), and NAS smokers are more likely to be health-conscious than other smokers and to cite this as a reason for choosing NAS (Byron, Baig, Moracco & Brewer, 2016; O’Connor, et al., 2016).

Clearly, natural cigarette advertising and the misinformation it inspires represent a timely and topical application for studying inoculation against misinformation. As discussed, there is a wide range of concerns pertaining to inoculation and the moderators and mediators of its success. Here, I have identified some of the most relevant concerns related to inoculating against misinformation in particular. This dissertation will aim to probe those specific concerns. The key focus areas will be exploring the importance of argument type or matching arguments to the misinformation (i.e., refutational same or different), as well as considering the relevance of the recent considerations of reactance-enhanced (or, deception-enhanced) inoculations that focus on source credibility and prior deception by the persuasive source. It will also consider the moderating role of issue involvement, as well as the potential mediating roles of counterarguing and threat. Each of the three dissertation studies will highlight one or more of these three areas, in an effort to contribute to the growing body of work regarding inoculation against misinformation. Ultimately, the role of inoculation – and the significance of highlighting source deception – are important issues to consider in the continued quest to combat
health-related misinformation. In an exploration of these issues, I conducted two pilot studies and three dissertation studies focused on inoculating against misinformation from misleading natural cigarette advertising.
CHAPTER 2: PILOT WORK

Pilot Study 1

This randomized experiment sought to establish misinformation effects of NAS advertising content. We exposed current and former smokers (n = 1,128) to NAS advertising content, and then assessed resulting misbeliefs. In this study, misinformation stimuli included a selection of NAS ads as well arguments taken directly from the ads. We conducted a detailed review of available NAS ads via search engines and the NAS website, and classified the ads into four categories. Our experimental conditions included ads from each category, in order to ensure sufficient representation of the variety of ads used in NAS marketing. We also created a fifth experimental condition, which was a textual condition that utilized arguments (and specific wording) from a selection of multiple NAS ads. The intent behind this condition was to more generally represent the broader universe of claims from NAS ads, as well as the cumulative effects of exposure to a variety of NAS advertising materials.

The primary outcomes in this study were misinformed beliefs about NAS. To compose the belief measures, we conducted a review of NAS ad content, as well as content about NAS in articles and videos available via search engines (e.g., comments about NAS accompanying news articles and You Tube videos). We used this content to produce belief statements about NAS in five thematic categories that emerged in the searches: enhanced healthfulness/safety, purer/healthier composition, reduced addictiveness, smoother taste, and reduced environmental impact, with the former three categories representing misinformed beliefs.
Findings showed that NAS ads prompted misbeliefs about the healthy composition of the cigarettes, and that textual arguments from the ads produced misbeliefs about product safety and harmfulness (Appendix 1 presents results pertaining to main effects on misbeliefs). Results indicated that leading claims utilized in the brand’s advertisements influence particular (mis)beliefs that are not specifically addressed in the ads themselves. For current smokers, these misbeliefs also partially mediated effects on intentions to smoke NAS. Thus, this study experimentally supported misinformation effects of misleading NAS advertising content (see Gratale, Maloney, Sangalang & Cappella, 2018).

Pilot Study 2

This study sought to assess the utility of applying inoculation principles to combat misbeliefs that arise from misleading NAS advertising. In our first application of inoculation in this context, we tested several categories of inoculation messages and compared them to a misinformation-only control. Current and former smokers (n = 775) were randomized to a no-exposure control, a misinformation-only control, or one of several inoculation messages. Participants in the no-exposure control saw no experimental stimuli, whereas participants in the misinformation-only control saw only the misinformation stimuli. Those assigned to an inoculation condition first read an inoculation message warning them about the dangers of NAS, then viewed the misinformation stimuli, and subsequently completed outcome measures.

For the misinformation stimuli, we used modified versions of the misleading textual descriptions based on NAS ads, prepared for Pilot Study 1. Participants saw two
exposures to the misinformation, both of which aggregated specific language from NAS advertisements. Inoculation correctives varied in format: simple exposition, humor, or first-person narrative (one of two types of narratives: with or without “modeling” of the smoking behavior and “emotional” reaction to learning the truth about the dangers of NAS). The exposition represented a simple corrective, whereas the humor and narrative correctives were designed to draw in the reader, respectively, through satirical elements or through story and identification (Nabi, Moyer- Gusé & Byrne, 2007; Green & Brock, 2000). The expository inoculation was a straightforward corrective message, directly specifying the harms of NAS cigarettes and forewarning that the audience could be falsely led to believe that NAS is a safer cigarette. The humor inoculation utilized irony to emphasize deceptive messaging in NAS ads and to identify the dangers of the product (for instance, “organic tobacco gives you ‘organic lung cancer’”). The narrative inoculations utilized first-person story to highlight the dangers of smoking NAS, as a narrative character suggests trying NAS to the protagonist. In the study that pre-tested the correctives, several narratives were tested. The strongest narrative included specific elements of emotion but did not have the protagonist “model” the smoking behavior, compared to a weaker narrative with modeling but no emotion. Here, we included both the strong (emotion, no modeling) and the weak narratives (modeling, no emotion).

Results showed promise for the inoculation approach in addressing misinformation from natural cigarette advertising (Appendix 2 presents results pertaining to main effects on misbeliefs). The misinformation-only control increased misbeliefs about the health/safety and composition of NAS relative to the no-exposure control. Relative to the misinformation-only control, expository and humor inoculations
consistently dispelled misinformation, which largely mediated attitudinal effects. Yet narrative inoculations were sometimes ineffective, particularly for current smokers and especially with the weaker narrative. Findings indicated the potential for inoculation to combat misinformation arising from misleading advertising, but underscored the importance of particular corrective format/features, especially when dealing with motivated reasoners and an identity issue like smoking (see conference paper Gratale et al., 2019).
CHAPTER 3: STUDY 1

Background

The primary focus of this study was assessing whether inoculations designed to combat misinformation from misleading advertising need to directly address the specific arguments from the ads and the exact resulting misbeliefs, or whether they can more broadly address thematic categories of misinformation. As discussed, research generally indicates that traditional inoculations do not need to match the exact arguments used in the subsequent persuasive attack, as refutational-different inoculations are often successful. Specifically, refutational-different arguments are understood to promote perceptions of threat and to motivate the audience to protect their attitudes and beliefs from the subsequent persuasive attack, even if the exact persuasive arguments have not been individually refuted (Pfau, 1997). In this manner, refutational-different arguments may work by activating other “linked” beliefs related to the subject (Judd & Krosnick, 1989) or creating more associations with the subject that can be activated in the event of a persuasive attack (Pfau et al., 2005; Smith, 1988).

In fact, refutational-different arguments have been shown to have similar effects on attitudes and intentions as do refutational-same inoculations (Pfau, Kenski, Nitz & Sorenson, 1990), especially over time (McGuire, 1962). Nevertheless, some research indicates that refutational-same arguments may convey greater levels of resistance to subsequent persuasive attacks, depending on the particular situation (Papageorgis & McGuire, 1961; Syzbillo & Heslin, 1973), such as when inoculations are used independently and not in conjunction with a subsequent correction, or when inoculations
are immediately prior to attack (McGuire, 1961, 1962). In general, this question has not been unequivocally resolved, nor has it been sufficiently tested regarding inoculating against misinformation.

This is a particularly important consideration with regard to health misinformation about such issues as natural cigarettes, as we cannot always anticipate the exact nature of the misinformation that will arise. It is further complicated by the fact that with the example of natural cigarettes, the misinformation is not outwardly stated in the marketing, but more often implicitly conveyed. For instance, our prior studies indicate that viewing NAS advertising content with the words “natural”, “additive-free”, and “tobacco + water” prompts misbeliefs that NAS is healthier and safer than traditional cigarettes. The wording in the advertising represents misleading content, and the resulting beliefs represent the emergence of misinformation. Thus, it is important to consider whether inoculations meant to forestall misinformation from misleading advertising need to match the misleading ad content and the resulting misbeliefs, or whether they can address broad categories of expected misinformation or alternatively, simply warn that subsequent advertising content may be misleading.

In addition to assessing the role of argument type, this study built upon the results of Pilot Study 2 to probe the significance of inoculation format. Prior research has considered a potential role of inoculation format, such as whether an inoculation message uses cognitive or emotional appeals in inoculation, or how traditional inoculation messages perform relative to other formats such as narrative (Pfau, Szabo et al., 2001; Niederdeppe, Heley & Barry, 2015). Still, extant research has not established the extent to which message format matters for inoculation success in correcting misinformation.
Specifically, when studying inoculation against misinformation in particular, one important consideration is whether inoculation correctives presented via exposition are sufficient, or whether an enhanced message format such as narrative inoculation is necessary. As discussed above, some research indicates that misinformation corrections can be more effective if they present a narrative account of the misinformation and how it arose, as well as a causal explanation of the truth (Lewandowsky et al., 2012; Johnson-Laird, 2012; Thorson, 2016).

Narrative messages may be particularly useful for addressing misinformation because they present information through a series of events using causal structures and, in many cases, emotional engagement (Hinyard & Kreuter, 2007; Cappella et al., 2015). A limitation of many corrective messages that simply articulate a claim as false is the lack of alternative explanation, promoting a mental gap in understanding (Johnson & Seifert, 1994). Yet narratives can provide alternative explanations to address that gap. Further, narrative engagement with emotional plots and characters minimizes opportunities for reactance, message derogation, and other forms of message resistance (Green & Brock, 2000; Moyer-Guse, 2008). In fact, inoculations that prompt emotional reactions have, more broadly, been found to be successful; for instance, anger-inducing inoculation messages have been especially effective at eliciting threat, which also promotes both counterarguing and resistance (Pfau, et al., 2001; Lee & Pfau, 1997). By warning of a threat to freedom posed by misleading health messages, inoculation narratives could potentially evoke emotions like anger and channel them toward the deceptive source itself rather than the corrective message. Prior research about narrative correctives indicates that narratives bolstered with an emotional corrective, especially at the end of
the message, can be particularly effective in combating misinformation (Sangalang, Ophir & Cappella, 2019).

The narrative format, and the accompanying transportation and identification it often promotes (Green & Brock, 2000; Kreuter et al., 2007), could represent a promising avenue for engaging audiences, provided that they do not invite identification with the problematic behavior, as potentially occurred in Pilot Study 2. In that study, two forms of narrative were tested, and the emotional narrative was more effective (in line with the Sangalang, Ophir & Cappella 2019 study). Nevertheless, even the emotional narrative was not entirely successful in correcting current smokers’ misinformation, potentially because that narrative may have enabled identification with the smoking behavior and motivated acceptance of the misinformation. One of the narrative characters smoked NAS and believed in its enhanced safety, but the protagonist refuted the misinformation; while all the correctives presented and corrected misinformation, perhaps the first-person nature of the narrative allowed for more buy-in of the misinformation.

As a result, Study 1 considered inoculations in the form of exposition and first-person narrative, as in Pilot Study 2, but also incorporated another narrative condition, an exemplar narrative. Exemplar messages feature an individual character’s story, though not necessarily in the first-person; they serve as an individual example of a broader category (e.g., an individual smoker representing experiences of other smokers; Zillman, 1999, 2002). This type of message often presents an individual perspective that is meant to be associated with related individuals or experiences (Yu et al., 2010). Exemplar messages can take on many formats, including narrative, which can be a particularly useful vehicle through which to convey a personal account. Exemplars have been found
to produce higher levels of narrative engagement as well as belief and attitude change (Zillman, 2006; Kim et al., 2012). Exemplar narratives have been successfully applied in the context of protecting against persuasive messages related to dangerous health behaviors like smoking (see, for instance, Niederdeppe, Heley & Barry, 2015; Kim et al., 2012). By utilizing a third-person exemplar format, I hoped to reduce the potential opportunity for identification with the negative behavior but still provide a compelling vehicle for story and identification.

Research Questions and Hypotheses

In order to further bear out the role of argument type in inoculation, my primary research question was as follows:

**RQ1.** Do inoculation messages intended to combat health misinformation need to contain the same arguments as the misinformation? Can a forewarning with an “implied refutation” serve to inoculate as well as an inoculation with direct argument refutation?

My associated hypotheses were:

**H1.** Inoculations do not need to contain the same arguments as the misinformation (i.e., misleading ads or the misinformation itself). Generic arguments against the misinformation will inoculate as well as specific, matched arguments.

**H2.** Inoculations with “implied refutation” will confer some inoculation benefit, but will not perform as well as inoculations with explicit refutations.
My next aim in this study was to assess whether the format of the inoculation message affects corrective success. Pilot Study 2 indicated that in some cases, certain formats of inoculation messages (e.g., first-person narrative) may not be successful. Here, I sought to test this proposition further, with three specific types of corrective messages (discussed under Stimuli). My research question was as follows:

**RQ2.** What are the most effective formats for inoculation messages designed to combat health misinformation?

Informed by Pilot Study 2, my hypothesis was:

**H3.** Inoculations presented via exposition or exemplar messages will provide stronger inoculation effects than those presented via first-person narrative.

Method

**Procedure**

Study 1, completed in September 2019, was a randomized online experiment administered via the Qualtrics survey platform. Dynata provided the sample. At the start of the study, participants completed background screeners regarding their age and smoking history/status, to assess their eligibility for the study. I randomized eligible participants to a control condition or one of a set of treatment conditions, described under Stimuli. Participants in all experimental conditions viewed (for a minimum of 10 seconds) an inoculation message warning them about the risks of natural cigarettes. Control and treatment group participants then saw two examples of NAS advertising content (for a minimum of five seconds each). Following the advertising exposure, they completed a distraction task (for a minimum of 30 seconds), followed by all outcome
measures. The survey contained three attention checks; the first check provided a warning, but an incorrect response on the subsequent checks resulted in the participant being dropped from the study. Upon completion of the outcome measures, all participants were debriefed as to the harms of natural cigarettes and the effects of cigarette smoking.

**Stimuli**

**Misinformation stimuli.** All study participants saw two forms of misleading NAS advertising content for the misinformation stimuli. The first misinformation exposure was based on a textual description of NAS originally compiled from a set of NAS advertisements reviewed in Pilot Study 1. For that study, our team designed the textual stimuli to represent a range of arguments utilized in NAS marketing materials. Here, alongside the text, I also included a small NAS advertisement icon; this represented a set of NAS advertisements that use a simple graphic representation (e.g., a green image of tobacco leaves coming out of a water faucet, symbolizing “tobacco and water”). The second misinformation exposure was a full page NAS print advertisement, also from the review of advertisements in Pilot Study 1. In that study, we found that many NAS advertisements contain more elaborated arguments and details about the product (e.g., sustainable, organic growing practices), in addition to photographic representations of nature (e.g., tobacco fields); the second misinformation exposure included such an “elaborated” advertisement. Our IT team made slight modifications to this advertisement, such as enlarging the print and replacing an image of a coupon with a common graphic used in several NAS ads. See Appendix 1 for misinformation stimuli.
**Corrective stimuli.** For the experimental correctives, I designed a set of inoculation correctives that vary based on two factors, argument type and format. Each corrective incorporated core elements of inoculation, namely forewarning of the impending persuasive attempt and refutational preemption of the expected persuasive arguments. Specifically, the inoculations warned about the misleading nature of NAS advertising, and that the ads/tobacco companies may try to make people believe that NAS cigarettes are safer than other cigarettes. For a refutational preemption, they addressed three broad thematic areas of misinformation, namely the purported reduced harm, healthier natural composition, and lower addictiveness of NAS.

The study applied a 3 x 2 design, with two set-aside conditions. Specifically, the main experimental factors applied to the inoculation stimuli were argument type (specific, generic) and message format (exposition, first-person narrative, exemplar narrative). To address Research Question 1, I designed a “specific” and a “generic” version of each inoculation corrective. The “specific” version aimed to match the misinformation closely, both in the forewarning and refutation components of the inoculation. In particular, the forewarning specifically referenced leading language that respondents would subsequently encounter in the misinformation stimuli (e.g., “certified organic”, “tobacco + water”, “additive-free, natural tobacco”). Then, the refutation countered some of the exact misbeliefs that respondents would see in the outcome measures. In this manner, the “specific” inoculations quite directly addressed the arguments contained in the misinformation stimuli and the misbelief assessments (e.g., NAS is just as likely to cause heart disease and cancer). In contrast, the “generic” stimuli more broadly forewarned about the misleading advertising, alluding to the “buzz words”
and “natural” visuals the ads use to craft a healthier image for the product. Rather than addressing the exact misbeliefs, they incorporated a thematic refutation that specified more generally that NAS is not healthier, safer or less addictive than other cigarettes; in this manner, it touched upon particular misinformation themes but not detailed arguments.

To assess Research Question 2, I tested three formats of inoculation correctives: exposition, first-person narrative and exemplar narrative. The exposition and first-person narrative were adapted based on stimuli developed for Pilot Study 2. In that study, the exposition successfully corrected among current and former smokers. In recognition of the aforementioned benefits of narrative correctives, I incorporated here two forms of narrative correctives. First, I utilized the first-person narrative that performed more strongly of the two narratives in Pilot Study 2. I also designed an exemplar narrative modeled on the story told in the first-person narrative; it was modified to a third-person story format similar to the narrative exemplar corrective found to be successful in prior inoculation studies (see Niederdeppe, Heley & Barry, 2015). The nature and details of the forewarning and the refutation were standardized across inoculation formats. For instance, as part of the forewarning, each inoculation highlighted the tobacco industry’s history of consumer deception. Similarly, the content of the refutations was consistent across conditions, such that participants viewing, for instance, the “specific” exposition saw the same corrective facts as the “specific” exemplar, though they were presented using different phrasing.

The two “set-aside” conditions were the forewarning condition and the misinformation control condition. These conditions were over-sampled so that they
would have a commensurate number of participants relative to the other inoculation corrective types, and allow for subgroup analysis if desired. The forewarning condition was designed to match the forewarning component of the other inoculation correctives. However, rather than including a “generic” or “specific” refutation, it included an implied refutation. It did not directly correct any misconceptions likely to arise from the advertising stimuli, but instead mentioned a high-level characterization of the misbeliefs likely to arise, and indicated that one ought not believe all implications of tobacco advertising. The final condition was the control condition. In this condition, participants did not see a corrective message, but instead only saw the misinformation stimuli, or the persuasive “attack”, as is common in many inoculation studies (see e.g., Nabi, 2003; Pfau & Burgoon, 1988). This study did not include a no-exposure control, as Pilot Studies 1 and 2 already established the misinformation effects of NAS advertising content. Moreover, the no-exposure control groups in those studies also reflected acceptance of misbeliefs about NAS, and did not represent a true baseline in absence of misinformation. Thus, I sought to establish that the correctives reduce misbeliefs relative to the misinformation-only control, but also to tested how they compare to each other in terms of effectiveness. See Appendix 2 for corrective stimuli.

**Measures**

The main outcome measures for this study were misbeliefs about NAS. I adapted all belief measures from Pilot Study 1 (Gratale, Maloney, Sangalang & Cappella, 2018). In that study, our team reviewed NAS marketing materials, public discussion boards and article comments regarding NAS, as well as focus group results in which participants discussed perceptions about NAS. We used this review to inform the design of
misinformed belief statements about NAS cigarettes. For the present study, I adapted the (mis)beliefs pertaining to the health/safety, composition and addictiveness of NAS. Thematically, these belief areas represent (mis)perceptions that NAS cigarettes are safer/less harmful, healthier and purer because of their natural composition, and less addictive as compared to traditional cigarettes. For each category of misbeliefs, I included both high-level thematic statements (e.g., that NAS cigarettes are safer than traditional cigarettes) as well as more detailed, specific statements (e.g., that NAS cigarettes are less likely to cause heart disease), the latter of which were addressed in the “specific” refutations but not the “generic”.

As secondary outcomes, I included attitude and intention measures, which were also used in the aforementioned study. The attitude measures were six semantic differential slider scales (e.g., “harmful-beneficial”, “unenjoyable-enjoyable”) as well as a Likert measure of attitude favorability. I also included measures of attitudes toward tobacco companies, adapted from prior work (see Hmielowski et al., 2014). The intention measures assessed participant willingness to use NAS within six months, try a free sample of NAS, or talk about NAS with family and friends. These items used Likert responses from “definitely not” to “definitely will” (see Gibson, Parvanta & Jeong, 2014).

A final category of outcome measures assessed participant responses to the misinformation stimuli themselves, i.e. the NAS advertising content. I adapted these measures from prior measures of counterarguing (see Niederdeppe, Heley & Barry, 2015), as well as threat and reactance measures used in our prior studies about NAS. See Appendix 3 for outcome measures.
Analysis

To assess my primary research questions, I utilized one-way ANOVA (with correction for multiple tests) to test main effects on mean belief scores. The misbelief outcome measures fell into scales representing health/safety, composition and addictiveness of NAS, and the measures were scaled accordingly, with assessment of scale reliability. For Research Question 1, I conducted a comparison of four grouped conditions: “specific” correctives, “generic” correctives, forewarning (implied refutation) and control. I analyzed effects of condition on the three misbelief scales in their entirety, as well as on the subsets of more detailed misbeliefs directly addressed by the “specific” inoculations only. For Research Question 2, I compared five groups: exposition (“generic” and “specific”), first-person narrative (“generic” and “specific”), exemplar narrative (“generic” and “specific”), forewarning (implied refutation) and control. I further used one-way ANOVA to test for effects on the other aforementioned outcome measures, and Preacher and Hayes’ PROCESS model to explore mediated effects of inoculation messages on beliefs.

Results

Participants

This experiment included 1541 adult participants, all of whom were current (n = 771) or former (n = 770) smokers. Current and former smokers constituted the target population because prior research indicates that smokers are particularly susceptible to misconceptions arising from NAS advertising, and such misconceptions influence intentions to use among current and even former smokers (Byron, Baig & Moracco,
Further, the smoker identity is a defining component of the self-concept that sometimes persists even after cessation, and it is empirically linked to related behaviors (Hertel & Mermelstein, 2012; Vangeli, Stapleton & West, 2010; Tombor, Shahab, Brown & West, 2013).

