

Inoculation Theory and Affect

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Although affect factors into most theoretical explanations for inoculation-conferred resistance to influence, it has received comparably less attention than its cognitive features. What we do know from extant research, however, is important for our understanding of resistance to influence. This review surveys research in affect and inoculation theory with special attention to how affect can bolster or thwart resistance; how affective messages function in comparison with other approaches; and the role of specific emotions, like anger, in inoculation. It provides an overview of the conventional inoculation theoretical model and a careful reading of what we can learn from research exploring issues of affect in inoculation.

Keywords: persuasion, social influence, emotion, campaigns, resistance to influence

In some ways, affect—the experience of feelings (Dillard & Seo, 2012)—has always been a part of inoculation theory’s story. McGuire’s inspiration for proposing an inoculation approach to resistance to influence seemed to be sparked, at least in part, by his concern for those in “forced exposure situations” (McGuire & Papageorgis, 1961, p. 327), such as prisoners of war—which is certainly an intense, emotional situation. Although limited to bland issues in the earliest years of the theory (e.g., the safety of toothbrushing), inoculation theory soon covered an array of highly charged, controversial topics, including abortion (Benoit, 1991), animal testing (Nabi, 2003), and the legalization of marijuana (e.g., Pfau et al., 2001). Threat—long considered one of the core processes of inoculation-conferred resistance (Compton, 2013, 2021; McGuire, 1964; Pfau, 1997)—has clear overlap with affect, including anger (Pfau et al., 2009), fear (Ivanov et al., 2016), and motivation (Banas & Richards, 2017). We can also consider arguments that cognition and affect, in general, should not be sharply delineated (e.g., Pessoa, 2008). Affect, then, has never been far from inoculation and its applications: Inoculation theory was born of concern for others; it quickly encompassed emotional issues that raised strong passions, and its theoretical explanation centers on threat.

And yet, the story of inoculation theory *research* is without a consistent focus on affect and inoculation theory. For much of its 60-year history, scholars have focused on the cognitive dimensions of inoculation (Compton, 2013), and specifically, threat and counterarguing: “For the most part . . . early theorizing and research on inoculation simply assumed that the process of resistance was cognitive” (Compton & Pfau, 2005, pp. 112–113). Contemporary inoculation scholarship continued its cognitive focus;

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Pfau, Tusing, and colleagues' (1997) study stated focus of exploring "the cognitive process unleashed via inoculation" (p. 474) is indicative of a good deal of inoculation scholarship in the 1990s. Even conceptualizations of threat, a motivational force in inoculation (Compton, 2013; Ivanov, 2017; McGuire, 1964), have focused mostly on cognitive processes of recognition and perception: For example, threat is "conceptualized as the recognition of impending challenges to attitudes, which triggers a perception of the vulnerability of attitudes to potential change" (Compton & Pfau, 2005, p. 100). Of course, such an emphasis on cognitive processes is not unique to inoculation theory; communication scholarship, in general, had long neglected affect (Guerrero, Andersen, & Trost, 1998; Nabi, 1999).

This review explores what scholars have uncovered about affect and the inoculation theory process of resistance to influence. It provides an overview of the conventional inoculation model and then turns to a careful reading of what we can learn from research exploring issues of affect in inoculation. We argue that affect and inoculation theory research and theorizing should not be overlooked, which is a risk considering the heavy focus on cognitive dimensions of resistance during much of inoculation theory's history. The idea that inoculation theory-conferred resistance to influence is mostly (if not exclusively) a cognitive process could continue to dampen its theoretical development and application. Additionally, with increased attention to inoculation as a potential antidote to mis- and disinformation (e.g., Compton, van der Linden, Cook, & Basol, 2021), the time is particularly right for clarifying a fuller range of cognitive and affective dimensions to this increasingly popular area of study.

Inoculation Theory

Inoculation theory is built on a medical analogy: A medical inoculation confers protection from future viral threats by subjecting people to weakened forms of the virus; an attitudinal inoculation confers protection from future persuasive threats by subjecting people to weakened forms of the argument (e.g., two-sided messages; McGuire, 1964). McGuire's (1964) early theorizing centered on two processes of resistance: threat and counterarguing. *Threat* is usually conceptualized as the recognition that a currently held position might be vulnerable to future attacks (Compton, 2013; McGuire, 1964). *Counterarguing* is the process of raising and refuting counterattitudinal arguments, otherwise known as refutational preemption (Compton, 2013; McGuire, 1964).