To qualify for the study, current smokers must have smoked at least 100 (lifetime) cigarettes and must currently smoke daily or intermittently. Former smokers must have previously smoked on a daily basis and must have quit at least six months prior to enrollment in the study (U.S. Centers for Disease Control and Prevention, 2016). As done in Pilot Studies 1 and 2, I included an educational quota, such that no more than 35 percent of the sample could hold a college degree or higher. Prior data sets collected by our research team have imposed this quota following soft launches in which respondents had atypically high education levels for smokers. In recognition of national patterns (about one-third of smokers have some college education; see Neff et al., 2016), but cognizant of the fact that NAS smokers tend to skew somewhat more educated (see Pearson et al., 2017), I imposed the aforementioned quota. Data collection was supported by a grant from the National Institutes of Health and the U.S. Food and Drug Administration.

The target sample size for this study was calculated based on a power analysis in G*Power (see Faul, Erdfelder, Lang & Buchner, 2007) conducted using data from Pilot Study 2. That study was powered to detect an effect of approximately .16; in the prior study, the primary comparisons were between inoculation correctives and the misinformation control, though it did detect some differences among correctives (using
planned contrasts). For this study, I expected potentially smaller differences in condition effects, as I aimed to assess differences among correctives based on argument type and format; I targeted a roughly 15% increase in sample size, with the power to detect an effect of approximately .11. Table 1 presents participant assignment by condition and smoker type.

<table>
<thead>
<tr>
<th>Table 1: Summary of Participant Data by Condition, Smoker Type</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Condition</strong></td>
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<tr>
<td>---------------------</td>
</tr>
<tr>
<td>Control</td>
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<tr>
<td></td>
</tr>
<tr>
<td>Forewarning</td>
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<tr>
<td></td>
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<tr>
<td>Specific</td>
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<tr>
<td></td>
</tr>
<tr>
<td>Specific – Exposition</td>
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<tr>
<td></td>
</tr>
<tr>
<td>Specific – First Person</td>
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<tr>
<td></td>
</tr>
<tr>
<td>Specific – Exemplar</td>
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<tr>
<td></td>
</tr>
<tr>
<td>Generic</td>
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<tr>
<td></td>
</tr>
<tr>
<td>Generic – Exposition</td>
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<tr>
<td></td>
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<tr>
<td>Generic – First Person</td>
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<tr>
<td></td>
</tr>
<tr>
<td>Generic – Exemplar</td>
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<td></td>
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<tr>
<td><strong>N=1541</strong></td>
</tr>
</tbody>
</table>

Regarding demographics, the sample was 62% female and 96% non-Hispanic; the racial composition was 93% White, 4% Black/African American, 1% Asian, 1% American Indian or Alaska Native, 0.1% Native Hawaiian/Pacific Islander, and 1% Other. Approximately 61% reported a high school degree or less, 19% reported some college, and 21% reported a college degree or more. The sample was comprised of 50% current and 50% former smokers. Of current smokers, 1% selected NAS as their
regular/preferred brand, and 10% reported trying NAS. Of former smokers, 0.2% reported that NAS had been their regular/preferred brand when they smoked, and 3% reported having ever tried NAS. Overall, 97% of participants correctly answered Attention Check 1 (which just provided a warning if answered incorrectly), 87% correctly answered Attention Check 2, and 96% correctly answered Attention Check 3. The completion rates by condition for Attention Check 2 were 85% for Control, 87% for Forewarning, 87% for Specific, and 88% for Generic.

**Outcome measures**

**Misbeliefs about NAS.** The primary outcome measures for Study 1 were the three categories of misbeliefs about NAS. Research Question 1 explored effects of different inoculation messages on misbeliefs, with two associated hypotheses. Results supported Hypothesis 1, indicating that inoculations do not need to contain the same arguments as the misinformation; inoculations with generic arguments were, in almost all cases, as successful in forestalling misbeliefs about NAS as were inoculations with specific arguments. This result held true when analyzing the full scales of misbeliefs, as well as just those misbeliefs that were designed to match particular arguments in the specific versions of the inoculation messages. In fact, the specific and generic inoculations were only distinct from one another with regard to the composition misbeliefs scale, and further analysis revealed that this distinction only held true when comparing the specific versus generic inoculation in the first-person narrative format (within the exposition and exemplar formats, the generic and specific versions produced statistically indistinguishable results).
Findings also supported Hypothesis 2, as the “forewarning only” inoculations with implied refutations did confer an inoculation benefit relative to the misinformation control, for all categories of misbeliefs. Yet they were not as successful as the specific or generic inoculations, which contained explicit refutations. Table 2 presents mean scores on misbelief scales by conditions, grouped by inoculation argument type.

| Table 2: Mean Scores (SD) on Misbeliefs, Conditions Grouped by Argument Type |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Condition       | Health (All) (α = .93; n = 9) | Health (Specific) (α = .86; n = 4) | Composition (All) (α = .77; n = 6) | Composition (Specific) (α = .75; n = 3) | Addictiveness (All) (α = .88; n = 4) | Addictiveness (Specific) (α = .82; n = 2) |
| Control         | 3.53 (1.25)      | 3.32 (1.33)      | 4.77 (.99)       | 4.45 (1.26)      | 3.57 (1.38)      | 3.83 (1.47)      |
| Forewarning     | 2.74***a (1.27)  | 2.64***a (1.28)  | 3.83***a (1.12)  | 3.41***a (1.45)  | 2.78***a (1.39)  | 2.98***a (1.60)  |
| Specific        | 2.21***b (1.24)  | 2.16***b (1.27)  | 3.34***b (1.07)  | 2.76***b (1.43)  | 2.21***b (1.26)  | 2.39***b (1.46)  |
| Generic         | 2.31***b (1.23)  | 2.22***b (1.24)  | 3.49***c (1.03)  | 3.01***c (1.32)  | 2.34***b (1.30)  | 2.58***b (1.49)  |

* p < .05; ** p < .01; *** p < .001; Italics p < .05 with Bonferroni correction, with all comparisons to the misinformation-only control. Higher means indicate higher endorsement of misbeliefs. Note: a, b, c notation denotes significant differences among correction conditions, tested using planned contrasts; conditions with different letters are significantly different from one another.

Research Question 2 focused on the format of the inoculation messages. The findings partially supported Hypothesis 3, as exemplar messages were more successful than first-person narratives, but expository messages were not. All formats were successful in correcting relative to the misinformation control. Table 3 presents results...
pertaining to misbelief scores by conditions, grouped by inoculation format. All belief measures included the full participant sample.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Health Misbeliefs ($\alpha = .93; n = 9$)</th>
<th>Composition Misbeliefs ($\alpha = .77; n = 6$)</th>
<th>Addictiveness Misbeliefs ($\alpha = .88; n = 4$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>3.53 (1.25)</td>
<td>4.77 (.99)</td>
<td>3.57 (1.38)</td>
</tr>
<tr>
<td>Forewarning</td>
<td>2.74*** (1.27)</td>
<td>3.83*** (1.12)</td>
<td>2.78*** (1.39)</td>
</tr>
<tr>
<td>Exposition</td>
<td>2.31***b (1.24)</td>
<td>3.56***b (1.04)</td>
<td>2.34***b (1.28)</td>
</tr>
<tr>
<td>First-person</td>
<td>2.33***b (1.22)</td>
<td>3.45***b (1.02)</td>
<td>2.36***b (1.28)</td>
</tr>
<tr>
<td>Exemplar</td>
<td>2.14***b (1.24)</td>
<td>3.25***c (1.08)</td>
<td>2.13***c (1.27)</td>
</tr>
</tbody>
</table>

* $p < .05$; ** $p < .01$; *** $p < .001$; *Italics p < .05 with Bonferroni correction, with all comparisons to the misinformation-only control.

Higher means indicate higher endorsement of misbeliefs. Note: a, b, c notation denotes significant differences among correction conditions, tested using planned contrasts; conditions with different letters are significantly different from one another.

**Attitudes and intentions toward NAS.** Intention measures only included current smokers, as our prior studies have consistently shown extremely low intentions among former smokers, regardless of experimental treatment. All inoculation treatments successfully reduced the favorability of current and former smokers’ attitudes towards NAS, and depressed current smokers’ intentions toward NAS, relative to the misinformation control. Table 4 presents results related to attitudes, and Table 5 presents results regarding intentions.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>-.92 (5.30)</td>
</tr>
</tbody>
</table>

**Conditions, by Inoculation Argument Type**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forewarning</td>
<td>-3.64*** (5.29)</td>
</tr>
<tr>
<td>Specific</td>
<td>-5.26*** (4.77)</td>
</tr>
<tr>
<td>Generic</td>
<td>-5.17*** (4.48)</td>
</tr>
</tbody>
</table>

**Conditions, by Inoculation Format**
Table 5: Mean Scores on Current Smokers’ Intentions towards NAS (Scaled) (n = 767) (α = .79; n = 3)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control (n=155)</td>
<td>2.78 (.84)</td>
</tr>
<tr>
<td>Conditions, by Inoculation Argument Type</td>
<td></td>
</tr>
<tr>
<td>Forewarning (n=152)</td>
<td>2.40*** (.80)</td>
</tr>
<tr>
<td>Specific (n=221)</td>
<td>2.19*** (.80)</td>
</tr>
<tr>
<td>Generic (n=240)</td>
<td>2.07*** (.77)</td>
</tr>
<tr>
<td>Conditions, by Inoculation Format</td>
<td></td>
</tr>
<tr>
<td>Exposition (n=162)</td>
<td>2.24*** (.84)</td>
</tr>
<tr>
<td>First-person (n=145)</td>
<td>2.08*** (.76)</td>
</tr>
<tr>
<td>Exemplar (n=154)</td>
<td>2.06*** (.74)</td>
</tr>
</tbody>
</table>

* p < .05; ** p < .01; *** p < .001; Italics p < .05 with Bonferroni correction, with all comparisons to the misinformation-only control.

Mediated effects. Because the inoculation messages were quite successful in reducing intentions towards NAS, I conducted additional analysis regarding this effect. Specifically, using the Preacher and Hayes PROCESS model, I explored whether the observed reductions in misbeliefs might have mediated effects on intentions. Here, I included the three misbelief scales as individual mediators in a parallel mediation analysis. I did this rather than scaling all misbeliefs together because findings in my pilot studies indicated that some types of misbeliefs (namely health and composition) might play a more prominent role in mediating effects than others (i.e., addictiveness).

Results support potential mediation of effects on intentions via reduction of misbeliefs, particularly the categories of health/safety and composition misbeliefs. Direct effects were small and non-significant, whereas indirect effects were significant and accounted for the vast majority of the total effect. Table 6 presents results of the
mediation analysis, which explored mediation of effects of exposure to any inoculation condition (vs. control) on current smokers’ intentions, via the three categories of misbeliefs. It should be noted that this mediation was a statistical one, as the mediator was not causally manipulated. As such, I cannot make causal claims about the results; still, the model tested (which yielded significant effects) was based upon expected pathways of effect from beliefs to attitudes to intentions, informed by theoretical models of attitude/behavior change (i.e., the Theory of Reasoned Action; see Fishbein & Ajzen, 1975, 2010).

<table>
<thead>
<tr>
<th>Table 6: Mediated Effects of Condition Exposure on Current Smokers’ Intentions, via Misbeliefs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Paths from Exposure to Misbeliefs – Coefficient (SE) (n=768)</strong></td>
</tr>
<tr>
<td>Health/Safety</td>
</tr>
<tr>
<td>Composition</td>
</tr>
<tr>
<td>Addictiveness</td>
</tr>
<tr>
<td><strong>Paths from Misbeliefs to Intentions</strong></td>
</tr>
<tr>
<td>Health/Safety</td>
</tr>
<tr>
<td>Composition</td>
</tr>
<tr>
<td>Addictiveness</td>
</tr>
<tr>
<td><strong>Total Effects</strong></td>
</tr>
<tr>
<td><strong>Indirect Effects</strong></td>
</tr>
<tr>
<td><strong>Direct Effects</strong></td>
</tr>
</tbody>
</table>

* p < .05; ** p < .01; *** p < .001; Italics p < .05 with Bonferroni correction

**Message reactions.** The final category of outcome measures pertained to participant reactions to the misinformation (ad) stimuli themselves, namely threat, counterarguing and reactance to the stimuli. The measures for counterarguing and reactance were scales adapted from prior work (see Niederdeppe, Heley & Barry, 2015; Gratale, et al., 2018), whereas threat was a single item. Results here followed similar patterns to beliefs, as all inoculations were successful relative to the control in enhancing...
counterarguing, threat, and reactance; further, while the inoculations with explicit refutation did not differ from each other, they were somewhat more successful than the inoculation with implied refutation. Notably, the narrative conditions, particularly the exemplar, appeared to be more successful in promoting the desired responses than the inoculation in exposition format. Table 7 presents results pertaining to counterarguing, threat, and reactance.

| Table 7: Mean Scores (SD) on Message Variables |
|-----------------|-----------------|-----------------|
| Condition       | Counterarguing (n=1534) (α=.81; n=2) | Threat (n=1534) | Reactance (n=1532) (α=.91; n=3) |
| Control         | 3.80 (1.44)     | 3.35 (1.60)     | 3.34 (1.51)     |
| Conditions, by Inoculation Argument Type |
| Forewarning     | 4.84***a (1.55) | 4.73***a (1.70) | 4.55***a (1.60) |
| Specific        | 5.11***b (1.56) | 5.02***b (1.73) | 4.88***b (1.54) |
| Generic         | 5.18***b (1.47) | 5.00***b (1.75) | 4.88***b (1.59) |

* p < .05; ** p < .01; *** p < .001; Italics p < .05 with Bonferroni correction, with all comparisons to the misinformation-only control.

Note: a, b, c notation denotes significant differences among correction conditions, tested using planned contrasts; conditions with different letters are significantly different from one another.

Conditions, by Inoculation Format |

<table>
<thead>
<tr>
<th>Condition</th>
<th>Counterarguing (n=1534) (α=.81)</th>
<th>Threat (n=1534)</th>
<th>Reactance (n=1532) (α=.91)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposition</td>
<td>4.99***a (1.47)</td>
<td>4.72***a (1.70)</td>
<td>4.62***a (1.60)</td>
</tr>
<tr>
<td>First-person</td>
<td>5.17***ab (1.53)</td>
<td>5.07***b (1.70)</td>
<td>4.87***b (1.57)</td>
</tr>
<tr>
<td>Exemplar</td>
<td>5.27***b (1.54)</td>
<td>5.24***b (1.73)</td>
<td>5.16***c (1.48)</td>
</tr>
</tbody>
</table>

* p < .05; ** p < .01; *** p < .001; Italics p < .05 with Bonferroni correction, with all comparisons to the misinformation-only control.

Note: a, b, c notation denotes significant differences among correction conditions, tested using planned contrasts; conditions with different letters are significantly different from one another.

Study Conclusions

The findings of this study were largely consistent with hypotheses and were very promising in terms of the potential for inoculation correctives to combat misinformation that arises implicitly from misleading advertising. Specifically, I observed success of all
inoculation correctives relative to the misinformation-only control in reducing three categories of misbeliefs about NAS. In most cases, results supported comparable levels of correction among inoculations with specific versus generic correctives, indicating inoculations do not need to match every individual argument from the anticipated misinformation. I also found stronger correction by inoculations with explicit refutations versus implied refutation, though the latter also corrected relative to control. Further, results indicated comparable corrective success among expository and first-person narrative correctives, and somewhat higher levels of correction among exemplar correctives. In general, the findings of this study indicate success of virtually all inoculations regardless of specific inoculation type; in fact, even the forewarning only was consistently successful.

The patterns observed for beliefs were largely consistent with those for other subsidiary outcome measures including attitudes, intentions, counterarguing, threat, and reactance. With regard to attitudes and intentions, the forewarning-only inoculation actually performed as well as the inoculations with explicit refutations. Notably, narrative inoculations were more successful than the expository inoculation in the latter three categories, which are traditional outcomes for inoculation processes. These constructs, and their potential role in influencing outcomes such as corrective success, were probed further in the subsequent dissertation studies. Importantly, the observed reduction of misbeliefs appeared to mediate effects of the inoculation correctives on other key outcomes, namely intentions. Still, this study did not probe mediation of effects on misbelief reduction itself, but the subsequent studies did.
Limitations of this study include representativeness, stimuli selection, and mediation conclusions. This study did not recruit a nationally representative sample, or one to match characteristics of the smoking population. Yet it did impose a restriction on proportion of college educated participants, to make it closer to the typical smoking population. Also, while the study utilized corrective stimuli that were, to a large degree, pre-tested in prior studies, each condition had only one corrective stimulus, thereby limiting its ability to represent the whole class of stimuli. This issue is addressed to some degree in the subsequent studies, which utilized multiple stimuli per condition. This study yielded clear, significant mediation results; nevertheless, it utilized a statistical mediation analysis, not a causally manipulated one. While this limits the causal conclusions that can be inferred, the results observed were consistent with theoretical expectations based on established theoretical models of behavior change.

The results in this study evince the promise of inoculation messages as a tool for forestalling misbeliefs that arise from misleading messaging. They further support that inoculations need not match exact misinformation arguments in order to address such misbeliefs. The subsequent studies also aimed to test the bounds of the findings here, and more closely probe other subsidiary outcome measures as well as the mediating and moderating relationships among the key variables of study.
CHAPTER 4: STUDY 2

Background

The purpose of Study 2 was to build upon the analysis from Study 1 exploring the significance of the argument type factor. Specifically, I sought to further assess whether inoculation arguments need to match misinformation arguments. As this study focused specifically on the argument type factor – which I believe to be the most salient message factor regarding inoculation against misinformation – I intended to provide a stricter test of potential differences in effects based on argument type. As a result, I exaggerated the distinctions between “specific” and “generic” argument conditions, to test the bounds of the corrective power of generic inoculations relative to specific.

In addition to the changes regarding the correctives, the design of Study 2 also added a timing factor, to assess effects of each corrective type over time. Inoculation studies vary widely in the amount of time between the inoculation and the attack message, or between the stimuli and assessment of outcomes. Some studies (e.g., Nabi, 2003) administer attack messages shortly after inoculations, and assess outcome measures shortly after attack, finding immediate success of inoculation treatments. Other studies have shown that while inoculation messages can be effective quickly, short delays before the persuasive attack can promote inoculation success by affording more time for resistance to develop (Hass & Grady, 1975; Freedman & Sears, 1965). In some cases, inoculation treatments have been shown to be effective over longer time intervals (e.g., Pfau & Van Bockern, 1994). Nevertheless, research indicates that inoculation effects may decay over time (Banas & Rains, 2010), though potentially more slowly than effects.
of more standard, supportive treatments; interestingly, effects of refutational-different inoculations may take longer to confer resistance, but the resistance they confer may be more durable because it is not contingent upon recollection of particular arguments (McGuire, 1962). With these considerations in mind, assessing the durability of inoculations against misinformation – as well as potentially different durability of resistance based on inoculation argument type – emerged as a valuable and as yet unaddressed inquiry.

In Study 2, I also aimed to probe potential mediation of effects. Here, I assessed the mechanisms of inoculation effects, namely whether the aforementioned theoretical mediators of counterarguing and threat do in fact mediate effects when inoculating against misinformation (McGuire 1961, 1962; McGuire & Papageorgis, 1961; Pfau et al., 1990, 2001, 2004). The elicitation of counterarguing and threat is particularly important because these are theorized to be leading mediators of inoculation effects, as warnings should induce threat to one’s attitudes/beliefs, which in turn leads to counterarguing of subsequent attacks (Compton & Pfau, 2005). In the case of inoculating against misleading information, successfully prompting counterarguing may be more important than in other applications of inoculation. Rather than trying to protect an existing attitude or make it more salient – which could actually be problematic if the misinformation itself is congenial to prior attitudes – inoculating against misinformation hinges on conveying resistance to the persuasive attack and, in all likelihood, inspiring the ability to counterargue against it.

Especially in the case of refutational-different arguments, when the arguments themselves do not match the exact misinformation, the content of the inoculation alone
would not be expected to provide a matched counter to the misinformation. Yet if the inoculation prompts the ability and/or desire to counterargue the persuasive attack, it should be able to confer resistance to the misinformation. In fact, with regard to inoculations with refutational-different arguments, general threat and counterarguing rather than exact refutations are theorized to confer resistance to persuasive attacks (McGuire, 1962; Pfau, 1992; Pfau, Kenski, Nitz & Sorenson, 1990; Pfau et al., 2005). In this manner, counterarguing may explain the seemingly durable resistance conveyed by refutational-different arguments (McGuire, 1962), as inoculations that strongly inspire the inclination to counterargue may in turn convey resistance that carries forward even beyond the useful potency of specific arguments. Thus, even if “specific” and “generic” inoculations seemingly perform similarly with regard to outcomes like beliefs, it is useful to know if they differentially influence counterarguing, threat or reactance.

In addition, threat and counterarguing can also be considered indicators of reactance, and more specifically, reactance to the misinformation. Again, in the case of misinformation, we cannot rely on an audience’s desire to protect existing attitudes, or even on the ability of inoculation to directly contradict every facet of the misinformation. Rather, inoculation’s potential lies in the ability to generate the desire to resist, potentially because of perceived threat of the misinformation and reactance to it (Miller et al., 2013; Banas & Miller, 2013). As discussed, because misinformation correctives often fail to generate reactance toward the misinformation and instead generate reactance toward the corrective itself (Lewandowsky et al., 2012), assessing these variables and their potential mediating role in the process of inoculating against misinformation is particularly important. My exploration of the mechanisms of inoculation further included
a consideration of whether argument type influences counterarguing, threat and reactance.

Research Questions and Hypotheses

To further bear out the results of Study 1, I probed the following research questions:

**RQ1.** Do inoculation messages intended to combat health misinformation need to contain the same arguments as the misinformation?

**RQ2.** Do inoculations with specific or generic refutations provide more durable resistance over time?

My associated hypotheses were:

**H1.** Inoculations do not need to contain the same arguments as the misinformation (i.e., the misleading advertisements or the misinformation itself). Inoculations with “generic” argument refutations will inoculate as well as those with “specific”, matched refutations.

**H2.** Inoculations with “generic” argument refutations will provide more durable resistance over time than those with “specific” argument refutations.

My research questions also considered potential mechanisms of effect, specifically probing whether the theoretically hypothesized mechanisms of counterarguing and threat serve as mediators of inoculation effects. In this consideration, I also sought to answer the question of whether inoculations with “specific” vs. “generic” argument refutations differentially influence potential mediators. My related research questions were:
RQ3. Do inoculations with “specific” vs. “generic” argument refutations prompt different levels of counterarguing of misinformation?

RQ4. What are potential mechanisms of effect for the inoculation correctives?

Specifically, do counterarguing, threat and reactance mediate effects of inoculation exposure on (mis)beliefs?

My associated hypotheses were:

H3. Inoculations with “generic” and “specific” argument refutations will prompt comparable levels of counterarguing in response to misinformation stimuli.

H4. Counterarguing, threat and reactance will mediate effects of inoculations on (mis)beliefs.

Method

Procedure

Study 2 was completed in May of 2020, again an online randomized experiment administered via Qualtrics with a Dynata sample. As with Study 1, participants completed background screeners regarding their age and smoking history/status, to assess their eligibility for the study. I randomized eligible participants to a control condition or one of a set of treatment conditions, described under Stimuli. Participants in inoculation treatment conditions viewed (for a minimum of 10 seconds each) an inoculation message warning them about the risks of natural cigarettes. All participants then saw two examples of NAS advertising content (for a minimum of ten seconds each). Prior to the outcome measures, all participants completed a distraction task (for a minimum of 30
seconds). The survey contained three attention checks; the first check only provided a warning following an incorrect response, but an incorrect response on the subsequent attention checks resulted in the participant being dropped from the study. Upon completion of the outcome measures, all participants were debriefed as to the harms of natural cigarettes and the effects of cigarette smoking.

Unlike Study 1, Study 2 added a time component. Approximately one week after administration of the study, all participants were invited to complete a follow-up survey. The follow-up survey included a re-administration of targeted outcome measures, namely those pertaining to beliefs, attitudes and intentions about NAS. This re-administration allowed for an exploration of the effects of the inoculation correctives over time.

**Stimuli**

**Misinformation stimuli.** As with Study 1, this study included two misinformation exposures. The misinformation exposures were the same as those utilized in Study 1, as analysis revealed they did prompt misinformed beliefs with sufficient room for correction.

**Corrective stimuli.** Selection of the corrective stimuli for this study was based upon results of Study 1. Here, I randomized participants to one of four conditions: “generic” inoculation, “specific” inoculation, “forewarning-only” inoculation or misinformation-only control. All inoculations included a forewarning and some form of refutation. The forewarning element signaled that given the history of tobacco industry deception, NAS ads may be deceptive and may imply things about the product that are not true. The forewarning was consistent across the inoculation conditions, but the conditions differed in the refutation component. As in Study 1, the forewarning-only
condition included an implied (rather than explicit) refutation component, as it did not directly correct any misperceptions about NAS, but instead warned against believing the misleading implications of tobacco advertising.

The “specific” and “generic” inoculations differed in their refutation component. As in Study 1, the “specific” inoculations contained detailed arguments to refute all three categories of misinformation implied in the ads and addressed in the misbelief statements, whereas the “generic” inoculations simply provided higher-level arguments that did not match the exact details of the ads or the misbeliefs. However, Study 2 amplified the differences between the “specific” and “generic” inoculations via changes to the “generic” inoculations. In particular, in Study 1, the “generic” inoculations broadly addressed the three thematic categories of misinformation, but did not provide the level of detail contained in the “specific” inoculations. For instance, whereas the “specific” inoculations would state that NAS cigarettes cause heart disease, lung disease and other cancers, secondhand smoke from NAS can cause Sudden Infant Death Syndrome, and NAS cigarettes contain just as much or more nicotine, the “generic” inoculations might include statements that NAS cigarettes are just as damaging to health and just as addictive as regular cigarettes. The statements in the “specific” inoculations directly corresponded to misbeliefs assessed as outcome measures, whereas those in the “generic” inoculations simply matched the misinformation on a broader thematic level. Yet in Study 2, I no longer made the “generic” refutations correspond to the three thematic areas of misinformation. Rather, the “generic” correctives instead just broadly explained that NAS cigarettes are not safer or less dangerous than other cigarettes. This type of refutation was high level and did not contain even the three thematic parallels to the
“specific” refutations, as was done in Study 1. Thus, it provided a more rigorous test of
differences based on argument type.

Both of the inoculation conditions with explicit refutations utilized a multiple
message design, and participants saw one of two potential inoculation messages from that
condition. In particular, I included “generic” and “specific” inoculations in both
exemplar and exposition formats. I selected the exemplar corrective because it was
somewhat more successful than the other formats in Study 1, and the exposition
corrective because it is representative of a more typical corrective and was as successful
as the first-person narrative in Study 1. Each participant saw either the exemplar or the
expository corrective within his/her assigned condition.

Measures

Study 2 incorporated the primary and secondary outcome measures used in Study
1. Study 2 expanded the scope of Study 1 to focus on the potential mechanisms of effects
on misbeliefs, namely counterarguing, threat and reactance, with an additional threat
measure added as well.

Analysis

As with Study 1, I applied one-way ANOVA (with correction for multiple tests)
to assess the success of the inoculation conditions in addressing misbeliefs about NAS,
relative to control. Using planned contrasts, I compared individual corrective conditions
to each other. I again scaled the misbeliefs. Here, I further assessed main effects by
condition on other key variables related to inoculation, such as threat, counterarguing,
and reactance. Because these are theorized mediators of inoculation effects, I
subsequently applied Preacher & Hayes’ PROCESS model (Hayes, 2009) to test potential
mediation of condition effects on misbeliefs, via these variables. While this was not a causal mediation test, as I did not manipulate the mediator, it followed an a priori expectation of pathways of effect based on prior research about inoculation. It also allowed me to test simultaneous mediators. For Time 2 data, I applied one-way ANOVA to test effects of condition on misbeliefs, attitudes and intentions.

Results

Participants

Like Study 1, Study 2 included current and former adult smokers. All eligibility criteria mirrored those applied in Study 1, including the age and smoking screeners and the requested education quota. The target sample size was determined using a power analysis in G*Power (see Faul, Erdfelder, Lang & Buchner, 2007), following analysis of Study 1 data. The target sample was approximately 1,200 current and former smokers, to provide 80% power to detect a small effect among smoker subgroups at Time 1 and among the full sample at Time 2, assuming a 50% Time 2 response rate (effects of approximately .12 at Time 1 and .17 at Time 2). This afforded power to detect the lower end of effect size observed for beliefs in Study 1. The final sample included 1,275 participants at Time 1 and 814 at Time 2, due to a higher than anticipated yield at Time 2. Table 8 provides a list of participants by condition and smoker type.

| Table 8: Summary of Participant Data by Condition, Smoker Type, Time 1 |
|-----------------------------|-----------------------------|-----------------------------|
| **Condition** | **Number of Participants** | **Smoking Status** |
| Control | 313 | Current – 140  
Former – 173 |
| Forewarning | 291 | Current – 145  
Former – 146 |
| Specific | 327 | Current – 146 |
In terms of demographics, the sample was 52% male and 95% non-Hispanic; the racial composition was 90% White, 6% Black/African American, 3% Asian, 1% American Indian/Alaska Native, 0.3% Native Hawaiian/Pacific Islander, and 2% Other. While I requested a maximum of 35% of the sample with a college degree or higher, the vendor-provided sample had approximately 49% with a college degree or more. The sample contained 44% current and 56% former smokers. Of current smokers, 2% reported NAS as their regular/preferred brand, and 12% reported having ever tried NAS. Of former smokers, 0.3% reported that NAS had been their regular/preferred brand when they smoked, and 5% reported having ever tried NAS. With regard to the attention checks, 95% of participants correctly answered the first check that provided a warning, 85% correctly answered Attention Check 2, and 96% correctly answered Attention Check 3. The completion rates by condition for Attention Check 2 were 83% for Control, 82% for Forewarning, 87% for Specific, and 88% for Generic.

**Outcome measures**

**Misbeliefs about NAS.** Misbeliefs pertaining to the health/safety, composition, and addictiveness of NAS were the primary outcome measures for both Time 1 and Time 2. As in Study 1, results supported Hypothesis 1, indicating that inoculations do not need to match specific misinformation arguments in order to combat such misinformation. These results held true even with the stricter test established by the exaggerated differences between the specific and generic inoculation stimuli in this study. Again,
inoculations with both specific and generic refutations were more successful than the forewarning-only inoculation, but the forewarning also corrected relative to control.

Table 9 presents results regarding main effects on misbeliefs at Time 1.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Health Misbeliefs (α = .94; n = 9)</th>
<th>Composition Misbeliefs (α = .78; n = 6)</th>
<th>Addictiveness Misbeliefs (α = .87; n = 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>3.36 (1.32)</td>
<td>4.61 (1.02)</td>
<td>3.32 (1.46)</td>
</tr>
<tr>
<td>Forewarning</td>
<td>2.67***a (1.29)</td>
<td>3.81***a (1.11)</td>
<td>2.73***b (1.36)</td>
</tr>
<tr>
<td>Specific</td>
<td>2.31***b (1.34)</td>
<td>3.46***b (1.15)</td>
<td>2.34***b (1.35)</td>
</tr>
<tr>
<td>Generic</td>
<td>2.27***b (1.34)</td>
<td>3.44***b (1.17)</td>
<td>2.36***b (1.37)</td>
</tr>
</tbody>
</table>

* p < .05; ** p < .01; *** p < .001; Italics p < .05 with Bonferroni correction, with all comparisons to the misinformation-only control.
Higher means indicate higher endorsement of misbeliefs.

Note: a, b, c notation denotes significant differences among correction conditions, tested using planned contrasts; conditions with different letters are significantly different from one another.

**Attitudes and intentions towards NAS.** While I did not have specific hypotheses related to attitudes and intentions, I examined them as subsidiary outcomes.

Results were similar to those regarding misbeliefs, with all inoculation messages resulting in reported reduction of attitude favorability and of intentions towards NAS.

Table 10 presents results pertaining to attitudes and intentions towards NAS.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Attitude Scale, Mean (SD) (α = .95; n = 6)</th>
<th>Intentions Scale, Current Smokers, Mean (SD) (n = 578) (α = .85; n = 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>-1.35 (5.68)</td>
<td>2.91 (.81) (n=138)</td>
</tr>
<tr>
<td>Forewarning</td>
<td>-3.30***a (5.41)</td>
<td>2.39***a (.88) (n=143)</td>
</tr>
<tr>
<td>Specific</td>
<td>-4.38***b (5.53)</td>
<td>2.43***a (.92) (n=145)</td>
</tr>
<tr>
<td>Generic</td>
<td>-4.44***b (5.12)</td>
<td>2.34***a (.95) (n=152)</td>
</tr>
</tbody>
</table>

* p < .05; ** p < .01; *** p < .001; Italics p < .05 with Bonferroni correction, with all comparisons to the misinformation-only control.
Note: a, b, c notation denotes significant differences among correction conditions,

---

1 Due to uneven distribution of current and former smokers across experimental conditions, analyses were also conducted with smoking status as a covariate. All patterns of significant difference and rank order means remained the same.
tested using planned contrasts; conditions with different letters are significantly different from one another.

**Message reactions.** As with other outcome measures, the inoculations with specific and generic refutations were not statistically distinct from one another with regard to message outcomes, supporting Hypothesis 3. In most cases, they prompted higher levels of negative reactions to the NAS ads relative to forewarning, which inspired more negative reactions than did the control. Table 11 presents results for message variables. These outcomes were assessed at Time 1.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Counterarguing (n=1,253) (α = .81; n = 2)</th>
<th>Threat (n=1,258) (α = .92; n = 2)</th>
<th>Reactance (n=1,257) (α = .89; n = 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>3.98 (1.63)</td>
<td>3.58 (1.69)</td>
<td>3.79 (1.57)</td>
</tr>
<tr>
<td>Forewarning</td>
<td><strong>4.78</strong>* (1.49)</td>
<td><strong>4.45</strong>* (1.55)</td>
<td><strong>4.44</strong>* (1.46)</td>
</tr>
<tr>
<td>Specific</td>
<td><strong>5.07</strong>* (1.57)</td>
<td><strong>4.75</strong>* (1.64)</td>
<td><strong>4.78</strong>* (1.58)</td>
</tr>
<tr>
<td>Generic</td>
<td><strong>5.00</strong>* (1.53)</td>
<td><strong>4.93</strong>* (1.55)</td>
<td><strong>4.85</strong>* (1.43)</td>
</tr>
</tbody>
</table>

* p < .05; ** p < .01; *** p < .001; Italics p < .05 with Bonferroni correction, with all comparisons to the misinformation-only control.

Note: a, b, c notation denotes significant differences among correction conditions, tested using planned contrasts; conditions with different letters are significantly different from one another.

**Mediated effects.** Study 2 expanded upon analyses from Study 1 to probe potential mediation pathways from correctives to effects on misbeliefs. Unlike in Study 1, here I examined misbeliefs as the outcome, in order to assess my hypothesized mechanisms of inoculation effects on misbeliefs. Specifically, I tested whether the traditional inoculation processes of counterarguing and threat, as well as reactance, serve to mediate effects of inoculation messages on misbelief correction. In this case, I scaled all misbeliefs together, rather than analyzing the three themes separately, because I did not anticipate or hypothesize any different mechanisms of effect on the three different
categories of misbeliefs (whereas in Study 1, I expected that the distinct misbelief categories might differentially influence effects on intentions, based on the results of my pilot work).

Results partially supported Hypothesis 4; while threat (and reactance) did not mediate this relationship, counterarguing did. Exposure to any inoculation message (all inoculation conditions aggregated) relative to control increased reported counterarguing of the information in NAS ads, which in turned predicted lower endorsement of misbeliefs (three categories aggregated). Table 12 presents mediation results, and Table 13 presents correlations among mediators. As in Study 1, this was a statistical mediation rather than a causal one; still, results were consistent with hypothesized effects and theoretical expectations, as counterarguing is thought to be a mechanism of inoculation effects that occurs concurrently with the persuasive attack and prior to attitude/belief change.

| Table 12: Mediated Effects of Condition Exposure on Misbeliefs, via Message Reactions |
|---------------------------------------|---------------------------------------|
| Paths from Exposure to Message Variables – Coefficient (SE) (n = 1,253) |
| Counterarguing | .98*** (.10) |
| Threat | 1.15*** (.11) |
| Reactance | .91*** (.10) |
| Paths from Message Variables to Misbeliefs |
| Counterarguing | -.29*** (.03) |
| Threat | -.001 (.04) |
| Reactance | .01 (.04) |
| Total Effects | -.96*** (.08) |
| Indirect Effects | Total Indirect: -.28 (.04) boot LLCI = -.37, boot ULCI = -.21 |
| Counterarguing: | -.29*** (.04) |
| Threat: | -.002 (.04) |
| Reactance: | .01 (.04) |
| Direct Effects | -.68*** (.08) |

* p < .05; ** p < .01; *** p < .001
Table 13: Correlations among Mediators

<table>
<thead>
<tr>
<th></th>
<th>Counterarguing</th>
<th>Threat</th>
<th>Reactance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counterarguing</td>
<td>.637***</td>
<td></td>
<td>.645***</td>
</tr>
<tr>
<td>Threat</td>
<td></td>
<td>.841***</td>
<td></td>
</tr>
</tbody>
</table>

* p < .05; ** p < .01; *** p < .001

**Time 2 results.** At Time 2, I examined participant responses on the outcome measures of beliefs, attitudes and intentions. Time 2 participants included 352 current and 462 former smokers, representing a 64% response rate. Retention rates by condition were 62% for control, 63% for forewarning, 64% for “specific”, and 67% for “generic”. Appendix 6 lists total numbers of participants by condition and smoking status, at Times 1 and 2. My primary hypothesis for Time 2 pertained to the effectiveness of different forms of inoculation on misbeliefs. Hypothesis 2 was not supported, as generic refutations were not superior to specific refutations at Time 2; instead, they were comparably effective. Yet another interesting result arose. While the inoculations with direct refutations outperformed the forewarning-only inoculation at Time 1, they no longer did so at Time 2 for either health or composition misbeliefs. Table 14 presents Time 2 results for misbelief scales.

<table>
<thead>
<tr>
<th>Table 14: Mean Scores (SD) on Misbeliefs, Time 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condition</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>Control</td>
</tr>
<tr>
<td>Forewarning</td>
</tr>
<tr>
<td>Specific</td>
</tr>
<tr>
<td>Generic</td>
</tr>
</tbody>
</table>

* p < .05; ** p < .01; *** p < .001; Italics p < .05 with Bonferroni correction, with all comparisons to the misinformation-only control. Higher means indicate higher endorsement of misbeliefs. Note: a, b, c notation denotes significant differences among correction conditions, tested using planned contrasts; conditions with different letters are significantly different from one another.
While I did not have additional hypotheses regarding attitudes and intentions, I examined these metrics as well. For attitudes, I observed the same patterns of results as occurred for misbeliefs. Though results for (current smokers’) intentions were similar, in this case the forewarning inoculation did not significantly differ from control, but results trended in the expected direction (p = .059). Table 15 presents Time 2 results for attitudes and intentions.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Attitude Scale, Mean (SD) (α = .95; n = 6)</th>
<th>Intentions Scale, Current Smokers, Mean (SD) (n = 352) (α = .85; n = 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>-2.40 (5.65)</td>
<td>2.80 (.89) (n= 80)</td>
</tr>
<tr>
<td>Forewarning</td>
<td>-4.03*** (5.28)</td>
<td>2.54a (.83) (n= 80)</td>
</tr>
<tr>
<td>Specific</td>
<td>-4.55**** (5.17)</td>
<td>2.27**** (.93) (n= 96)</td>
</tr>
<tr>
<td>Generic</td>
<td>-4.49**** (5.14)</td>
<td>2.44**** (.90) (n= 96)</td>
</tr>
</tbody>
</table>

* p < .05; ** p < .01; *** p < .001; Italics p < .05 with Bonferroni correction, with all comparisons to the misinformation-only control.

Note: a, b, c notation denotes significant differences among correction conditions, tested using planned contrasts; conditions with different letters are significantly different from one another.

**Mediated effects.** I also conducted mediation analysis using Time 2 data. Here, I used exposure at Time 1 and message reactions (counterarguing, threat, reactance) at Time 1 to predict misbeliefs (scale of all misbeliefs) at Time 2. Results were very similar to those obtained at Time 1. Exposure to any inoculation predicted increased counterarguing, threat and reactance at Time 1, and Time 1 counterarguing in turn predicted reductions in reported misbeliefs at Time 2. The significant indirect effect via counterarguing accounted for about half of the total effect, notably more than at Time 1. Table 16 presents Time 2 mediation results.
Table 16: Mediated Effects of Time 1 Condition Exposure on Time 2 Misbeliefs, via Time 1 Message Reactions

<table>
<thead>
<tr>
<th>Paths from Exposure to Message Variables – Coefficient (SE) (n= 803)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counterarguing</td>
</tr>
<tr>
<td>Threat</td>
</tr>
<tr>
<td>Reactance</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Paths from Message Variables to Misbeliefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counterarguing</td>
</tr>
<tr>
<td>Threat</td>
</tr>
<tr>
<td>Reactance</td>
</tr>
<tr>
<td>Total Effects</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Indirect Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Indirect: -.25 (.05) boot LLCI = -.37, boot ULCI = -.16</td>
</tr>
<tr>
<td>Counterarguing: -.28*** (.05)</td>
</tr>
<tr>
<td>Threat: .06 (.06)</td>
</tr>
<tr>
<td>Reactance: -.03 (.05)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Direct Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>-.25** (.09)</td>
</tr>
</tbody>
</table>

* p < .05; ** p < .01; *** p < .001

Study Conclusions

The results of Study 2 expanded upon and bolstered the findings from Study 1. Significantly, Study 2 replicated the finding that inoculations do not need to match specific misinformation arguments in order to forestall such misinformation. In Study 2, though, the distinctions between the inoculations with specific and generic refutations were even starker. Here, the “generic” refutation only provided a very broad warning about safety, and did not even match the three themes addressed in the “specific” refutations, let alone the individual arguments. Yet the corrective success between the two types of inoculations was not significantly different. That they were comparably effective – and more successful than the also effective forewarning – helps evince the utility of both the forewarning and refutation components of inoculation in countering misinformation. The specific and generic refutations also had comparable success in
reducing attitude favorability and intentions towards NAS, and in promoting negative reactions to the NAS advertising.

When analyzing results over time, findings indicated that the “generic” inoculation did not outperform the “specific” as had been expected. Yet a potentially related result transpired. Unlike at Time 1, by Time 2 the forewarning-only inoculation performed as well as the “specific” and “generic” inoculations in reducing two of the three misbelief scales. Further, for one of these scales, all inoculations performed better at Time 2 than at Time 1, indicating that the improved relative performance of the forewarning-only inoculation was not simply due to an erosion of effectiveness of the “specific” and “generic” inoculations. Rather, it seems that over time, the erosion was to the relative advantage of the explicit refutations over the implied refutation. Nevertheless, this is a somewhat limited result restricted to this study, and it should be replicated in future work to establish greater confidence in conclusions about effects over time. Also, it is important to note that while Hypothesis 2 was not supported, the “specific” inoculation also did not outperform the “generic” inoculation for any misbelief scale; this again underscores the promise of more generic refutations utilized in inoculations, even attenuated refutations that are not directly thematically matched to anticipated misinformation.