Decades of research have confirmed that threat and counterarguing are elicited during inoculation-conferred resistance across a range of contextual applications (see Ivanov, Parker, & Dillingham, 2020, for a review). The conventional model does not explain everything, however. A series of studies using structural equation modeling revealed a direct path from inoculation to resistance that does not seem to work through threat or counterarguing (e.g., Ivanov, Pfau, & Parker, 2009b; Pfau et al., 1997, 2001, 2004). Early theorizing also pointed to other processes that might create inoculation-conferred resistance. One candidate that might function as one of the "additional mechanisms" (Insko, 1967, p. 328) is affect (see Crane, 1962).

Inoculation Theory and Affect Scholarship

A few inoculation studies have made affect their primary focus, and a few more have looked at affect issues as part of larger studies. We survey some of this research next.

Affect Elicited by Inoculation Messages

Pfau and colleagues (2001) offered some of the most comprehensive early findings of how affect influences resistance to persuasion. Specifically, Pfau and colleagues expected that inoculation messages generating anger would induce message scrutiny and careful processing, which in turn would enhance the process of counterarguing and consequently resistance. On the other hand, they expected that inoculation messages would elicit happiness in receivers who, as a result, would attempt to extend the duration of this state by suppressing careful message scrutiny and counterarguing, inevitably leading to less resistance. With Lazarus's (1991) theorizing as a guide, Pfau and colleagues (2001) designed the experimental inoculation messages accordingly. Anger-based inoculation messages suggested that counterattitudinal arguments would thwart the achievement of desired goals by directing the blame toward the counterattitudinal arguments and their advocates. On the other hand, happiness-based inoculation messages indicated that the perseverance of the attitudes in question would lead to attaining desired goals (i.e., well-being and affiliation).

The Pfau and colleagues (2001) study was a landmark in resistance research, not only because it offered one of the first and most comprehensive looks at affect and inoculation, but also because the researchers employed structural equation modeling to offer a more intricate portrait of *how* inoculation confers resistance. This was the second study to confirm a direct path of resistance, from treatment message to attack, a path that does not seem to go through threat or counterarguing (see also Ivanov et al., 2009b; Pfau et al., 1997, 2001, 2004). Indeed, all three message conditions (affective-anger, affective-happiness, and cognitive) revealed this direct path from treatment to resistance. Pfau and associates' (2001) structural equation model also supported the conventional model of inoculation with cognitive and affective-negative messages showing resistance through threat and counterarguing. With affective-positive messages, however, resistance deviated from the conventional model, with resistance seemingly independent of threat and counterarguing.

One of the most surprising findings from the Pfau and colleagues (2001) study was that affective-happiness messages led to the highest resistance to subsequent persuasive attacks. As Pfau and associates (2001) observed, "There is no obvious theoretical explanation for this finding" (p. 242). Evidence suggests that happiness-based inoculation messages were not more effective because of threat and counterarguing, as anger messages elicited more threat than happiness messages. Pfau and his colleagues suggested a few possible explanations. Perhaps the happiness message was simply more reassuring, or it created resistance through an alternative, heuristic route (i.e., passive message processing reliant on fewer cognitive resources). It is important to emphasize, however, the difference between how the messages were constructed and the actual elicited emotions. Although messages intended to elicit happiness were the most effective (affective-happiness), actual elicited happiness seemed to diminish resistance, and anger seemed to bolster resistance (Pfau et al., 2001).

Years later, Pfau would lead another team in a comprehensive, large-scale study to revisit some of these unresolved questions, but with a couple of key differences. First, Pfau and associates (2009) used a different operationalization of affective messages. They constructed affective messages by relying on "emotional triggers"—embedded messages that "signal that goals may be facilitated (affective positive

messages) or thwarted (affective negative messages)" (Pfau et al., 2009, pp. 77–78; see Lazarus, 1994). Unlike the 2001 study that also altered the type of supporting material (e.g., affect-laden words, opinions, anecdotes), the 2009 study used strong supporting evidence in all inoculation treatments (cognitive, affective-negative, and affective-positive). Second, Pfau and colleagues teased out differences in affective and cognitive messages in terms of their respective influence on threat, involvement, counterarguing output, and associative networks.