This study also yielded useful results regarding potential mediation processes that underpin inoculation effects on misinformation. Specifically, I expected that the traditional inoculation processes of counterarguing and threat, as well as reactance, would mediate effects on misinformation correction. Like numerous prior studies, this study found a sizable direct effect of the inoculation messages on the inoculation outcome – in
this case, misinformation correction. Yet it also found a significant mediating effect via the process of counterarguing. Further, in the Time 2 mediation analysis, the indirect effect actually accounted for about half of the (reduced) total effect, and the use of the Time 1 predictor and mediator with the Time 2 outcome afforded an element of temporal order. While we cannot rule out that at Time 1, counterarguing could have been influenced by beliefs, the results observed, in which counterarguing affects beliefs, are consistent with theoretical expectations. Specifically, the findings here are especially relevant because they are in line with the prediction that inoculations will inspire the ability to counterargue the persuasive attack (or NAS ad), even in the absence of exactly matched refutational information. Finding that inoculations with generic refutations correct as well as do specific ones, and that even inoculations with implied refutations can successfully thwart misinformation from NAS ads, indicates that some other corrective process (like counterarguing) is at work beyond the provenance of a particular refutation.

Like the prior study, this study also has its limitations. In this study, the percentage of college-educated respondents was even higher, thus making it less representative of the smoking population. Still, I conducted an analysis on the key study outcomes, split on education level, and found that results within each education subgroup mirrored the patterns of the full sample. Secondly, this study is also limited by having individual corrective stimuli represent each corrective category; yet in this case, I randomized participants to one of two corrective messages (that utilized different formats) in each correction condition, in order to reduce the influence of effects arising from any peculiarities of a single message. Finally, my mediation analysis was once
again statistical and not causally manipulated, which limits the conclusions that can be drawn. Further, my proposed mediators were self-reported, which also poses problems with potentially inaccurate reporting. Here, I found support for my hypothesis that counterarguing would mediate effects of inoculation exposure on corrective outcomes. While this was a statistical mediation, the results were consistent with theoretical predictions and with a large body of research establishing the role of counterarguing in inoculation.

When thinking about the relevance of this study’s findings, and the mediation results in particular, the forewarning component may have proven crucial in inspiring the desire to counterargue and thereby bolstering the protective effects of the inoculation. One potential reason for this could be that the forewarning inspires skepticism, which in turn engenders counterarguing. In the case of the inoculations about NAS, it is possible that the skepticism arises, at least in part, from the inoculation message’s highlighting of the prior deceptive acts on the part of the persuasive source. The relevance of this element of deception was the focus of the final study conducted here.
Background

As suggested in past research, an element that may be important to consider in the process of inoculating against misinformation is the role of identifying prior source deception, as this can influence perceptions of source credibility. When assessing the truthfulness of information, individuals tend to consider source credibility as a key factor (Schwarz, 2004; Schwarz, Sanna, Skurnik & Yoon, 2007). Even when information is not closely evaluated, source credibility often influences persuasive effects (Petty, Cacioppo, & Goldman, 1981; Chaiken, 1987). Source credibility has been associated with confidence in information from the source, and with persuasion itself (Briñol, Petty, and Tormala, 2004; Clark, Wegener, Sawicki, Petty, & Briñol, 2013).

In general, individuals tend to derogate sources that are found to be deceptive or lying (e.g., McCormack & Levine, 1990; Tyler, Feldman, & Reichert, 2006; Green & Donohue 2011). Lying elicits negative feelings and disapproval, and self-interested or malicious motivations for lying exacerbate disapproval (Utz, 2005), as deception for personal gain prompts especially negative reactions (Tyler, Feldman, & Reichert, 2006; Backbier, Hoogstraten & Meerum, 1997). Intentional deception is considered to be particularly unacceptable (Green & Donohue, 2011), especially if the deception promotes one’s self-interest rather than helping someone else (Cantarero et al., 2018). In fact, in some cases, intentionally misrepresenting one’s actions or positions is actually viewed more negatively than committing an unacceptable action, because of the morally unacceptable character of deception and hypocrisy (see, e.g., Jordan, Sommers, Bloom &
Rand, 2017). As a result, it stands to reason that if people are warned that they will encounter information designed to deceive them, then they will be motivated to question it; in fact, early research indicates that specifying a dishonest motivation behind misinformation (e.g., an intent such as purposeful deception for personal gain) can help to increase the acceptability of a correction (Lewandowsky, Stritzke, Oberauer & Morales, 2005, 2009; Lewandowsky, et al., 2012).

The role of credibility and source derogation has been considered in some prior applications of inoculation theory (Niederdeppe, Heley & Barry, 2015; Hersey, et al., 2005; Pfau & Van Bockern, 1994; Pfau, Van Bockern & Kang, 1992; Green & Donohue, 2011). With regard to tobacco misinformation, highlighting deceptive tobacco company practices may be a promising means of conferring inoculation to pro-smoking messaging. Niederdeppe and colleagues (2015) speak to the role of deception in inoculation; they suggest that messages that identify industries as using deceptive marketing practices can influence support for anti-industry policy by altering audience beliefs about the industry and enhancing the salience of such beliefs as predictors of policy support. Calling attention to deceptive marketing techniques is thereby expected to reduce receptivity to and persuasive impact of such marketing, as messages that explicitly refer to deceptive advertising tactics can lower source credibility and thereby promote reactance and resistance to the advertising (Hersey et al., 2005). Early work on inoculating against misinformation indicates promise for the strategy of highlighting deception. Studies have concluded that that successful inoculations may explicitly caution against the deceptive nature of impending, unproven claims (Ecker, Lewandowsky & Tang, 2010). By focusing on the deceptive nature of misleading messages, inoculations may be able to
render such messages less persuasive (Cook, Lewandowsky & Ecker, 2017; Cook, Ellerton & Kinkead, 2018).

Because many documented areas of health misinformation have arisen from intentional deception on the part of a particular industry, inoculating against messages from the deceptive industry rather than combating individual industry claims may prove to be an effective means of inoculation, and a very appropriate one for health issues like the dangers of natural cigarettes. Blake & colleagues (National Cancer Institute, 2011) have found that identifying misleading advertising techniques can generate negative feelings toward tobacco companies, and that use of the term “manipulation” prompts feelings of deception in the audience. Empirical research links receptivity to pro-tobacco advertising/communications to increased likelihood of smoking (MacFayden, Hastings & MacKintosh, 2001; Botvin, Goldberg, Botvin & Dusenbury, 1993), so opponents of the tobacco industry expect that fostering anti-industry attitudes would conversely lower receptivity to smoking.

Importantly, the tobacco industry was actually found to have intentionally misled the public about tobacco addictiveness and risks and to have violated the Racketeer Influenced & Corrupt Organizations Act, and was required to publicly correct misperceptions about cigarettes and disclose their deception (United States v. Phillip Morris USA, 2006); yet the tobacco companies appealed the decision and upon appeal were no longer required to identify their deception in their corrections (Schoenberg, 2013). Interestingly, though, highlighting tobacco industry deception has been considered as a strategy to bring about “tobacco industry denormalization”, and in fact, sample messages that warn of prior tobacco industry deception have been shown to elicit
anger toward the industry and stimulate intentions to quit (Kollath-Cattano et al., 2014). Thus, testing the relevance of highlighting deception would be important for a theoretical understanding of inoculating against misinformation, but also from a practical perspective, as it could elucidate the informational value of sharing the type of information disallowed by the latest court ruling.

From a broader perspective, it will also be important to consider whether warning about source deception to inoculate against misleading advertising may confer resistance not just to the particular subject of the advertising, but also to other messaging from that source. Specifically, inoculation messages that focus on deceptive tactics are geared towards derogation of the persuasive source, not just the particular information at hand. In this manner, the resistance conveyed through such inoculations might apply very broadly to messages from that source. For instance, in the case of misleading natural cigarette advertising, could inoculation effects carry over to other products from the same industry, such as “Modified Risk Tobacco Products”? The Food and Drug Administration is currently considering applications for Modified Risk Tobacco Products (MRTPs), which are products sold to reduce the risk of harm from traditional tobacco products (e.g., e-cigarettes, heat-not-burn, snus; see U.S. Food and Drug Administration, 2019). In this case, messages that effectively inoculate against natural cigarette messaging could possibly also trigger undue levels of skepticism towards MRTPs, which actually should convey reduced harm. Thus, this study explicitly tested the effectiveness of warning about source deception when inoculating against misinformation from that source, and it also considered effects on attitudes towards other messages and products from that source.
In Study 3, I also explored potential moderation of effects associated with highlighting deception in inoculation messages. Specifically, I considered the role of a potentially important moderator of inoculation effects – involvement – and whether audience involvement interacts with the deception factor. In the context of inoculation, involvement can pertain to either the audience’s pre-existing level of involvement with the issue, or to the level of engagement with the issue that the inoculation inspires. Here, I sought to probe the role of prior issue involvement, namely whether the subject of the inoculation is an issue for which an audience has a high level of outcome relevance, salience or personal importance (Johnson & Eagly, 1989; Petty & Cacioppo, 1979). As discussed, high levels of issue involvement have been associated with biased processing and motivated acceptance or rejection of messages pertaining to the issue. Researchers expect a role of involvement in inoculation success, but the hypothesized curvilinear relationship between inoculation effectiveness and issue involvement remains unsubstantiated. Specifically, issue involvement has been shown to facilitate resistance to persuasive attack (e.g., Pfau et al., 2004, 2005); yet some studies show that moderate levels of involvement are especially effective (Pfau et al., 1997), while others indicate moderate or high levels are equally effective (Ivanov, 2006). The role of involvement in inoculation becomes especially opaque when attempting to protect against misinformation, particularly misbeliefs that are potentially congenial to the involved audience.

In the case of inoculating current and former smokers against misinformation about natural cigarettes, the issue of involvement would pertain to smoking status (with current smokers being more “involved” with the issue). With regard to smoking,
involvement is a particularly important consideration in motivated reasoning, as smoking is tied to identity and is often considered to be a defining trait of the self-concept, sometimes even among former smokers (see, for example, Hertel & Mermelstein, 2016; Rosa & Aloise-Young, 2015; Tombor, et al., 2015; Vangeli, Stapleton & West, 2010). In fact, in prior research, smoker identity has been associated with outcomes including message processing (e.g., rejection of anti-smoking messages) as well as behaviors (e.g., smoking escalation) (Freeman, Hennessy & Marzullo, 2001; Hertel & Mermelstein, 2012; Tombor, Shahab, Brown & West, 2013). The persistent smoker identity poses challenges for anti-smoking messaging, as it contributes to motivated reasoning, at times even for former smokers. Smokers may purposively try to distance themselves from their smoker identity, but this is not always maintained in the long-term (Hoek et al., 2013; Tombor, Shahab, Brown & West, 2013). In the case of natural cigarettes, misinformation is particularly problematic because such advertising may disproportionately influence individuals who are vulnerable to misleading health claims. Thus, in this study, I also intended to assess whether any interactions occur between inoculation message factors (i.e., highlighting source deception) and issue involvement.

Research Questions and Hypotheses

The primary aim of Study 3 was to assess the utility of incorporating information about prior deception on the part of a persuasive source, when trying to inoculate against future misinformation from that source. As discussed, early research on inoculating against misinformation pertaining to scientific issues indicates that highlighting prior source deception may be a useful tactic. Yet this issue has not been sufficiently borne
out, nor has it been applied to a context like natural cigarettes, when misbeliefs typically arise from misleading messaging. As a result, I sought to explicitly probe this question in the context of health misinformation pertaining to natural cigarettes. My primary research question was as follows:

**RQ1.** Are deception-enhanced inoculations more effective (than inoculations without this) at preventing misbeliefs from misleading advertising? Are deception-enhanced inoculations without a direct refutation of misleading arguments still effective?

My associated hypotheses were:

**H1.** Deception-enhanced inoculations will be more effective than inoculations that do not highlight prior source deception (i.e., deception-enhanced direct refutation > direct refutation without deception enhancement).

**H2.** Deception-enhanced inoculations with “implied refutation” will confer some inoculation benefit relative to the misinformation-only control, but will not perform as well as inoculations with direct refutations (i.e., deception-enhanced direct refutation, direct refutation without deception enhancement > deception-enhanced forewarning).

In my exploration of the role of highlighting prior deception by the persuasive source, I also aimed to assess whether deception-enhanced inoculation messages induce more potent attitudinal effects in other areas, specifically related to attitudes toward the persuasive source and information coming from that source. My second research question was:
**RQ2.** Do deception-enhanced inoculation messages yield stronger effects on other related outcomes, namely attitudes toward the persuasive source and trust in other information from that source?

My associated hypotheses were:

**H3.** Deception-enhanced inoculations will yield stronger (i.e., more negative) effects on opinions of the source of the persuasive message, in this case prompting greater skepticism and distrust towards tobacco companies (i.e., deception-enhanced direct refutation and forewarning > direct refutation without deception enhancement).

**H4.** Deception-enhanced inoculations will yield stronger (i.e., more negative) spillover effects on other messages/products from the same source (in this case, greater skepticism of related products such as MRTPs (i.e., deception-enhanced direct refutation and forewarning > direct refutation without deception enhancement).

As with Study 2, I considered potential mechanisms of effect, in the event of observed differences. My related research question were:

**RQ3.** Do deception-enhanced inoculations prompt higher levels of counterarguing and threat, in response to misinformation stimuli?

**RQ4.** Do counterarguing and threat mediate effects of inoculation exposure on (mis)beliefs?

My associated hypotheses are:

**H5.** Deception-enhanced inoculation messages will prompt higher levels of counterarguing and threat.
H6. Counterarguing and threat will mediate effects on (mis)beliefs.

Lastly, I examined the potential role of motivated reasoning in the process of inoculating against misinformation. Here, I expected smokers to engage in more motivated reasoning, which would incline them towards acceptance of the misinformation and rejection of the inoculations. Yet of interest here is whether there might be an interaction between the deception factor in the inoculation messages and issue involvement (i.e., smoking status). While it stands to reason that highlighting deception could cause particularly strong perceptions of threat among current smokers, who are more vulnerable to tobacco company messaging, extant research has not borne out this issue. Thus, I posed the below research question, without an associated directional hypothesis.

RQ5. Do inoculation effects differ based on audience involvement? Specifically, does the deception factor interact with smoking status?

Method

Procedure

As with Studies 1 and 2, participants completed background screeners regarding their age and smoking history/status, to assess their eligibility for the study. I randomized eligible participants to a control condition or one of a set of treatment conditions, described under Stimuli. Participants in all treatment conditions viewed (for a minimum of 10 seconds each) inoculation messages warning them about the risks of natural cigarettes. Control and treatment group participants then saw two examples of NAS advertising content (for a minimum of ten seconds each). Following the advertising
exposure, they completed a distraction task (for a minimum of 30 seconds), followed by all outcome measures. The survey contained three attention checks; the first check provided a warning, but an incorrect response on the subsequent attention checks resulted in the participant being dropped from the study. Upon completion of the outcome measures, all participants were debriefed as to the harms of natural cigarettes and the effects of cigarette smoking.

**Stimuli**

**Misinformation stimuli.** This study included the same two misinformation exposures as Studies 1 and 2.

**Corrective stimuli.** Selection of the corrective stimuli for this study was informed by results of Study 1. Here, I randomized participants to one of four conditions: deception-enhanced forewarning-only (with implied refutation), deception-enhanced forewarning with direct refutation, forewarning (no deception) with direct refutation, or misinformation-only control. In each of the corrective conditions, I exposed participants to one of two inoculation messages, representing two successful message formats from Study 1. In this manner, I sought to minimize the chance of effects arising from a peculiarity of any one individual message.

While Studies 1 and 2 kept constant the inclusion of information about source deception in each condition, Study 3 varied this factor. The two deception conditions saw inoculations buttressed with information about prior deception by the persuasive source, yet the no deception condition did not. More specifically, the deception conditions included language about the tobacco industry intentionally concealing information about the harmful realities of tobacco smoking (“they denied for decades that
smoking causes cancer and is designed to be addictive, and that tobacco ads targeted kids and secondhand smoke hurts kids”). They also provided information about the ownership of Natural American Spirit, identifying that the maker of the brand is actually Big tobacco, not an independent company (“after all, Santa Fe Natural Tobacco…isn’t an independent, American Indian company like their logo implies. It’s actually owned by RJ Reynolds – Big tobacco”). These statements support the key forewarning: “Don’t jump to the conclusions that tobacco advertising implies”. On the other hand, the no deception condition instead forewarned the audience not to jump to conclusions about the brand based on implications of the advertising, but did not explicitly mention tobacco industry deception (“Don’t make assumptions about Natural American Spirit because it’s a natural or organic cigarette. Even though the characteristics of Natural American Spirit may suggest that it’s a less risky alternative to other cigarettes on the market, nothing actually claims that it’s healthier”).

**Measures**

Study 3 utilized the primary and secondary outcome measures used in Study 1, as well as the extra measures related to the mechanisms of inoculation effects included in Study 2. In addition, Study 3 also included analysis of additional measures to determine potential effects on attitudes towards other information/products from the persuasive source. Specifically, for this study I also assessed measures of (dis)trust towards tobacco companies, particularly whether they can be trusted as a source of information and whether they intentionally mislead the public. Further, I included measures assessing opinions and beliefs about MRTPs, to test for potential spillover effects. These measures evaluated participant perceptions of the harmfulness and addictiveness of MRTPs,
relative to traditional cigarettes. In theory, opinions of these products, which are classified as modified risk, should not be affected by a correction regarding natural cigarettes, and it would be incorrect to view them as more harmful than traditional cigarettes. Yet it is possible that a successful inoculation that intentionally elicits more negative attitudes towards NAS, which is incorrectly considered by many to be lower risk, could unintentionally spill over onto actual MRTPs.

**Analysis**

Like with the prior studies, I applied one-way ANOVA (with correction for multiple tests) to assess the success of the inoculation conditions in addressing misbeliefs about NAS, relative to control. I compared individual corrective conditions to each other in planned contrasts. I again created scales representing the three categories of misbeliefs. I also assessed condition effects on secondary variables, such as attitudes toward tobacco companies and MRTPs, and potential mediating variables of counterarguing, threat and reactance. I applied Preacher & Hayes’ PROCESS model (Hayes, 2009) to test potential mediation of condition effects on misbeliefs, via these variables.

**Results**

**Participants**

Study 3 was administered concurrently with Study 2, as an online randomized experiment with a panel provided by Dynata. Like Studies 1 and 2, Study 3 included current and former adult smokers. All eligibility criteria were the same as those applied in Study 2, including the age and smoking screeners and the education quota. As with
Study 2, the target sample size was determined using a power analysis in G*Power (see Faul, Erdfelder, Lang & Buchner, 2007), based on Study 1 results. The target sample was approximately 1,200 current and former smokers, to provide 80% power to detect a small effect (approximately .12) among smoker subgroups when testing moderated effects. The final sample included 1,193 participants, consisting of 518 current and 675 former smokers. Because Study 3 was administered concurrently with Study 2, they shared the two comparison conditions (misinformation control and forewarning). Table 17 provides a list of participants by condition and smoker type.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Number of Participants</th>
<th>Smoking Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>313</td>
<td>Current – 140</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Former – 173</td>
</tr>
<tr>
<td>Forewarning</td>
<td>291</td>
<td>Current – 145</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Former – 146</td>
</tr>
<tr>
<td>Deception</td>
<td>305</td>
<td>Current – 122</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Former – 183</td>
</tr>
<tr>
<td>No Deception</td>
<td>284</td>
<td>Current – 111</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Former – 173</td>
</tr>
</tbody>
</table>

N= 1,193

With regard to demographics, the sample was: 52% male and 95% non-Hispanic; the racial composition was 90% White, 6% Black/African American, 3% Asian, 2% American Indian/Alaska Native, 0.3% Native Hawaiian/Pacific Islander, and 2% Other. Although I requested a maximum of 35% with a college degree or higher, the vendor-provided sample contained approximately 48% of college-educated (or more) respondents. The sample included 43% current and 57% former smokers. Two percent of current smokers specified NAS as their regular/preferred brand, and 12% said they had ever tried NAS. For former smokers, 0.2% indicated that NAS was their regular/preferred brand when they smoked, and 6% reported that they had ever tried
NAS. On the attention checks, 95% of participants correctly answered the first check that provided a warning, 84% correctly answered Attention Check 2, and 95% correctly answered Attention Check 3. The completion rates by condition for Attention Check 2 were 83% for Control, 82% for Forewarning, 83% for Deception, and 86% for No Deception.

**Outcome measures**

**Misbeliefs about NAS.** Results provided limited support for Hypothesis 1, which predicted that deception-enhanced inoculations would correct better than those without deception enhancement. Specifically, this hypothesis held true for composition misbeliefs, but not for health/safety or addictiveness misbeliefs. Results supported Hypothesis 2, which predicted that forewarning-only inoculations would correct misbeliefs relative to control, but would not be as successful in correcting as were the inoculations with direct refutations (both deception enhanced and without deception enhancement). Table 18 presents results regarding misbeliefs.²

<table>
<thead>
<tr>
<th>Condition</th>
<th>Health Misbeliefs (α = .93; n = 9)</th>
<th>Composition Misbeliefs (α = .76; n = 6)</th>
<th>Addictiveness Misbeliefs (α = .87; n = 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>3.36 (1.32)</td>
<td>4.61 (1.02)</td>
<td>3.32 (1.46)</td>
</tr>
<tr>
<td>Forewarning</td>
<td>2.67*** (1.29)</td>
<td>3.81*** (1.11)</td>
<td>2.73*** (1.36)</td>
</tr>
<tr>
<td>Deception</td>
<td>2.32*** (1.34)</td>
<td>3.41*** (1.12)</td>
<td>2.33*** (1.30)</td>
</tr>
<tr>
<td>No Deception</td>
<td>2.32*** (1.18)</td>
<td>3.61*** (1.03)</td>
<td>2.46*** (1.24)</td>
</tr>
</tbody>
</table>

* *p < .05; ** p < .01; *** p < .001; Italics p < .05 with Bonferroni correction, with all comparisons to the misinformation-only control. Higher means indicate higher endorsement of misbeliefs.

Note: a, b, c notation denotes significant differences among correction conditions, tested using planned contrasts; conditions with different letters are significantly different.

² Due to uneven distribution of current and former smokers across experimental conditions, analyses were also conducted with smoking status as a covariate. Most patterns of significant difference and rank order means remained the same, except the forewarning and no deception conditions were no longer significantly different on the composition and addictiveness scales.
from one another.

**Attitudes and intentions towards NAS.** While I did not have particular hypotheses pertaining to attitudes and intentions, I examined effects of condition exposure on attitudes towards NAS and towards tobacco companies, and intentions towards NAS. Exposure to any inoculation condition reduced attitude favorability towards NAS relative to control, more so for the inoculations with direct refutation than forewarning only. With regard to tobacco industry attitudes, only the deception-enhanced inoculation reduced attitude favorability relative to control, though it was not statistically different from the other two correctives. Among current smokers, all inoculation conditions significantly reduced intentions to use or talk about NAS, relative to control, and the inoculation conditions did not differ from each other. Table 19 presents results for attitudes and intentions.

<table>
<thead>
<tr>
<th>Condition</th>
<th>NAS Attitude Scale, Mean (SD) (n=1,181) (α = .95; n = 6)</th>
<th>NAS Intentions Scale, Current Smokers, Mean (SD) (n=512) (α = .84; n = 3)</th>
<th>Tobacco Industry Attitude, Mean (SD) (n=1,171)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>-1.35 (5.68)</td>
<td>2.91 (.81) (n=138)</td>
<td>2.93 (1.75)</td>
</tr>
<tr>
<td>Forewarning</td>
<td>-3.30***a (5.41)</td>
<td>2.39***a (.88) (n=143)</td>
<td>2.67a (1.67)</td>
</tr>
<tr>
<td>Deception</td>
<td>-4.55***b (5.38)</td>
<td>2.46***a (.92) (n = 121)</td>
<td>2.45***a (1.69)</td>
</tr>
<tr>
<td>No Deception</td>
<td>-4.46***b (5.24)</td>
<td>2.45***a (.87) (n = 110)</td>
<td>2.68a (1.68)</td>
</tr>
</tbody>
</table>

* p < .05; ** p < .01; *** p < .001; *Italic* p < .05 with Bonferroni correction, with all comparisons to the misinformation-only control.

Note: a, b, c notation denotes significant differences among correction conditions, tested using planned contrasts; conditions with different letters are significantly different from one another.
Skepticism and trust towards tobacco companies and MRTPs. My second research question explored potential spillover effects of including information about deception on such outcomes as tobacco industry distrust and perceptions of MRTPs. Results supported Hypothesis 3, as the deception-enhanced inoculation inspired higher levels of skepticism and distrust (i.e., lower trust scores) toward information from tobacco companies than did the inoculation without deception enhancement. This measure was a scale assessing trust in information from tobacco companies and perceptions that they intentionally provide misleading information to the public. Still, the forewarning-only inoculation was not statistically different from the inoculation without deception enhancement, though the means were in the expected direction.

Results did not support Hypothesis 4, as the deception-enhanced inoculation did not yield spillover effects regarding MRTPs, and did not inspire greater perceptions of harm or addictiveness relative to traditional cigarettes. While the hypothesized effect did not bear out, the actual result is a more desirable outcome, as MRTPs – unlike natural cigarettes – actually are classified as modified risk. Table 20 presents results regarding trust and skepticism towards tobacco companies and MRTPs.

<table>
<thead>
<tr>
<th>Table 20: Mean Scores (SD) on Trust and Skepticism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condition</td>
</tr>
<tr>
<td>Control</td>
</tr>
<tr>
<td>Forewarning</td>
</tr>
<tr>
<td>Deception</td>
</tr>
<tr>
<td>No Deception</td>
</tr>
</tbody>
</table>

* p < .05; ** p < .01; *** p < .001; Italics p < .05 with Bonferroni correction, with all comparisons to the misinformation-only control.
Note: With the MRTP scales, lower scores indicate higher levels of perceived harm/addictiveness relative to traditional cigarettes.
Note: a, b, c notation denotes significant differences among correction conditions, tested using planned contrasts; conditions with different letters are significantly different from one another.

**Message reactions.** My third research question explored effects on message reactions, namely counterarguing, threat, and reactance to the NAS ad content. Results supported Hypothesis 5, as the deception-enhanced inoculation prompted higher levels of counterarguing and threat relative to the inoculation without deception enhancement (this effect also held true for reactance, though I did not have any associated hypotheses regarding reactance). While the forewarning-only inoculation was not statistically different from the inoculation without deception enhancement, it prompted as much counterarguing, threat and reactance, despite the absence of an explicit refutation. Table 21 displays results pertaining to message reactions.

<table>
<thead>
<tr>
<th>Table 21: Mean Scores (SD) on Message Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condition</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>Control</td>
</tr>
<tr>
<td>Forewarning</td>
</tr>
<tr>
<td>Deception</td>
</tr>
<tr>
<td>No Deception</td>
</tr>
</tbody>
</table>

* p < .05; ** p < .01; *** p < .001; *Italic* p < .05 with Bonferroni correction, with all comparisons to the misinformation-only control.

Note: a, b, c notation denotes significant differences among correction conditions, tested using planned contrasts; conditions with different letters are significantly different from one another.

**Mediated effects.** In this study, as with Study 2, I tested mechanisms of effect of inoculation correctives on misbelief reduction, using a scale of all misbeliefs as the outcome variable. I hypothesized that counterarguing and threat would mediate effects of exposure on misbelief correction. Results partially supported Hypothesis 6, as counterarguing was a significant mediator of effects, but threat and reactance were not.
Exposure to any inoculation (vs. control) increased counterarguing, which in turn predicted reductions in misbeliefs. Table 22 provides mediation results, and Table 23 lists correlations among mediators.

**Table 22: Mediated Effects of Condition Exposure on Misbeliefs, via Message Reactions**

<table>
<thead>
<tr>
<th>Paths from Exposure to Message Variables – Coefficient (SE) (n = 1170)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Counterarguing</td>
<td>.92*** (.10)</td>
</tr>
<tr>
<td>Threat</td>
<td>.98*** (.11)</td>
</tr>
<tr>
<td>Reactance</td>
<td>.77*** (.10)</td>
</tr>
</tbody>
</table>

**Paths from Message Variables to Misbeliefs**

| Counterarguing | -.30*** (.03) |
| Threat | .04 (.03) |
| Reactance | -.05 (.03) |

**Model Effects**

| Total Effects | -.93*** (.08) |
| Direct Effects | -.65*** (.07) |
| Indirect Effects | -.28 (.04); Boot LLCI = -.36, Boot ULCI = -.20 |
| Indirect - Counterarguing | -.28*** (.04) |
| Indirect - Threat | .04 (.03) |
| Indirect - Reactance | -.04 (.03) |

* p < .05; ** p < .01; *** p < .001

**Table 23: Correlations among Mediators**

<table>
<thead>
<tr>
<th></th>
<th>Counterarguing</th>
<th>Threat</th>
<th>Reactance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counterarguing</td>
<td></td>
<td>.627***</td>
<td>.617***</td>
</tr>
<tr>
<td>Threat</td>
<td>.627***</td>
<td></td>
<td>.818***</td>
</tr>
</tbody>
</table>

* p < .05; ** p < .01; *** p < .001

**Moderated effects.** With regard to moderation, Research Question 5 explored whether inoculation effects vary based on issue involvement level. Specifically, in this case, would the deception factor interact with smoking status in terms of influencing key inoculation outcomes? I tested for an interaction of condition exposure and smoking status, and I subsequently tested for an interaction between the presence or absence of the deception factor and smoking status. In both cases, and for all categories of outcomes
tested – misbeliefs, attitudes, and message reactions – there was no significant interaction between factors. Inoculation effects did not vary with issue involvement, operationalized as smoker type.

Study Conclusions

The findings of this study provide considerable, though not universal, support for the hypotheses. In terms of misbelief correction, the deception-enhanced inoculation was only more successful than the inoculation without deception enhancement for one of the three misbelief scales. Yet with regard to message reactions, the deception-enhanced inoculation proved clearly superior in eliciting counterarguing, threat, and reactance. The forewarning-only inoculation performed equally well as the inoculation without deception enhancement; this is distinct from misbelief correction, where the forewarning did not perform as well (presumably because of the lack of direct refutation), further supporting the role of the deception component in other message-related outcomes.

The result regarding tobacco industry trust/skepticism may be of particular importance; specifically, this effect is most likely not just an artifact of negative attitude prompted by the deception factor, as attitudes towards NAS and tobacco companies were comparably low in the inoculations with or without deception enhancement. Yet the addition of the deception component prompted greater distrust of tobacco companies and increased skepticism of information from them, representing the potential informational value, and not just a prejudicial one, of this message factor. While this did not translate directly into greater corrective success for all misbelief scales (just the composition scale), the increased counterarguing, which Studies 2 and 3 indicate helps to mediate
effects of inoculation on misbelief reduction, is a promising finding. Similarly, the reduced trust in the tobacco industry supports a more skeptical processing that the inoculations were designed to inspire; such skepticism may be especially important when inoculating against misinformation and attempting to confer resistance to other future persuasive attacks, the exact character and details of which may be unknown.

Like the prior studies, this study has similar limitations (and mitigating factors) regarding the education level of participants, the case-category issue, and the non-causal mediation analysis. More broadly speaking, another limitation that is perhaps especially relevant to this study is the topic area. In all three studies, I tested my hypotheses within the context of inoculation against misinformation about natural cigarettes. Yet in this study, there may be a greater potential for the results to be somewhat topically specific; because the study centers on the role of highlighting prior source deception, it is possible that the persuasive source being the tobacco industry may have particularly influenced the results. For instance, the deception factor could be more important because it is more readily believable with such a distrusted source. On the other hand, because of the reputation of the tobacco industry, further highlighting deception may be less influential in moving the opinion needle compared to a lesser-known or lesser-disliked source.

Ultimately, to better understand the relevance of this component, it would be important to explore this research question in applications to additional topics. From this study, what we glean is that including the deception factor in the inoculation message appears to confer some benefit to the inoculation process, in a limited fashion by boosting corrective success but also by increasing skepticism towards the persuasive source.
CHAPTER 6: GENERAL DISCUSSION & CONCLUSIONS

Through these three studies, I aimed to test effective means of inoculating against misinformation, as well as the mechanisms of such inoculation. Each of the three studies contributed to the understanding of the bounds and/or the tactics of inoculating against misinformation.

Discussion

Inoculation bounds

The most significant test of the bounds of inoculation that I administered here was assessing whether inoculation can be applied to misinformation, particularly in the context of implicitly arising health misinformation. In the past, inoculation has been shown to be effective in protecting attitudes from attack, in comparison with more traditional supportive treatments or no treatment (Pfau et al., 1997; 2000; Wood, 2007; Suedfeld & Borrie, 1978; also see Banas & Rains, 2010). More specifically, it has been tested with regard to health-related advertising and messaging, and results support the approach’s efficacy when utilized to reinforce existing anti-smoking or anti-industry attitudes, whether through videos, advertisements, or hands-on workshops (e.g., Hersey et al., 2005; Pfau & Van Bockern, 1994; Banerjee & Greene, 2007). Studies have also evinced the utility of inoculation in anti-drug/alcohol advocacy or campaigns to promote healthful behaviors (e.g., Godbold & Pfau, 2000; Pfau, Van Bockern, & Kang, 1992; Pfau et al., 1997). Other relevant research has considered the potential for applying inoculation to science-based misinformation, finding that approaches that utilize hands-on classroom techniques or that train audiences to identify faulty arguments can be
effective (e.g., Borah & Cook, 2017; Cook, Lewandowsky & Ecker, 2017; Cook, Ellerton & Kinkead, 2018). Still, while inoculation has been successfully leveraged in the context of health advertising and shows promise with misinformation, it has not been sufficiently tested in the experimental context with regard to inoculating against misinformation, particularly misbeliefs that arise implicitly from misleading messaging. The research I conducted here bridges this gap by examining the performance of inoculation in exactly such a context. All three studies find that inoculation can be effective when applied to misinformation, and they also seek to establish the bounds of inoculation effects in this regard.

With the results of Study 1, I aimed to assess whether high-level inoculations can provide a general protection against subsequent misinformation, or whether they have to specifically match the arguments. While many studies and meta-analytic findings support that refutational-different arguments are as effective as refutational-same arguments in protecting attitudes from attack (see for instance, Pfau, 1992; Banas & Rains, 2010), others reach different conclusions (e.g., Prior & Steinfatt, 1978), and this issue is unresolved in the misinformation context. This is a particularly important consideration with regard to misinformation, as it is not necessarily possible to anticipate the exact character of misleading health information, especially with implicit misbeliefs that arise from misleading implications rather than explicitly stated falsehoods. Yet if more generic inoculation arguments can successfully convey resistance to misinformation, this will be incredibly useful in the realm of combating misleading advertising. The findings of Study 1 – and the subsequent studies – consistently supported that inoculations do not need to match the exact arguments of anticipated
misinformation in order to confer resistance to such misinformation. Rather, thematically matched refutations served well in conferring resistance.

In Study 2, I sought to replicate the findings of Study 1 with a stricter test of the key research question, and to test the duration and the mechanisms of inoculation effects. The more attenuated generic refutation in Study 2 compared to Study 1 was still as effective as the specific refutation. Study 2 also showed that the forewarning-only inoculation effectively conferred resistance and, over time, it performed quite similarly to the explicit refutations. These results indicate that even more liberal approaches to inoculating against misinformation with less closely matched refutations still serve to inoculate, and when looking over time, the implied refutation confers comparably strong resistance. This result is consistent with the mediation results, which supported counterarguing (which was inspired by both explicit and implied refutations) as one of the mechanisms of effect on misbelief reduction, both initially and over time. Thus, my findings support conclusions of some prior research that inoculations do not necessarily have to match subsequent persuasive attacks (e.g., Pfau et al., 1990; Banas & Rains, 2010), and contribute to our understanding of this issue in the new context of inoculating against misinformation.

Inoculation best practices

Studies 1 and 3 sought to broaden our knowledge of specific strategies for inoculating against misinformation. Study 1 considered the relevance of inoculation message format, whereas Study 3 explored the role of a particular thematic element – source deception. Through Study 1, I built upon the findings from Pilot Study 2 to identify successful formats of inoculation. With regard to format, a great deal of research
has considered the most effective forms of persuasive messages. With misinformation correctives in particular, research has indicated that it is important not just to offer a correction, but to provide a causal explanation of how the misinformation arose and what the truth is (Lewandowsky et al., 2012; Johnson-Laird, 2012), potentially indicating promise for messages in forms like narrative. As a result, I aimed to explore whether different message formats would yield differing levels of inoculation success.

In theory, first-person narratives would be particularly well equipped to address the aforementioned concerns, as narratives present information with a compelling causal structure and promote emotional engagement that can reduce the potential for reactance (e.g., Green & Brock, 2000; Moyer-Guse, 2008). But because my pilot study results indicated reduced effectiveness of the first-person narrative relative to other corrective formats in certain cases (potentially because of identification with the problem behavior), in Study 3, I also included an exemplar-based narrative message. Exemplar narratives have been shown to promote engagement and belief and attitude change, and to induce resistance to persuasive attempts (Zillman, 2006; Kim et al., 2012; Niederdeppe, Heley & Barry, 2015). The results of Study 1 indicated that all message formats were effective in inoculating. The first-person narrative and the expository inoculations performed nearly identically, indicating that perhaps the reduced effectiveness of the narrative corrective in my Pilot Study 2 was the result of the particular content; still, testing other first-person narratives in future studies would be helpful in more conclusively addressing this issue. In general, narrative exemplar messages showed a slight edge over the other formats, perhaps by eliciting the engagement and identification for which narratives are
traditionally known, but in a straightforward and easily comprehensible manner that avoided problematic identification or reactance.

With the final study, I attempted to tease out the relevance of highlighting prior source deception when inoculating against future misinformation from that source. This study focused on the strategy of explicitly identifying prior deceptive behavior of the persuasive source to forewarn about potential additional deception by that same source. Several studies have suggested the promise of this strategy in order to inspire skepticism towards the persuasive source and thereby convey resistance to potential misinformation (e.g., Lewandowsky, Stritzke, Oberauer & Morales, 2005, 2009). Some have specifically proposed the idea of deception enhancement in the context of inoculation (see Cook, Lewandowsky & Ecker, 2017; Ecker, Lewandowsky & Tang, 2010; Cook, Ellerton & Kinkead, 2018; see Niederdeppe, Heley & Barry, 2015 for reactance-enhanced inoculation). Yet this element has not been sufficiently or explicitly tested in studies of inoculation, particularly in the context of implicit misinformation arising from misleading messaging. Thus, with Study 3, my aim was to isolate the element of deception to see if it does enhance inoculation effects.

While results were somewhat equivocal, they did show that there is a benefit to the strategy of highlighting prior deception, specifically in increasing counterarguing of the persuasive message and promoting skepticism of the persuasive source. Study 3 also tested whether the utility of the deception factor varied by smoker type, as a function of issue involvement. Prior research supports that the success of an inoculation or a misinformation correction may vary based on issue involvement, as highly involved audiences process information differently and may engage in motivated reasoning in
support of their previously held views (e.g., Lodge and Taber, 2006; Kuklinski et al., 2000; Thorson, 2016; see Pfau et al., 1997; Johnson & Eagly, 1989 for inoculation and involvement). Yet I did not find any difference in effects based on smoker type, indicating that involvement may not have been a factor here; still, this could be because even former smokers – for whom the smoking identity often lingers – still feel considerably involved with the issue (e.g., Hertel & Mermelstein, 2012; Vangeli, Stapleton & West, 2010).

Importantly, though, as the inoculations were effective and success did not vary by smoker type, we do not see any evidence of motivated reasoning or reactance. By likely inspiring counterarguing and source derogation towards the NAS messaging, perhaps the inoculation correctives – particularly the deception-enhanced ones that led to the most counterarguing – were able to prompt reactance to the persuasive source but to avoid the pitfalls of motivated reasoning that would have worked counter to the inoculation message. Overall, Studies 1 and 3 thereby contributed to the body of research regarding successful inoculation strategies, namely those pertaining to message format and thematic focus.

**Broader significance of findings**

Besides exploring specific limits and tactics of inoculating against misinformation, these studies also showed the relevance of core inoculation components, namely forewarning, refutation and the mechanism of counterarguing. In each study, the forewarning-only inoculation successfully corrected misbeliefs relative to the misinformation control, thus establishing the significance of the first element of inoculation: forewarning (McGuire, 1961; Compton & Pfau, 2005); here, the
forewarning appeared to convey sufficient threat to the audience’s attitude or perspective in order to stimulate the desire to defend against the misleading advertisements. In fact, Study 2 indicated that over time, the forewarning message itself could perform comparably well to the more detailed inoculations for most outcomes. Yet in all studies, at Time 1, the “specific” and “generic” inoculations were more effective than the forewarning itself in reducing misbeliefs, highlighting the distinct contribution of the other core inoculation element: refutation (McGuire, 1961; Compton & Pfau, 2005; Richards & Banas, 2015). Specifically, by providing either specific or generic arguments against the anticipated persuasive attack, it appears that the inoculation correctives armed the audience with more material with which to defend against the misleading advertising content.

Finally, the mediation analysis in Studies 2 and 3 supported the potential role of counterarguing as a mediator of effects of the inoculation correctives on misbeliefs. Counterarguing has been hypothesized to be a key mechanism of inoculation in general (e.g., Compton & Pfau, 2005; Pfau et al., 1997; McGuire, 1961), and I expected it to have an important role when inoculating against misinformation in particular, because the refutations must sometimes be implied or at least more generic and high level. Thus, the desire to counterargue appears to become more important. The results of Studies 2 and 3 supported such a role for counterarguing. By illustrating the individual value of the distinct elements of inoculation, in the context of the effects on misbelief reduction, the findings here help to establish inoculation as one appropriate means of addressing misinformation.
Research Conclusions

Broadly, the three studies conducted here sought to assess the promise of inoculation methods in conferring resistance to health-related misinformation, and to identify useful strategies for such inoculation. My goal was for the results of these studies to provide a more crystallized approach to techniques for inoculating against often-implicit health misinformation, like that arising from misleading advertising. As such, my key findings speak to the bounds as well as best practices of inoculating against misinformation. On a high level, the core contribution of these studies is the consistent finding that we can successfully inoculate against implicit misinformation, without directly addressing the exact misinformation claims. From a more detailed perspective, this research also established support for both of the central elements of inoculation – forewarning and refutational preemption – as well as the much-hypothesized mechanism of counterarguing, when attempting to provide resistance to subsequent misinformation.

The core finding of Studies 1 and 2 – the success of the “generic” inoculations – advances our understanding of the broader utility of “refutational-different” inoculations. Again, this is particularly important when considering cases of implicit misinformation that arise from misleading messaging, when the specific arguments against which one must inoculate may be undetermined. Study 3 identified a strategic value of highlighting prior source deception, as it increased counterarguing of the persuasive message and promoted skepticism of the persuasive source, which are useful when attempting to inoculate against implicitly arising, and potentially unknown, misinformation. The results observed in these three studies are meaningful because they support the utility of and identify tactics for applying inoculation in the relatively new context of combating
misinformation, and because they underscore the unique importance of each element of inoculation.