In the Pfau and colleagues (2009) study, affective-negative messages were designed to elicit anger or fear, while affective-positive messages were designed to elicit happiness. The messages worked as intended, to a degree. Affective-negative messages elicited more negative affect, but affective-positive messages failed to elicit more positive affect. Consistent with the 2001 study, all inoculation conditions conferred resistance. Additionally, the 2009 study confirmed that all inoculation conditions elicited more threat, involvement, attitude certainty, attitude strength, and resistance when compared with the control (no inoculation) condition. Although the team intended to compare cognitive and affective counterarguing, participants reported only a handful of affective counterarguments; indeed, only 13 of 281 participants used an affective counterargument (Pfau et al., 2009).

Fear was reduced immediately after the inoculation treatment, but for other emotions, "effects were muted" (Pfau et al., 2009, p. 88). Those inoculated were angrier and less happy than the control group after reading the inoculation message, but differences in anger and happiness were not statistically significant. After the attack, those inoculated were angrier and less happy, but not less fearful than the control group. The researchers' decision to test affect at two different phases produced a more precise look at when affect plays a role in inoculation. Although some effects immediately dissipated after the attack, others emerged only after the attack message.

Building on Pfau and colleagues' (2001) findings that elicited happiness seemed to diminish resistance and elicited anger seemed to strengthen it, the 2009 team predicted that affective-negative and cognitive treatments would work better than affective-positive treatments. Indeed, cognitive and affective-negative treatments led to greater involvement, both immediately after inoculation and after the attack, but they did not elicit more threat. Affective-negative messages did, however, lead to more threat than affective-positive messages, suggesting there are affective dimensions of threat—a possibility we return to later in this piece.

In another study, Pfau and colleagues (2010) were mainly interested in involvement levels and threat, but their findings fit into the current discussion of affect because of the link they made between threat and anger. Pfau and cohorts (2010) sought to enhance the significance of elicited threat by altering messages with words suggesting "greater severity (seriousness), salience, certainty, and immediacy" (p. 6) of the impending persuasive attacks. Results suggested that enhanced threat manipulations generated threat, but no more than the conventional forewarning generated threat. Additionally, instead of eliciting more anger, as they predicted, the enhanced threat measure generated less anger (although still more anger than the control condition). These findings suggest that threat's relationship to anger is complicated.

Miller and colleagues (2013) triggered psychological reactance in their inoculation messages, which boosted resistance to subsequent persuasive attacks. Their research is pertinent to a discussion of affect

because of the link between psychological reactance and elicited anger. Drawing on Dillard and Shen's (2005) conceptualization of psychological reactance as anger and negative cognitions, the researchers embedded reactance triggers into inoculation treatment messages. When compared with both conventional inoculation treatment messages and the control condition, the enhanced inoculation treatments elicited more anger toward the source of the attack message and more negative affect after the inoculation treatment and after the attack message.

In summary, inoculation messages have been shown to elicit a number of emotional responses, including happiness, anger, and confidence. But what emotions are elicited by the attack (counterattitudinal) messages? We explore these findings next.

Affect Elicited by Attack Messages

Unlike earlier studies that focused on designing messages to elicit affect or a specific emotion (e.g., happiness or anger; Pfau et al., 2009), Ivanov, Hester, and colleagues (2020) were interested in assessing the persistence of a range of discrete emotions (i.e., fear, anger, happiness, sadness, surprise) generated by an attack. They studied inoculation as a way to protect attitudes about the scope of the First Amendment. Not only did the authors discover that threat was persistent after the attack, but also that increases in fear, sadness, anger, and reductions in happiness may in fact strengthen the experience of post-attack threat.

Affect and Associative Networks

Inoculation studies have revealed key insights into the nature of associated networks and affect. Associated networks are spider-like structures comprising long-term memory by linking related pieces of information (i.e., nodes) through associated pathways (Ivanov et al., 2012, 2016). As such, pieces of information that influence changes in individual nodes can trigger potential reevaluation and changes in related nodes through the shared associative pathways (Ivanov, Parker, & Pfau, 2012; Ivanov et al., 2016), which can explain how inoculating against attacks on one attitude can affect related attitudes (see Dinauer & Fink, 2005; Ivanov et al., 2012, 2016) as well as how inoculation treatments can fundamentally modify attitude structures, attitude components, and attitude relationships (see Compton, 2013).