Due to the limitations discussed for each study, additional research should be conducted in order to replicate and expand upon the findings. It would be useful to apply these research questions to another health topic about which misinformation is common (e.g., vaccination, opioids). Further, as the results of Study 3 were somewhat equivocal, further research about the relevance of highlighting source deception would be important, especially with a topic for which the persuasive source is not already so highly distrusted. This would help to demonstrate whether the inoculation approach overall works as well when not utilized against a low credibility source about which the audience may already be skeptical. Ultimately, the studies completed here contribute to our understanding of the promise of inoculation in addressing misinformation, and future research will help to refine this understanding of the strategies and limits of inoculating against misinformation.
Appendix 1: Pilot Study 1 Results

Mean (SD) Comparison of Conditions to Control: Former Smokers, n = 478

<table>
<thead>
<tr>
<th>Condition</th>
<th>Control (n = 74)</th>
<th>Graphic Ads (n = 84)</th>
<th>Simple Ads (n = 77)</th>
<th>Elaborated Ads (n = 87)</th>
<th>Web Ads (n = 80)</th>
<th>Ad Claims (n = 76)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addiction</td>
<td>3.20 (.95)</td>
<td>3.40 (1.29)</td>
<td>3.11 (1.47)</td>
<td>2.85 (1.29)</td>
<td>3.17 (1.24)</td>
<td>3.65 (1.50)*</td>
</tr>
<tr>
<td>Health/Safety</td>
<td>2.92 (.92)</td>
<td>2.91 (1.03)</td>
<td>2.73 (1.14)</td>
<td>2.64 (1.09)</td>
<td>2.95 (1.08)</td>
<td>3.55 (1.09)***</td>
</tr>
<tr>
<td>Composition</td>
<td>3.89 (.64)</td>
<td>4.35 (.87)**</td>
<td>4.23 (.68)*</td>
<td>4.25 (1.02)**</td>
<td>4.14 (.76)</td>
<td>4.97 (.98)***</td>
</tr>
<tr>
<td>Taste</td>
<td>4.22 (.87)</td>
<td>4.31 (1.23)</td>
<td>4.32 (1.18)</td>
<td>4.25 (1.35)</td>
<td>4.51 (1.17)</td>
<td>5.09 (1.24)***</td>
</tr>
<tr>
<td>Sustainability</td>
<td>3.91 (.86)</td>
<td>4.14 (1.34)</td>
<td>4.17 (1.06)</td>
<td>4.48 (1.61)**'</td>
<td>4.31 (1.17)*</td>
<td>4.81 (1.31)***</td>
</tr>
</tbody>
</table>

* p < .05, ** p < .01, *** p < .001

Italics = p < .05 with Bonferroni correction; \( t \) = p < .10 with Bonferroni correction

Mean (SD) Comparison of Conditions to Control: Current Smokers, n = 650

<table>
<thead>
<tr>
<th>Condition</th>
<th>Control (n = 112)</th>
<th>Graphic Ads (n = 100)</th>
<th>Simple Ads (n = 105)</th>
<th>Elaborated Ads (n = 103)</th>
<th>Web Ads (n = 110)</th>
<th>Advertising Claims (n = 120)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addiction</td>
<td>3.79 (.97)</td>
<td>3.77 (1.25)</td>
<td>3.82 (1.38)</td>
<td>3.93 (1.36)</td>
<td>3.71 (1.35)</td>
<td>4.16 (1.31)*</td>
</tr>
<tr>
<td>Health/Safety</td>
<td>3.67 (.87)</td>
<td>3.62 (.97)</td>
<td>3.65 (1.11)</td>
<td>3.70 (1.10)</td>
<td>3.56 (1.10)</td>
<td>4.06 (1.07)**'</td>
</tr>
<tr>
<td>Composition</td>
<td>4.35 (.70)</td>
<td>4.73 (.82)**</td>
<td>4.72 (.88)**</td>
<td>4.72 (.80)**</td>
<td>4.67 (.92)**'</td>
<td>5.02 (.90)***</td>
</tr>
<tr>
<td>Taste</td>
<td>4.68 (1.00)</td>
<td>4.94 (1.17)</td>
<td>5.14 (1.06)**</td>
<td>5.28 (1.04)**</td>
<td>5.10 (1.12)**'</td>
<td>5.25 (1.17)***</td>
</tr>
<tr>
<td>Sustainability</td>
<td>4.59 (1.07)</td>
<td>4.82 (1.07)</td>
<td>5.07 (1.18)**</td>
<td>5.26 (1.04)**</td>
<td>5.04 (1.23)**</td>
<td>5.26 (1.20)***</td>
</tr>
</tbody>
</table>

* p < .05, ** p < .01, *** p < .001

Italics = p < .05 with Bonferroni correction; \( t \) = p < .10 with Bonferroni correction
Appendix 2:

Pilot Study 2 Results

<table>
<thead>
<tr>
<th>Condition</th>
<th>Health/Safety Misinformation</th>
<th>Composition Misinformation</th>
<th>Addictiveness Misinformation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Misinformation Control</td>
<td>3.32 (1.11)</td>
<td>4.95 (1.01)</td>
<td>3.46 (1.30)</td>
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<tr>
<td>No-Message Control</td>
<td><strong>2.85 (1.04)</strong></td>
<td><strong>4.08 (.91)</strong>***</td>
<td>3.23 (1.17)</td>
</tr>
<tr>
<td>Expository Inoculation</td>
<td><strong>2.55 (1.15)</strong>***</td>
<td><strong>4.47 (1.01)</strong>**</td>
<td><strong>2.60 (1.43)</strong>***</td>
</tr>
<tr>
<td>Humor Inoculation</td>
<td><strong>2.71 (1.27)</strong>***</td>
<td><strong>4.29 (1.22)</strong>***</td>
<td><strong>2.86 (1.48)</strong>***</td>
</tr>
<tr>
<td>Weak Narrative Inoculation</td>
<td>3.12 (1.23)</td>
<td>4.74 (1.12)</td>
<td>3.22 (1.35)</td>
</tr>
<tr>
<td>Strong Narrative Inoculation</td>
<td><strong>2.90 (1.15)</strong></td>
<td><strong>4.48 (1.05)</strong>***</td>
<td>2.98 (1.38)***</td>
</tr>
</tbody>
</table>

* *p < .05, ** *p < .01, *** *p < .001, Bold *p < .05 (Bonferroni correction); ^ *p < .10 (Bonferroni correction)

Note: All comparisons are to the misinformation-only condition. Higher means indicate greater agreement with misinformed beliefs.
Appendix 3: Misinformation Stimuli (All Studies)

Ad Exposure 1
What typically goes into a cigarette? Besides tobacco, usually hundreds of chemical additives. Not in Natural American Spirit cigarettes. Natural American Spirit began with a simple mission – do away with all of the extras. Use only tobacco without additives, without shortcuts, without compromises. In fact, Natural American Spirit cigarettes are 100% additive free – no chemicals, flavorings, or preservatives. They’re made from only tobacco and water. That’s why they taste so good. Natural American Spirit uses premium quality, 100% certified organic tobacco grown according to the strict criteria of the USDA’s National Organic Program. That way, you get nothing but whole leaf, natural tobacco, grown on American soil by U.S. farmers dedicated to responsibly using the earth’s natural resources. And as smokers have known for more than 25 years – natural tastes better. With a commitment to the product, the people, and the planet, and a taste for every smoker, American Spirit is the natural, organic choice for smokers.

(This image appears next to the text in the online study.)
Our journey began, as they often do, with little more than an idea – to create a premium cigarette that was free of additives. Once that goal was achieved, our next stop was the creation of earth-friendly growing programs, and then tobacco grown under organic specifications, to lessen our farmers’ impact on the environment. We’re proud to have produced the first cigarette made with organic tobacco. We continued on to blends that celebrate American traditions. Along the way, we met the caretakers of a centuries-old process of aging tobacco in oak barrels. Our Perique blend styles carry on that heritage. And as we met more and more farmers, they inspired us to create our 100% U.S. Grown blend, to support our communities and the environment.

No additives in our tobacco does NOT mean a safer cigarette.

Organic tobacco does NOT mean a safer cigarette.

SURGEON GENERAL’S WARNING: Smoking By Pregnant Woman May Result in Fetal Injury, Premature Birth, And Low Birth Weight.
Appendix 4: Corrective Stimuli

Study 1

Forewarning
Some people have come to think that Natural American Spirit cigarettes are safer and purer than other cigarettes because they’re described as all natural and free of additives. Since Natural American Spirit is said to be made with just tobacco and water and some flavors use organic tobacco, people are led to assume it must be a healthier, less addictive cigarette. And that’s exactly what the tobacco companies would like people to assume.

Tobacco company ads themselves can lead you to think that smoking natural cigarettes is totally different than traditional cigarettes. They use buzz words and natural images in their ads to create an almost wholesome picture. Natural cigarette ads are designed to invite these very leading implications about the product.

But you might not want to jump to the conclusions that natural cigarette advertising implies. Tobacco companies have a track record of misleading the public. They denied for decades that smoking causes cancer, is extremely addictive and targets kids through its ads. Santa Fe Natural Tobacco Company (which makes American Spirit) is owned by RJ Reynolds – Big tobacco. It’s not an independent, American Indian company like their logo implies. This is the same industry that concealed evidence about the dangers of smoking from the public, to protect themselves from lawsuits. A federal court ruled that tobacco companies purposely defrauded the public about tobacco addictiveness and risks, for their own financial gain.

So, when you see an ad for Natural American Spirit, keep in mind the tobacco industry’s track record, and think twice before you believe everything that is said or implied in the marketing of natural cigarettes.
Exposition – Specific
Some people have come to think that Natural American Spirit cigarettes are safer and healthier than other cigarettes because they’re additive-free and all natural. But this assumption isn’t true.

Natural American Spirit is said to be made with just tobacco and water -- no added chemicals, flavorings, or preservatives, so people are led to assume it’s safer. Some types of Natural American Spirit use premium quality, 100% certified organic tobacco, making people think that its ‘pure’ composition makes it healthier. And that’s exactly what the tobacco companies would like people to believe – even though it’s not true.

Tobacco company ads can lead you to think that smoking natural cigarettes is different than traditional cigarettes – safer, purer, less addictive. They use words like “organic” and “whole leaf” and pictures of green tobacco leaves and water. And they mention their sustainable, earth-friendly growing practices and "100% U.S. grown" tobacco to craft a ‘healthier’ image. They say the tobacco is “additive-free”, possibly implying the product isn’t as addictive and is easier to quit. But this idea that it’s safer or less addictive is false. Here’s the truth:

Natural American Spirit cigarettes are NOT safer, less harmful or less addictive than other cigarettes:

-All cigarettes can cause heart disease, emphysema, acute myeloid leukemia, and cancer of the lung, mouth, esophagus, stomach, kidney, bladder, larynx, and pancreas, and premature death.
-Burning tobacco itself causes cancer, and using “whole-leaf” or “natural” tobacco doesn’t reduce the risk of cancer from smoking.
-Secondhand smoke from additive-free cigarettes like Natural American Spirit is just as dangerous, and it causes lung cancer and coronary heart disease in adults who do not smoke.
-Secondhand smoke from any tobacco puts babies/children at an increased risk for Sudden Infant Death Syndrome (SIDS), acute respiratory infections, ear problems, severe asthma, and reduced lung function.

There is no “healthy” or “pure” cigarette:
-Smoking organic tobacco is not a healthier alternative, and it is just as harsh on your lungs.
-Lighting tobacco produces and exposes you to dangerous chemical by-products, even when the tobacco is “natural”.
-Burning any kind of tobacco – even organic – produces tar.

All cigarettes are highly addictive:
-Natural tobacco without additives contains just as much nicotine, the addictive drug in tobacco. Some natural cigarettes even have more nicotine than traditional cigarettes.
- Additive-free does NOT mean less addictive. Natural American Spirit cigarettes are just as hard to quit.
- When you smoke, the nicotine actually changes your brain – that’s why quitting is so hard.

Don’t jump to the conclusions that tobacco advertising implies. Tobacco companies have a track record of misleading the public. They denied for decades that smoking causes cancer and is designed to be addictive; they denied that tobacco marketing targets kids and secondhand smoke hurts kids. Santa Fe Natural Tobacco Company (which makes Natural American Spirit) is owned by RJ Reynolds – Big tobacco. It’s not an independent, American Indian company like their logo implies. This is the same industry that has a history of concealing evidence and destroying documents to prevent the public from knowing about the dangers of smoking and to protect themselves from lawsuits. A federal court ruled that tobacco companies “intentionally engaged in a scheme to defraud smokers and potential smokers, for purposes of financial gain, by making false and fraudulent statements.” And a federal judge found that tobacco companies violated the Racketeer Influenced and Corrupt Organizations Act (RICO).

When you see an ad for Natural American Spirit, keep in mind that it may imply that natural cigarettes are safer and healthier, but this isn’t true. Remember the facts and think twice before you believe everything that is said or implied in the marketing of natural cigarettes.
Exposition – Generic
Some people have come to think that Natural American Spirit cigarettes are safer and healthier than other cigarettes because they’re all natural and free of additives. But this assumption isn’t true.

Because Natural American Spirit is said to be made with just tobacco and water – no added chemicals – and some flavors use organic tobacco, people mistakenly assume it must be a safer, less harmful cigarette. And that’s exactly what the tobacco companies would like people to assume – even though it’s not true.

Tobacco company ads can lead you to think that smoking natural cigarettes is different than traditional cigarettes – safer, purer, less addictive. The ads use buzz words and natural images to create this picture. They emphasize the cigarettes are natural and some are organic, leading people to think they’re healthier and safer. And they mention that natural cigarettes don't have additives, possibly implying they aren't as addictive. But this idea that natural cigarettes are safer or less addictive is false.

Here’s the truth:
- Natural American Spirit cigarettes are NOT safer or less harmful than other cigarettes.
- Certified organic or not, there is no “healthy” or “pure” cigarette.
- All cigarettes can cause serious, life-threatening conditions.
- Natural cigarettes are extremely harmful, since burning tobacco itself is what damages your health.
- Natural cigarettes are just as addictive as traditional cigarettes.

Don’t jump to the conclusions that tobacco company advertising implies. These companies have a track record of misleading the public. They denied for decades that smoking causes cancer, is extremely addictive and targets kids through its ads. Santa Fe Natural Tobacco Company (which makes Natural American Spirit) is owned by RJ Reynolds – Big tobacco. It’s not an independent, American Indian company like their logo implies. This is the same industry that concealed evidence about the dangers of smoking from the public, to protect themselves from lawsuits. A federal court ruled that tobacco companies purposely defrauded the public about tobacco addictiveness and risks, for their own financial gain.

When you see an ad for Natural American Spirit, keep in mind that it may imply that natural cigarettes are safer and healthier, but this isn’t true. Remember the facts and think twice before you believe everything that is said or implied in the marketing of natural cigarettes.
First-Person Narrative – Specific
The restaurant was emptying out, but I said yes to one more drink. Before my date with Eric, I hadn’t clicked with anyone in awhile, which is why I didn’t want the night to end just yet. I looked around at the artwork, and a black and white photo caught my eye. Eric said, “She’s a local artist, part of a community project to put young people’s art in public places.” “I’ve heard about it,” I replied, “but hadn’t seen one until now.” Eric said, “I know some other places that have them. Maybe we can go sometime.” He looked relaxed for a first date, and it made me comfortable too.

“You know what, Sara,” he said, “it looks like they’re taking a minute with our drinks. You want to come outside with me for a quick smoke?” I was surprised. He hadn’t mentioned he smokes. A year ago, I would have given anything for a smoke after sitting for an hour. But since I quit, I’m trying – working really – not to go down that road again.

“Sorry, I quit last year,” I said. “I’ve been trying to be healthier, eat better…training for a half marathon.” Eric nodded, “That’s the best part – these aren’t regular cigarettes. They’re Natural American Spirits…not nearly as bad for your lungs.” “Really…how can that be right?” I asked. Eric replied, “These are organic, natural tobacco. Way better. Purer. Straight tobacco and water. They taste great, and they’re not going to harm you like regular cigarettes. It’s what we’ve been waiting for, right? Smoking with less guilt…”

Noticing my skeptical look, he added, “Listen, I wasn’t sure when I heard about it. I don’t want to put those chemicals in my body either, but these don’t have chemicals or preservatives or weird flavorings. The tobacco’s U.S. grown, earth-friendly. After I tried it, I could really feel the difference. The smoke is so smooth.” I wasn’t sure how to respond. The night had been great and I didn’t want to mess that up. But I’d promised myself I wasn’t going to smoke again. Eric must’ve noticed I was uneasy, and he said: “I’m sorry – I didn’t mean to pressure you. I just meant that I was trying to quit too until I found out about these, so I know what you’re thinking.”

He seemed really sincere. He wasn’t pressuring me – he just understood what I was thinking. I told him, “It sounds tempting, but I’m going to have to pass.” He replied: “OK, don’t go anywhere. I’ll be back in 5.” When he went outside, I took my phone out to pass the time. I decided to look up Eric’s Natural American Spirit cigarettes. If he’s right that they’re natural and don’t have chemicals added in, maybe they are at least a better option, right?

After a few minutes of searching, it was clear that the answer was no, definitely not right. Apparently, Eric’s ideas are what tobacco companies would like us to think. But these ideas are totally misleading. Ads for cigarettes like Natural American Spirit use buzz words like “organic” and “whole leaf” and pictures of green tobacco leaves and water to build this natural, wholesome image. The ads say the cigarettes are all natural and even use “100% certified organic tobacco”, making people mistakenly
think they’re safer and healthier. And they emphasize the tobacco is “additive-free”, almost implying it’s less addictive and easier to quit. But everything I read made it clear that the idea that natural cigarettes are safer or less addictive isn’t the truth.

Actually, I saw that Natural American Spirit cigarettes are NOT safer – they’re just as harmful as other cigarettes. They can cause lung cancer, heart disease, emphysema, acute myeloid leukemia, esophageal and other cancers, and even premature death. So using organic tobacco doesn’t reduce your risk of cancer from smoking. And the secondhand smoke is just as dangerous for your lungs, causes heart disease and puts babies/children at risk for respiratory disease, asthma, reduced lung function and even SIDS (Sudden Infant Death Syndrome). Apparently, even organic tobacco produces tar and releases tons of chemical by-products when it’s lit, so it’s not some ‘pure’ alternative. And additive-free cigarettes aren’t less addictive, so they’re just as hard to quit. Some natural cigarettes actually have more nicotine, which is what addicts you and changes your brain chemistry.

Geez, this is bad. Just like a lot of other people, Eric bought into all of this, and thinks he’s being healthier by smoking Natural American Spirit. I don’t know why I’m surprised tobacco company ads are deceptive. For decades, tobacco companies denied that smoking causes cancer and is designed to be addictive, and denied that their ads target kids and secondhand smoke hurts kids. After all, it turns out Santa Fe Natural Tobacco Company (which makes Natural American Spirit) isn’t an independent, American Indian company like you’d think from their logo. It’s owned by RJ Reynolds…Big tobacco. The same industry that concealed evidence and destroyed documents to prevent the public from knowing about the dangers of smoking and protect themselves from lawsuits. One post I saw said that federal courts actually ruled that tobacco companies purposely misrepresented tobacco products and tried to defraud the public for their own financial gain. That they violated RICO (the Racketeer Influenced and Corrupt Organizations Act), the law that usually gets Mafia figures. Why would I think for a second that they’d actually make a “safe” product?

The more I saw, the more infuriated I became. I could feel myself getting worked up about people getting tricked into using “natural” cigarettes. I guess I had wanted to believe they could be healthier – and I was almost fooled. And Eric actually had bought into the spin in the tobacco ads. It made me really angry and worried that people can be pulled in by intentionally deceptive ads that are manipulated by greedy companies. I felt like I had to tell Eric, but I was worried he would think I was trying to tell him how to live his life. I really liked him, and I got the feeling that he cared about his health and wouldn’t want to be misled. I decided to just mention what I read – no pressure, no lecturing – and then leave it alone and let him make his own decision.

The drinks had arrived by the time he came back in. He sat down, and said, “I was looking up that local artist and saw she’s showing her work on Friday in Central Park. Want to check it out after work, then grab dinner?” I said “Yeah, I’d love to.” Eric raised his glass, “Cheers to a great night.” We looked at each other and smiled.
then clinked glasses.

I took a big gulp of my liquid courage and decided to take the plunge, hoping it wouldn’t screw things up with Eric. I said, “Eric, I know this isn’t my business, and feel free to do with this whatever you want, but while you were outside, I read some concerning things about natural cigarettes that I thought you should know…”

…Three days later, I was waiting in line for my morning coffee before work when Eric’s text popped up: “Still on for tonight?” I sighed, feeling relieved and also happy that I’d taken a risk and told him. I smiled at my phone as I replied, “Can’t wait!”
First-Person Narrative – Generic
The restaurant was emptying out, but I said yes to one more drink. Before my date with Eric, I hadn’t clicked with anyone in awhile, which is why I didn’t want the night to end just yet. I looked around at the artwork, and a black and white photo caught my eye. Eric said, “She’s a local artist, part of a community project to put young people’s art in public places.” “I’ve heard about it,” I replied, “but hadn’t seen one until now.” Eric said, “I know some other places that have them. Maybe we can go sometime.” He looked relaxed for a first date, and it made me comfortable too.

“You know what, Sara,” he said, “it looks like they’re taking a minute with our drinks. You want to come outside with me for a quick smoke?” I was surprised. He hadn’t mentioned he smokes. A year ago, I would have given anything for a smoke after sitting for an hour. But, since I quit, I’m trying – working really – not to go down that road again.

“Sorry, I quit last year,” I said. “I’ve been trying to be healthier, eat better… training for a half marathon.” Eric nodded, “that’s the best part – these aren’t regular cigarettes. They’re Natural American Spirits… not nearly as bad for you.” “Really… how can that be right?” I asked. Eric replied, “These are organics. Way better. Purer. Straight tobacco and water, no chemicals. They taste great, and they’re not going to harm you like regular cigarettes. It’s what we’ve been waiting for, right? Smoking with less guilt…”

Noticing my skeptical look, he added, “Listen, I wasn’t sure when I heard about it. I don’t want to put those chemicals in my body either, but after I tried them I could really feel the difference. The smoke is so smooth.” I wasn’t sure how to respond. The night had been great and I didn’t want to mess that up. But I’d promised myself I wasn’t going to smoke again. Eric must’ve noticed I was uneasy, and he said: “I’m sorry – I didn’t mean to pressure you. I just meant I was trying to quit too until I found out about these, so I know what you’re thinking.”

He seemed really sincere. He wasn’t pressuring me – he just understood what I was thinking. I told him, “It sounds tempting, but I’m going to have to pass.” He replied: “OK, don’t go anywhere. I’ll be back in 5.” When he went outside, I took my phone out to pass the time. I decided to look up Eric’s Natural American Spirit cigarettes. If they’re really all natural, maybe they’re at least a better option, right?

After a few minutes of searching, it was clear the answer was no, definitely not right. Apparently, Eric’s ideas are what tobacco companies would like us to think. But these ideas are totally misleading. Ads for cigarettes like Natural American Spirit use buzz words and natural visuals to build a wholesome image. The ads say these cigarettes are natural and some are organic, making people mistakenly think they’re safer and healthier. And they emphasize that natural tobacco doesn’t have additives, almost implying it’s less addictive. But everything I read made it clear that the idea that natural cigarettes are safer or less addictive isn’t the truth.
Actually, I saw that Natural American Spirit cigarettes are NOT safer – they’re just as harmful as other cigarettes. They all cause a host of serious, even life-threatening conditions. Natural cigarettes are still extremely harmful, since burning tobacco itself is what damages your health. And they’re just as addictive as traditional cigarettes. So, organic or not, there’s no ‘healthy’ or ‘pure’ cigarette.

Geez, this is bad. Just like a lot of other people, Eric bought into all of this, and thinks he’s being healthier by smoking Natural American Spirit. I don’t know why I’m surprised that tobacco company ads are deceptive. For decades, tobacco companies denied that smoking causes cancer, is incredibly addictive and targets kids through its ads. After all, it turns out Santa Fe Natural Tobacco Company (which makes American Spirit) isn’t an independent, American Indian company like you’d think from their logo. It’s owned by RJ Reynolds…Big tobacco. The same industry that hid evidence from the public about the dangers of smoking to protect themselves from lawsuits. One post I saw said that federal courts actually ruled that tobacco companies purposely defrauded the public about tobacco addictiveness and risks, for their own financial gain. Why would I think for a second that they’d care to make a “safer” product?

The more I saw, the more infuriated I became. I could feel myself getting worked up about people getting tricked into using “natural” cigarettes. I guess I had wanted to believe they could be healthier – and I was almost fooled. And Eric actually had bought into the spin in the tobacco ads. It made me really angry and worried that people can be pulled in by intentionally deceptive ads that are manipulated by greedy companies. I felt like I had to tell Eric, but was worried he would think I was trying to tell him how to live his life. I really liked him, and I got the feeling that he cared about his health and wouldn’t want to be misled. I decided to just mention what I read – no pressure, no lecturing – and then leave it alone and let him make his own decision.

The drinks had arrived by the time he came back in. He sat down, and said, “I was looking up that local artist and saw she’s showing her work on Friday in Central Park. Want to check it out after work, then grab dinner?” I said “Yeah, I’d love to.” Eric raised his glass, “Cheers to a great night.” We looked at each other and smiled, then clinked glasses.

I took a big gulp of my liquid courage and decided to take the plunge, hoping it wouldn’t screw things up with Eric. I said, “Eric, I know this isn’t my business, and feel free to do with this whatever you want, but while you were outside, I read some concerning things about natural cigarettes that I thought you should know…”

…Three days later, I was waiting in line for my morning coffee before work when Eric’s text popped up: “Still on for tonight?” I sighed, feeling relieved and also happy that I’d taken a risk and told him. I smiled at my phone as I replied, “Can’t wait!”
Exemplar Narrative – Specific

Sara moved to New York City a few years ago. Right away, she fell in love with the city, and her job in public relations. But she hadn’t really clicked with anyone she dated, until she met Eric. Being around Eric put Sara at ease. From their first date, their conversation flowed easily, and she knew pretty quickly he was someone she could see herself with. So she was caught off guard when an issue came up between them.

As Eric walked her home one night, he pulled out a cigarette pack and offered her one. As innocent as it seemed, it was a big deal for her. She had quit the year before, and she knew that being with a smoker would be really tough. She was surprised when Eric told her he’d thought about quitting too, but decided to switch to Natural American Spirit cigarettes instead. Since they’re made with just tobacco and water – no chemicals or preservatives – Eric tried them because he thought they’d be pure and safer. And since they’re ‘natural’ and some have 100% certified organic tobacco, he thought they’d be healthier. Sara was tempted at first, though she didn’t want to go down that road again; still, she took the time to look into what Eric said, because it seemed to make sense that if his cigarettes were natural, without chemicals added in, maybe they really were a better option.

But Sara quickly found out that this definitely is not the case. Eric incorrectly believed what tobacco companies would like people to think about natural cigarettes. But these ideas are totally misleading. Ads for cigarettes like Natural American Spirit use carefully selected buzz words like “organic” and “whole leaf” and pictures of green tobacco leaves and water to build a natural, almost wholesome image. The ads mention that the cigarettes are made with sustainable, earth-friendly growing practices and use “100% U.S. grown” tobacco, inviting people to think they’re safer. They emphasize the tobacco is “additive-free”, almost implying the cigarettes will be less addictive and easier to quit. But the idea that natural cigarettes are safer or less addictive is false.

Here’s the truth: Natural American Spirit cigarettes are NOT safer or less harmful than other cigarettes. All cigarettes, even natural ones, can cause lung cancer, heart disease, emphysema, acute myeloid leukemia, esophageal and other cancers, and even premature death. Using organic tobacco doesn’t reduce your risk of cancer from smoking. And the secondhand smoke is just as dangerous, causes heart and lung disease and puts babies/children at risk for respiratory disease, asthma, reduced lung function and even SIDS (Sudden Infant Death Syndrome). Even organic tobacco produces tar and releases tons of chemical by-products when it’s lit, so it’s not a “pure” alternative. And additive-free doesn’t mean less addictive, so they’re just as hard to quit. Some natural cigarettes actually have more nicotine, which is what addicts you and changes your brain chemistry.

Unfortunately, buying into misleading natural cigarette advertising like Eric did isn’t uncommon. Smokers like Eric are sold a bill of goods by tobacco companies that isn’t what they’re getting. It isn’t surprising that tobacco marketing can be deceptive, considering that for decades, tobacco companies denied that smoking causes cancer and
is designed to be addictive – and denied that tobacco ads target kids and secondhand smoke hurts kids. After all, Santa Fe Natural Tobacco Company (which makes Natural American Spirit) isn’t an independent, American Indian company like you’d think from their logo. It’s actually owned by RJ Reynolds – Big tobacco. The same industry that concealed evidence and destroyed documents to prevent the public from knowing about the dangers of smoking and protect themselves from lawsuits. A federal court ruled that tobacco companies “intentionally engaged in a scheme to defraud smokers and potential smokers, for purposes of financial gain, by making false and fraudulent statements, representations, and promises.” A federal judge even found that tobacco companies violated RICO (the Racketeer Influenced and Corrupt Organizations Act), the law that usually gets Mafia figures.

Not thinking about this deception, Eric had believed everything the Natural American Spirit ads implied. Luckily in his case, he had someone to tell him the facts about Natural American Spirit, so that he could make an informed decision; Sara said: “I felt like I had to tell Eric, but was worried he would think I was trying to tell him how to live his life. But I really liked him, and I got the feeling that he cared about his health and wouldn’t want to be misled. So I decided to mention what I knew – no pressure, no lecturing – and then he could make his own decision.” But for too many people, the reality of Natural American Spirit cigarettes is subtly hidden by their ads.

So, when you see an ad for Natural American Spirit, please keep in mind that it may imply that natural cigarettes are safer and healthier, but this isn’t true. And think twice before believing everything that is said and implied in the marketing of natural cigarettes.
Exemplar Narrative – Generic
Sara moved to New York City a few years ago. Right away, she fell in love with the city, and her job in public relations. But she hadn’t really clicked with anyone she dated, until she met Eric. Being around Eric put Sara at ease. From their first date, their conversation flowed easily, and she knew pretty quickly he was someone she could see herself with. So she was caught off guard when an issue came up between them.

As Eric walked her home one night, he pulled out a cigarette pack and offered her one. As innocent as it seemed, it was a big deal for her. She had quit the year before, so she knew that being with a smoker would be really tough. She was surprised when Eric told her he’d thought about quitting too, but decided to switch to Natural American Spirit cigarettes instead. They’re all natural and some use organic tobacco, so Eric tried them because he thought they’d be healthier than other cigarettes. And since they don't have additives and are made with just tobacco and water – no added chemicals – he assumed they’d be pure and safer. Sara was tempted at first, though she didn’t want to go down that road again; still, she took the time to look into what Eric said, because it seemed to make sense that if his cigarettes were natural, maybe they really were a better option.

But Sara quickly found out that this definitely is not the case. Apparently, Eric incorrectly believed what tobacco companies would like people to think about natural cigarettes. But these ideas are totally misleading. Ads for cigarettes like Natural American Spirit use buzz words and natural visuals to build this almost wholesome image. They mention the cigarettes are natural and some are organic, leading people to think they’re safer and healthier. They emphasize the tobacco doesn't have additives, almost implying that natural cigarettes will be less addictive. But the idea that natural cigarettes are safer or less addictive is false.

Here's the truth: Natural American Spirit cigarettes are NOT safer or less harmful than other cigarettes. All cigarettes – even natural ones – can cause serious, life-threatening conditions. Natural cigarettes are extremely harmful, since burning tobacco itself is what damages your health. And they’re just as addictive as traditional cigarettes. So, organic or not, there is no 'healthy' or 'pure' cigarette.

Unfortunately, buying into misleading natural cigarette advertising like Eric did isn’t uncommon. Smokers like Eric are sold a bill of goods by tobacco companies that isn’t what they’re getting. It isn’t surprising that tobacco marketing can be deceptive, considering that for decades, tobacco companies denied that smoking causes cancer, is incredibly addictive and targets kids through its ads. After all, Santa Fe Natural Tobacco Company (which makes Natural American Spirit) isn’t a small American Indian company like you’d think from their logo. It’s actually owned by RJ Reynolds – Big tobacco. The same industry that federal courts found to have purposely defrauded the public about tobacco addictiveness and risks, for their own financial gain. And to hide their lies and protect themselves from getting sued, the tobacco companies concealed evidence about the dangers of smoking.
Not thinking about this deception, Eric had believed everything the Natural American Spirit ads implied. Luckily in his case, he had someone to tell him the facts about Natural American Spirit, so that he could make an informed decision; Sara said: “I felt like I had to tell Eric, but was worried he would think I was trying to tell him how to live his life. But I really liked him, and I got the feeling that he cared about his health and wouldn’t want to be misled. So I decided to mention what I knew – no pressure, no lecturing – and then he could make his own decision.” But for too many people, the reality of natural cigarettes is subtly hidden by their ads.

So, when you see an ad for Natural American Spirit, please keep in mind that tobacco it may imply that natural cigarettes are healthier and safer, but this isn’t true. And think twice before believing everything that is said and implied in the marketing of natural cigarettes.
Studies 2 & 3 – Shared Stimulus

Forewarning

Some people have come to think that Natural American Spirit cigarettes are safer and purer than other cigarettes because they’re described as all natural and additive-free. Since Natural American Spirit is said to be made with just tobacco and water and some flavors use certified organic tobacco, people are led to assume it must be a healthier, less addictive cigarette. And that’s exactly what tobacco companies would like you to believe.

Natural American Spirit ads can lead you to think that smoking natural cigarettes is totally different than traditional cigarettes. That it’s a safer and purer alternative. They use carefully selected buzz words and visuals of nature in their ads to create an almost wholesome image. Natural cigarette ads are designed to invite these very leading implications about the product.

But you might not want to jump to the conclusions that natural cigarette advertising implies. Consider this. Tobacco companies have a long track record of misleading the public. They denied for decades that smoking causes cancer and is extremely addictive, and that their ads targeted kids. After all, Santa Fe Natural Tobacco Company (which makes Natural American Spirit) isn’t an independent, American Indian company like you’d think from their logo. It’s actually owned by RJ Reynolds – Big tobacco. This is the same industry that concealed evidence and destroyed documents to prevent the public from knowing about the dangers of smoking and to protect themselves from lawsuits. A federal court ruled that tobacco companies “intentionally engaged in a scheme to defraud smokers and potential smokers” about tobacco addictiveness and risks, for their own financial gain.

So, it might not be a good idea to trust the implications of natural cigarette ads. When you see an ad for Natural American Spirit, please keep in mind the tobacco industry’s track record, and think twice before you believe what is said or implied in the marketing of natural cigarettes.
Study 2

Study 2 – Inoculation – Exposition specific

Some people have come to think that Natural American Spirit cigarettes are safer and healthier than other cigarettes because they’re additive-free and all natural. But this assumption isn’t accurate.

Because Natural American Spirit is said to be made with just tobacco and water – no added chemicals, flavorings, or preservatives – people are led to assume it’s a safer cigarette. Some types of Natural American Spirit use premium quality, 100% certified organic tobacco, so people think that its ‘pure’ composition makes it healthier. And that’s exactly what tobacco companies would like you to believe, even though it’s not true.

Tobacco company ads can lead you to think that smoking natural cigarettes is totally different than traditional cigarettes – safer, purer, less addictive. They use words like “organic” and “whole leaf” and pictures of green tobacco leaves and water. And they mention their sustainable, earth-friendly growing practices and "100% U.S. grown" tobacco, to craft a ‘healthier’ image. They say the tobacco is “additive-free”, possibly implying the product isn’t as addictive and is easier to quit. But the idea that it’s safer or less addictive is false.

Here’s the truth:

Natural American Spirit cigarettes are NOT safer, less harmful or less addictive than other cigarettes:

- All cigarettes can cause heart disease, emphysema, acute myeloid leukemia, lung cancer, other types of cancers, and premature death.
- Burning tobacco itself causes cancer, and using “whole-leaf” or “natural” tobacco doesn’t reduce the risk of cancer from smoking.
- Secondhand smoke from additive-free cigarettes like Natural American Spirit is just as dangerous, and it causes lung cancer and heart disease in adults who do not smoke.
- Secondhand smoke from any tobacco puts babies/children at an increased risk for Sudden Infant Death Syndrome (SIDS), acute respiratory infections, ear problems, severe asthma, and reduced lung function.

There is no “healthy” or “pure” cigarette:
- Smoking organic tobacco is not a healthier alternative, and it is just as harsh on your lungs.
- Lighting tobacco produces and exposes you to dangerous chemical by-products, even when the tobacco is “natural”.
- Burning any kind of tobacco – even organic – produces tar.

All cigarettes are highly addictive:
- Natural tobacco without additives contains just as much nicotine, the addictive drug in tobacco. Some natural cigarettes have even more nicotine than traditional cigarettes.
- Additive-free does NOT mean less addictive. Natural American Spirit cigarettes are just as hard to quit.
- When you smoke, the nicotine actually changes your brain – that’s why quitting is so hard.

Don’t jump to the conclusions that tobacco advertising implies. Tobacco companies have a track record of misleading the public. They hid for decades that smoking causes cancer and is designed to be addictive, and denied that tobacco marketing targeted kids and secondhand smoke hurts kids. After all, Santa Fe Natural Tobacco Company (which makes Natural American Spirit) isn’t an independent, American Indian company like their logo implies. It’s actually owned by RJ Reynolds – Big tobacco. This is the same industry that concealed evidence and destroyed documents to prevent the public from knowing about the dangers of smoking and to protect themselves from lawsuits. A federal court ruled that tobacco companies “intentionally engaged in a scheme to defraud smokers and potential smokers, for purposes of financial gain, by making false and fraudulent statements.” And a federal judge found that tobacco companies violated the Racketeer Influenced and Corrupt Organizations Act (RICO).

So, it might not be a good idea to trust what’s implied in natural cigarette ads. When you see an ad for Natural American Spirit, please keep in mind that it may suggest that natural cigarettes are safer and healthier, but this isn’t true. Remember the facts and think twice before you believe what is said or implied in the marketing of natural cigarettes.
Study 2 – Inoculation – Exposition generic

Some people have come to think that Natural American Spirit cigarettes are safer than other cigarettes because they’re all natural. But this assumption isn’t accurate.

Because Natural American Spirit is said to be made with just tobacco and water and some flavors use organic tobacco, people mistakenly assume it must be a safer, less harmful cigarette. And that’s exactly what tobacco companies would like you to believe – even though it’s not true.

Tobacco company ads can lead you to think that smoking natural cigarettes is totally different than traditional cigarettes – that it’s less risky. The ads use buzz words and natural images to create this picture of a natural and somehow safer cigarette. But notice that nothing actually says that they’re less harmful, and that’s because they’re not considered to be a lower harm or modified risk product. Remember, they’re still combustible cigarettes. And they’re still producing smoke that you’ll inhale every time you light up – whether a cigarette uses natural tobacco or not, that doesn’t change. So the idea that it’s a safer alternative is false.

Here’s the truth:
- Natural American Spirit cigarettes are NOT safer or less harmful than other cigarettes.
- All cigarettes, including Natural American Spirit, are extremely risky.
- Natural cigarettes are just as damaging for you to smoke, since burning tobacco itself is what harms you.
- Natural or not, there is no safe cigarette.

Don’t jump to the conclusions that tobacco company advertising implies. These companies have a track record of misleading the public. They denied for decades that smoking is extremely hazardous and that cigarette ads targeted kids. After all, Santa Fe Natural Tobacco Company (which makes Natural American Spirit) isn’t an independent, American Indian company like their logo implies. It’s actually owned by RJ Reynolds – Big tobacco. This is the same industry that concealed evidence and destroyed documents to prevent the public from knowing about the dangers of smoking and to protect themselves from lawsuits. A federal court ruled that tobacco companies intentionally engaged in a scheme to defraud the public about tobacco risks and made fraudulent statements to the public, for their own financial gain.

So, it might not be a good idea to trust what’s implied in natural cigarette ads. When you see an ad for Natural American Spirit, please keep in mind that it may suggest that natural cigarettes are safer, but this isn’t true. Remember the facts and think twice before you believe what is said or implied in the marketing of natural cigarettes.
Study 2 – Inoculation – Exemplar specific

Sara moved to New York City a few years ago. Right away, she fell in love with the city, and her job in public relations. But she hadn’t really clicked with anyone she dated, until she met Eric. Being around Eric put Sara at ease. From their first date, their conversation flowed easily, and she knew pretty quickly he was someone she could see herself with. So she was caught off guard when an issue came up between them.

As Eric walked her home one night, he pulled out a cigarette pack and offered her one. As innocent as it seemed, it was a big deal for her. She had quit the year before, and she knew that being with a smoker would be really tough. She was surprised when Eric told her he’d thought about quitting too, but decided to switch to Natural American Spirit cigarettes instead. Since they’re made with just tobacco and water – no chemicals or preservatives – Eric tried them because he thought they’d be pure and safer. And since they’re ‘natural’ and some have 100% certified organic tobacco, he thought they’d be healthier. Sara was tempted at first, though she didn’t want to go down that road again. Still, she took the time to look into what Eric said, because it seemed to make sense that if his cigarettes were natural, without chemicals added in, maybe they really were a better option.

But Sara quickly found out that this definitely is not the case. Apparently, like a lot of people, Eric was taken in by what tobacco companies would like people to think about natural cigarettes. Ads for cigarettes like Natural American Spirit use carefully selected buzz words like “organic” and “whole leaf” and pictures of green tobacco leaves and water to build a natural, almost wholesome image. The ads mention that the cigarettes are made with sustainable, earth-friendly growing practices and use “100% U.S. grown” tobacco, inviting people to think they’re safer. They emphasize the tobacco is “additive-free”, almost implying the cigarettes will be less addictive and easier to quit. But the idea that natural cigarettes are safer or less addictive is false.

Here’s the truth: Natural American Spirit cigarettes are NOT safer or less harmful than other cigarettes. All cigarettes, even natural ones, can cause lung cancer, heart disease, emphysema, acute myeloid leukemia, other cancers, and even premature death. Using organic tobacco doesn’t reduce your risk of cancer from smoking. And the secondhand smoke is just as dangerous, causes heart and lung disease and puts babies/children at risk for respiratory disease, asthma, reduced lung function and even SIDS (Sudden Infant Death Syndrome). Even organic tobacco produces tar and exposes you to dangerous chemical by-products when it’s lit, so it’s not a “pure” alternative and is just as harsh on your lungs. And additive-free doesn’t mean less addictive, so they’re just as hard to quit. Some natural cigarettes actually have more nicotine, which is what addicts you and changes your brain chemistry.

Unfortunately, buying into misleading natural cigarette advertising like Eric did isn’t uncommon. Smokers like Eric are sold a bill of goods by tobacco companies that isn’t what they’re getting. It isn’t surprising that tobacco marketing can be deceptive,
considering that for decades, tobacco companies denied that smoking causes cancer and is designed to be addictive – and denied that tobacco ads targeted kids and secondhand smoke hurts kids. After all, Santa Fe Natural Tobacco Company (which makes Natural American Spirit) isn’t an independent, American Indian company like you’d think from their logo. It’s actually owned by RJ Reynolds – Big tobacco. The same industry that concealed evidence and destroyed documents to prevent the public from knowing about the dangers of smoking and protect themselves from lawsuits. A federal court ruled that tobacco companies “intentionally engaged in a scheme to defraud smokers and potential smokers, for purposes of financial gain, by making false and fraudulent statements.” A federal judge even found that tobacco companies violated RICO (the Racketeer Influenced and Corrupt Organizations Act), the law that usually gets Mafia figures.

Not thinking about this history of deception, Eric had believed everything the Natural American Spirit ads implied. Luckily in his case, he had someone to share the facts about Natural American Spirit, so that he could make an informed decision; Sara said: “I felt like I had to tell Eric, but was worried he would think I was trying to tell him how to live his life. But I really liked him, and I got the feeling that he cared about his health and wouldn’t want to be misled. So I decided to mention what I knew – no pressure, no lecturing – and then he could make his own decision.” But for too many people, the reality of Natural American Spirit cigarettes is subtly hidden by their ads.

So, when you see an ad for Natural American Spirit, please keep in mind that it may suggest that natural cigarettes are safer and healthier, but this isn’t true. And think twice before believing what is said or implied in the marketing of natural cigarettes.
Sara moved to New York City a few years ago. Right away, she fell in love with the city, and her job in public relations. But she hadn’t really clicked with anyone she dated, until she met Eric. Being around Eric put Sara at ease. From their first date, their conversation flowed easily, and she knew pretty quickly he was someone she could see herself with. So she was caught off guard when an issue came up between them.

As Eric walked her home one night, he pulled out a cigarette pack and offered her one. As innocent as it seemed, it was a big deal for her. She had quit the year before, so she knew that being with a smoker would be really tough. She was surprised when Eric told her he’d thought about quitting too, but decided to switch to Natural American Spirit cigarettes instead. They’re all natural, so Eric tried them because he thought they’d be safer than other cigarettes. And since they’re made with just tobacco and water and some flavors use organic tobacco, he assumed they’d be less risky. Sara was tempted at first, though she didn’t want to go down that road again; still, she took the time to look into what Eric said, because it seemed to make sense that if his cigarettes were natural, maybe they really were a better option.

But Sara quickly found out that this definitely is not the case. Apparently, like a lot of people, Eric was taken in by what tobacco companies would like people to think about natural cigarettes. Ads for cigarettes like Natural American Spirit use buzz words and natural images to create this picture of an almost wholesome, somehow safer cigarette. But notice that nothing actually says that they’re less harmful, and that’s because they’re not considered to be a lower harm or modified risk product. Remember, they’re still combustible cigarettes. And they’re still producing smoke that you’ll inhale every time you light up – whether a cigarette uses natural tobacco or not, this doesn’t change. So the idea that it’s a safer alternative is false.

Here’s the truth: Natural American Spirit cigarettes are NOT safer or less harmful than other cigarettes. All cigarettes – even natural ones like American Spirit – are extremely risky. Natural cigarettes are just as damaging for you to smoke, since burning tobacco itself is what harms you. Natural or not, there’s no safe cigarette.

Unfortunately, buying into misleading natural cigarette advertising like Eric did isn’t uncommon. Smokers like Eric are sold a bill of goods by tobacco companies that isn’t what they’re getting. It isn’t surprising that tobacco marketing can be deceptive, considering that for decades, tobacco companies denied that smoking is extremely hazardous and that cigarette ads targeted kids. After all, Santa Fe Natural Tobacco Company (which makes Natural American Spirit) isn’t an independent, American Indian company like you’d think from their logo. It’s actually owned by RJ Reynolds – Big tobacco. The same industry that concealed evidence and destroyed documents to prevent the public from knowing about the dangers of smoking and to protect themselves from lawsuits. A federal court ruled that tobacco companies intentionally engaged in a scheme to defraud the public about tobacco risks and made fraudulent statements to the public,
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Not thinking about this history of deception, Eric had believed everything the Natural American Spirit ads implied. Luckily in his case, he had someone to share the facts about Natural American Spirit, so that he could make an informed decision; Sara said: “I felt like I had to tell Eric, but was worried he would think I was trying to tell him how to live his life. But I really liked him, and I got the feeling that he cared about his health and wouldn’t want to be misled. So I decided to mention what I knew – no pressure, no lecturing – and then he could make his own decision.” But for too many people, the reality of natural cigarettes is subtly hidden by their ads.

So, when you see an ad for Natural American Spirit, please keep in mind that it may suggest that natural cigarettes are safer, but this isn’t true. And think twice before believing what is said or implied in the marketing of natural cigarettes.
Study 3

Study 3 – Inoculation – No Deception – Exposition

Some people have come to think that Natural American Spirit cigarettes are safer and healthier than other cigarettes because they’re all natural and additive-free. But this assumption isn’t accurate.

Natural American Spirit is described as being made with just tobacco and water – no added chemicals or preservatives – and people assume it’s a safer cigarette. Some types of Natural American Spirit use 100% certified organic tobacco, and people think that its pure composition makes it healthier. But that is not the case.

You might think that smoking Natural American Spirit cigarettes is healthier, purer or less addictive than smoking traditional cigarettes because of its all-natural characteristics. Natural American Spirit contains whole-leaf tobacco that is U.S. grown, using sustainable, earth-friendly growing practices. And the tobacco itself is also additive-free, so it might seem like the product isn’t as addictive or as hard to quit. But the idea that it’s safer or less addictive is not correct.

Don’t make assumptions about Natural American Spirit because it’s a natural or organic cigarette. Even though the characteristics of Natural American Spirit may suggest that it’s a less risky alternative to other cigarettes on the market, nothing actually claims that it’s healthier. It’s not considered to be a lower harm or modified risk product. It’s still a combustible cigarette, so it will produce fumes that smokers of Natural American Spirit inhale when they light up. Whether a cigarette contains natural tobacco or not, that doesn’t change.

Here’s the truth:

Natural American Spirit cigarettes are NOT safer or less harmful than other cigarettes:
-All cigarettes can cause cancer, heart disease, and other life-threatening conditions.
-Natural cigarettes and secondhand smoke from them are extremely harmful, since burning tobacco itself is what damages your health.
-Burning any tobacco – even organic – produces tar and exposes you to chemical by-products.
-Natural American Spirit cigarettes are just as addictive as traditional cigarettes.
-Certified organic or not, there is no healthy or pure cigarette.

So, when you think about Natural American Spirit, please remember the facts and keep in mind that natural cigarettes are not safer and healthier than traditional cigarettes.
Inoculation – No Deception – Exemplar

Sara moved to New York City a few years ago. Right away, she fell in love with the city, and her job in public relations. But she hadn’t really clicked with anyone she dated, until she met Eric. Being around Eric put Sara at ease. From their first date, their conversation flowed easily, and she knew pretty quickly he was someone she could see herself with. So she was caught off guard when an issue came up between them.

As Eric walked her home one night, he pulled out a cigarette pack and offered her one. As innocent as it seemed, it was a big deal for her. She had quit the year before, and she knew that being with a smoker would be really tough. She was surprised when Eric told her he’d thought about quitting too, but decided to switch to Natural American Spirit cigarettes instead. Since they’re made with just tobacco and water – no chemicals or preservatives – Eric tried them because he thought they’d be pure and safer. And since they’re natural and some types of American Spirit use 100% certified organic tobacco, he thought they’d be healthier. Sara was tempted at first, though she didn’t want to go down that road again. Still, she took the time to look into what Eric said, because it seemed to make sense that if his cigarettes were natural, without chemicals added in, maybe they really were a better option.

But Sara quickly found out that this is not the case. Eric believed what a lot of people assume about natural cigarettes, even though it’s incorrect. People think that smoking Natural American Spirit is safer or purer because of its all-natural characteristics. Since these cigarettes are made using sustainable, earth-friendly practices and they contain 100% U.S. grown whole-leaf tobacco, people often think they’re safer. And because they’re additive-free, it might seem that the cigarettes will be less addictive and easier to quit. But the idea that natural cigarettes are safer or less addictive is not accurate.

Unfortunately, these inaccurate perceptions of natural cigarettes aren’t uncommon. But it’s important that we don’t make incorrect assumptions because Natural American Spirit is a natural or organic cigarette. The characteristics of Natural American Spirit may suggest that it’s a less risky alternative to other cigarettes on the market, but nothing actually claims that it’s healthier. It’s not considered to be a lower harm or modified risk product. It’s still a combustible cigarette, so it produces fumes that smokers of Natural American Spirit inhale when they light up. Whether a cigarette contains natural tobacco or not, that doesn’t change.

Here’s the truth about natural cigarettes: Natural American Spirit cigarettes are NOT safer or less harmful than other cigarettes. All cigarettes, even natural ones, can cause cancer, heart disease, and other life-threatening conditions. Natural cigarettes and secondhand smoke from them are extremely harmful, since burning tobacco itself is what damages your health. Even organic tobacco produces tar and exposes you to chemical by-products when it’s lit. And Natural American Spirit cigarettes are just as addictive as traditional cigarettes. Certified organic or not, there’s no healthy or pure cigarette.
Not thinking about these facts, Eric agreed with the popular perceptions of Natural American Spirit cigarettes. Luckily, Sara was able to share some information with him so he could make an informed decision; Sara said: “I felt like I had to tell Eric what I knew, but was worried he would think I was trying to tell him how to live his life. But I really liked him, and I got the feeling that he cared about his health and would want all the information. So I decided to mention what I knew – no pressure, no lecturing – and then he could make his own decision.”

So, when you think about Natural American Spirit, please remember the facts and keep in mind that natural cigarettes are not safer or healthier than traditional cigarettes.
Some people have come to think that Natural American Spirit cigarettes are safer and healthier than other cigarettes because they’re all natural and additive-free. But this assumption isn’t accurate.

Because Natural American Spirit is said to be made with just tobacco and water – no added chemicals or preservatives – people mistakenly assume it’s safer. Some types of Natural American Spirit use 100% certified organic tobacco, so people think its “pure” composition makes it healthier and less harmful. And that’s exactly what tobacco companies would like you to believe – even though it’s not true.

Tobacco company ads can lead you to think smoking natural cigarettes is completely different than traditional cigarettes – safer, purer, less addictive. They use buzz words like “whole leaf” and visuals of green tobacco leaves and water to create this healthier image. And they emphasize the tobacco in Natural American Spirit is "100% U.S. grown" using sustainable, earth-friendly practices. The ads mention that Natural American Spirit cigarettes are “additive-free”, possibly implying they aren’t as addictive and are easier to quit. But this idea that natural cigarettes are safer or less addictive is false.

Don’t jump to the conclusions that tobacco advertising implies. Tobacco companies have a track record of misleading the public. They denied for decades that smoking causes cancer and is designed to be addictive, and that tobacco ads targeted kids and secondhand smoke hurts kids. After all, Santa Fe Natural Tobacco Company (which makes Natural American Spirit) isn’t an independent, American Indian company like their logo implies. It’s actually owned by RJ Reynolds – Big tobacco. This is the same industry that concealed evidence and destroyed documents to prevent the public from knowing about the dangers of smoking and to protect themselves from lawsuits. A federal court ruled that tobacco companies “intentionally engaged in a scheme to defraud smokers and potential smokers” about tobacco addictiveness and risks, for purposes of financial gain. So, it might not be a good idea to trust what’s implied in their advertising for natural tobacco.

Here’s the truth:

Natural American Spirit cigarettes are NOT safer or less harmful than other cigarettes:
- All cigarettes can cause cancer, heart disease, and other life-threatening conditions.
- Natural cigarettes and secondhand smoke from them are extremely harmful, since burning tobacco itself is what damages your health.
- Burning any tobacco – even organic – produces tar and exposes you to chemical by-products.
- Natural American Spirit cigarettes are just as addictive as traditional cigarettes.
- Certified organic or not, there is no “healthy” or “pure” cigarette.
So, when you see an ad for Natural American Spirit, please keep in mind that it may suggest that natural cigarettes are safer and healthier, but this isn’t true. Remember the facts and think twice before you believe what is said or implied in the marketing of natural cigarettes.
Inoculation – Deception – Exemplar

Sara moved to New York City a few years ago. Right away, she fell in love with the city, and her job in public relations. But she hadn’t really clicked with anyone she dated, until she met Eric. Being around Eric put Sara at ease. From their first date, their conversation flowed easily, and she knew pretty quickly he was someone she could see herself with. So she was caught off guard when an issue came up between them.

As Eric walked her home one night, he pulled out a cigarette pack and offered her one. As innocent as it seemed, it was a big deal for her. She had quit the year before, and she knew that being with a smoker would be really tough. She was surprised when Eric told her he’d thought about quitting too, but decided to switch to Natural American Spirit cigarettes instead. Since they’re made with just tobacco and water – no chemicals or preservatives – Eric tried them because he thought they’d be pure and safer. And since they’re “natural” and some types of American Spirit use 100% certified organic tobacco, he thought they’d be healthier. Sara was tempted at first, though she didn’t want to go down that road again. Still, she took the time to look into what Eric said, because it seemed to make sense that if his cigarettes were natural, without chemicals added in, maybe they really were a better option.

But Sara quickly found out that this definitely is not the case. Eric incorrectly believed what tobacco companies would like people to think about natural cigarettes. But these ideas are totally misleading. Ads for cigarettes like Natural American Spirit can lead you to think that smoking natural cigarettes is completely different than traditional cigarettes. They use carefully selected buzz words like “organic” and “whole leaf” and pictures of green tobacco leaves and water to build a natural, almost wholesome image. They mention that the cigarettes are made with sustainable, earth-friendly practices and use “100% U.S. grown” tobacco, inviting people to think they’re healthier. And they emphasize the tobacco is “additive-free”, possibly implying the cigarettes will be less addictive and easier to quit. But the idea that natural cigarettes are safer or less addictive is false.

Unfortunately, buying into misleading natural cigarette advertising like Eric did isn’t uncommon. But it’s important that we don’t jump to the wrong conclusions because Natural American Spirit is a natural or organic cigarette. Smokers like Eric are sold a bill of goods by tobacco companies that isn’t what they’re getting. It isn’t surprising that tobacco marketing can be deceptive, considering that tobacco companies have a track record of misleading the public. They denied for decades that smoking causes cancer and is designed to be addictive – and that tobacco ads targeted kids and secondhand smoke hurts kids. After all, Santa Fe Natural Tobacco Company (which makes Natural American Spirit) isn’t an independent, American Indian company like you’d think from their logo. It’s actually owned by RJ Reynolds – Big tobacco. The same industry that concealed evidence and destroyed documents to prevent the public from knowing about the dangers of smoking and protect themselves from lawsuits. A federal court ruled that tobacco companies “intentionally engaged in a scheme to defraud
smokers and potential smokers” about tobacco addictiveness and risks, *for their own financial gain*. So, it might not be a good idea to trust what’s implied in their advertising for natural cigarettes.

**Here’s the truth:** Natural American Spirit cigarettes are NOT safer or less harmful than other cigarettes. All cigarettes, even natural ones, can cause cancer, heart disease, and other life-threatening conditions. Natural cigarettes and secondhand smoke from them are extremely harmful, since burning tobacco itself is what damages your health. Even organic tobacco produces tar and exposes you to chemical by-products when it’s lit. And Natural American Spirit cigarettes are just as addictive as traditional cigarettes. Certified organic or not, there’s no “healthy” or “pure” cigarette.

Not thinking about these facts or the tobacco industry’s history of deception, Eric had bought into what Natural American Spirit ads imply. Luckily in his case, he had someone to share the facts about Natural American Spirit, so that he could make an informed decision; Sara said: “I felt like I had to tell Eric, but was worried he would think I was trying to tell him how to live his life. But I really liked him, and I got the feeling that he cared about his health and wouldn’t want to be misled. So I decided to mention what I knew – no pressure, no lecturing – and then he could make his own decision.” But for too many people, the reality of Natural American Spirit cigarettes is subtly hidden by their ads.

So, when you see an ad for Natural American Spirit, please keep in mind that it may suggest that natural cigarettes are safer and healthier, but this isn’t true. And think twice before believing what is said and implied in the marketing of natural cigarettes.
Appendix 5: Outcome Measures (all studies – differences noted in text)

Population Assessment of Tobacco and Health (PATH) Belief Measures
All PATH beliefs use a 5-point response scale:
A lot more (...) – Somewhat more (...) – About the same – Somewhat less (...) – A lot less (...)
• PathHS- Compared to other cigarettes, how harmful do you think Natural American Spirit cigarettes are to your health?
• PathAdd- Compared to other cigarettes, how addictive do you think Natural American Spirit cigarettes are?

NAS Beliefs
All NAS beliefs use a 7-point Likert response scale:
Strongly Disagree – Disagree – Somewhat Disagree – Neither Agree nor Disagree – Somewhat Agree – Agree – Strongly Agree
Please indicate the degree to which you agree or disagree with the following statements about Natural American Spirit.

Safety/Health
• HS1- Natural American Spirit cigarettes are less harmful than traditional cigarettes.
• HS2- Even though no cigarettes are safe, Natural American Spirit cigarettes are still safer than traditional cigarettes.
• HS3- Natural American Spirit cigarettes are a more responsible health choice than traditional cigarettes.
• HS4- Any cigarette can cause cancer, but Natural American Spirit cigarettes are less likely to cause cancer.
• HS5- A Natural American Spirit cigarette is no worse for smokers’ health than a can of soda.
• HS6- Secondhand smoke from Natural American Spirit cigarettes is less dangerous for friends and family than smoke from cigarettes with added chemicals.
• HS7- Natural American Spirit cigarettes are less likely to cause heart disease than traditional cigarettes.
• HS8- Natural American Spirit cigarettes are harmful to your health. (REVERSE)
• HS9- Natural American Spirit cigarettes can cause lung cancer and other types of cancer. (REVERSE)

Composition
• Comp1- All Natural American Spirit cigarettes are made with organic tobacco.
• Comp2- Natural American Spirit cigarettes with tobacco certified under the USDA Organic Program standards are a healthier alternative to traditional cigarettes.
• Comp3- Natural American Spirit cigarettes may contain ammonia. (REVERSE)
• Comp4- Smoking Natural American Spirit cigarettes produces less tar than traditional cigarettes.
• Comp5- Organic cigarettes like Natural American Spirit are less damaging to your lungs than cigarettes with added chemicals.
• Comp6- Tobacco and water are the only products you’re exposed to when you smoke a Natural American Spirit cigarette.

Addictiveness
• Add1- It is easier to quit smoking Natural American Spirit cigarettes than traditional cigarettes.
• Add2- Natural American Spirit cigarettes have less nicotine than traditional cigarettes.
• Add3- There is a lower chance of becoming addicted to Natural American Spirit cigarettes than traditional cigarettes.
• Add4- Natural American Spirit cigarettes are addictive. (REVERSE)
• AttChk2- This is an attention check. Please select “Strongly disagree” for this item.
• AttChk3- This is an attention check. Please select “Strongly agree” for this item.

NAS ATTITUDES
The next several questions ask you to describe your opinion of and intentions toward Natural American Spirit cigarettes.

Attitude – general
The NAS attitude measure will use the following response scale:
Very Unfavorable – Unfavorable – Somewhat Unfavorable – Neither Unfavorable nor Favorable – Somewhat Favorable – Favorable – Very Favorable
• AttGen- Please indicate how favorable or unfavorable your opinion is of Natural American Spirit cigarettes.

Attitude – semantic differentials
NAS semantic differential attitude measures will use the following response scale:
-10 to 10 (slider scale)
• Please click on the slider below and move it to the point on the scale from -10 to 10, to show how you would rate Natural American Spirit on the characteristics listed below. The number you have chosen will appear above the slider as you move it.
  o Att_Neg - Negative – Positive
  o Att_Bad - Bad – Good
  o Att_Harm - Harmful – Beneficial
  o Att_Fool - Foolish – Wise
  o Att_Unpl - Unpleasant – Pleasant
  o Att_Unenj - Unenjoyable – Enjoyable

NAS INTENTIONS
NAS intention measures will use the following response scale:
Definitely will not– Probably will not– Probably will – Definitely will

Intentions
Next, please indicate the degree to which you intend to use cigarettes in the future.
• INT6- How likely are you to smoke Natural American Spirit in the next 6 months?
• INTfree- How likely are you to try Natural American Sprit if you were offered a free sample?
• INTtalk- How likely are you to talk to friends/family about Natural American Spirit anytime soon?
• INTswitch- How likely are you to consider switching from traditional cigarettes to Natural American Spirit cigarettes? [with options for N/A – not a current smoker and N/A – Natural American Spirit is my usual brand]

COUNTERARGUING, THREAT, REACTANCE

These measures use a 7-point Likert response scale:
Strongly Disagree – Disagree – Somewhat Disagree – Neither Agree nor Disagree – Somewhat Agree – Agree – Strongly Agree

Now we’d like you to think about the Natural American Spirit ads you saw earlier in this study. Please indicate how much you agree or disagree with each of the following statements pertaining to the Natural American Spirit ads you saw.

Counterarguing
• CTR1- I found myself disagreeing with what the Natural American Spirit ads implied.
• CTR2- When I saw the Natural American Spirit ads, a lot of thoughts came to mind against what they said.

Threat
• THR1- Natural American Spirit ads try to interfere with me making an accurate judgment about natural cigarettes.
• THR2- Natural American Spirit ads try to interfere with me forming my own opinion about natural cigarettes. (Studies 2 and 3)

Reactance
• REA1- Natural American Spirit ads try to manipulate me.
• REA2- Natural American Spirit ads try to make up my mind for me.
• REA3- Natural American Spirit ads try to pressure me.

OUTCOMES FOR TOBACCO COMPANIES

The next few questions ask you to describe your opinion of tobacco companies.

The tobacco company attitude measure will use the following response scale:
Very Unfavorable – Unfavorable – Somewhat Unfavorable – Neither Unfavorable nor Favorable – Somewhat Favorable – Favorable – Very Favorable
• TOB1- Please indicate how favorable or unfavorable your opinion is of tobacco companies.

Please indicate the degree to which you agree or disagree with the following statements about tobacco companies.
• TOB2- Tobacco companies are mostly trustworthy as a source of information
• TOB3- The information I get from tobacco company advertising is mostly credible
• TOB4- Tobacco companies intentionally mislead the public about cigarettes.

MODIFIED RISK TOBACCO PRODUCTS (Study 3)
• ECig1- How interested would you be to learn more about e-cigarettes?
• MRTP1- How interested would you be to learn more about heat-not-burn, Snus, or other MRTPs?
• ECig2- How interested would you be to try an e-cigarette if you were offered a free sample?
• MRTP2- How interested would you be to try heat-not-burn, Snus, or other MRTPs if you were offered a free sample?
• ECig3- Compared to traditional cigarettes, how harmful do you think e-cigarettes are?
• MRTP3- Compared to traditional cigarettes, how harmful do you think heat-not-burn, Snus, or other MRTPs are?
• ECig4- Compared to traditional cigarettes, how addictive do you think e-cigarettes are?
• MRTP4- Compared to traditional cigarettes, how addictive do you think heat-not-burn, Snus, or other MRTPs are?
Appendix 6

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