Pfau and colleagues (2005) designed cognitive and affective treatment messages (see Pfau et al., 2001) to investigate whether inoculation treatments influence associative networks during resistance. Specifically, they found that both types of inoculation messages (cognitive and affective) increased the number of attitudinal nodes (i.e., pieces of information associated with the attitude) and linkages between the nodes (i.e., how these pieces of information were connected with one another; Pfau et al., 2005). Moreover, these changes contributed to resistance (although the researchers deemed the effect "tepid"; Pfau et al., 2005, p. 435). Argument strength might have also played a factor in the observed effects (see Nabi, 2003).

Although not the primary focus of their study, Pfau and colleagues (2009) discovered affective-negative messages increased the number and weight of cognitive nodes (i.e., the messages added information associated with the attitude and the importance of this information), whereas affective-positive messages (and cognitive messages) increased the number and weight of affective nodes.

Matching and Mismatching

Inoculation scholarship has also advanced our understanding of mismatching and matching strategies as they relate to affect. Using the topic of animal experimentation and video as the medium for both inoculation and attack messages, Nabi (2003) investigated the effect of emotional evocativeness (i.e., strength of emotional reactions to images) on resistance. Messages were altered so that some were consistent between counterargument and refutation levels (e.g., highly evocative counterarguments and highly evocative refutations), and other message conditions were inconsistent (e.g., highly evocative counterarguments and low evocative refutations). Nabi found that, with mismatched levels, resistance was either weaker than matched levels or nonexistent, and matching levels of evocativeness conferred the greatest resistance. Nabi also took a closer look at how negative emotions influenced resistance. With both the treatment message and the attack message, negative emotions reduced resistance, but if the emotional levels in the treatment message matched, this effect countered the reduction in resistance caused by the negative emotions.

Compton and Pfau (2008) studied the difference between fear-, guilt-, and rational-based inoculation messages to combat college students' temptation to plagiarize academic work. Although none of the inoculation treatments conferred resistance—a "disappointing" finding (Compton & Pfau, 2008, p. 112)—the researchers discovered that a matching strategy generally worked better than a mismatching strategy. Matching inoculation treatments with attacks (e.g., affective inoculation message with affective attack) was more effective in conferring resistance than mismatching treatments with attacks (e.g., affective inoculation message with rational attack message).

Ivanov and colleagues (2009a) also found matching, rather than mismatching, strategies to be more effective, but with a twist. Rather than matching or mismatching the inoculation treatment and the attack, they followed an approach similar to that of Compton and Pfau (2008): They matched and mismatched the base of the attitude (cognitive or affective) and the inoculation treatment (cognitive, affective, or combined) while keeping the attack constant (both affective and cognitive). The results confirmed that matching proved to be more effective (Ivanov et al., 2009a). However, in cases where a second combination of affective and cognitive attacks was introduced, using a combined affective and cognitive inoculation treatment proved to be the best approach (Ivanov et al., 2012).

Inoculating Against Changes in Affect

Inoculation work has looked at preventing changes in affect. Pfau and colleagues (2008) found that emotionally-evocative television news could diminish support of the United States' involvement in the war with Iraq. They also discovered that inoculation could, in fact, diminish such effects; however, the effects were, as the researchers put it, "anemic" (Pfau et al., 2008, p. 316). When looking at specific emotions, Pfau and associates (2008) found that inoculation preserved pride, which can be diminished by television news coverage of war, but inoculation did not affect anger, sadness, fear, involvement, or attitudes.

Ivanov and colleagues (2016) explored the potential of inoculation to create protection against undesired changes in a specific emotion: fear. In their study, these researchers confirmed the capacity of

inoculation as a pre-crisis strategy to enhance public beliefs in the ability of government agencies to prevent and/or minimize the effects of politically motivated acts of violence and national crises in general. The most intriguing findings of this study centered on the ability of inoculation to battle the fears of helplessness and powerlessness that accompany the threat of a politically-motivated act of violence.

Sutton (2011) took a look at a different emotion and inoculation's effect on it: romantic jealousy. Inoculation was not able to reduce the experience of jealousy; however, it was at least partially successful in augmenting its expression. When faced with a jealousy-inducing scenario, participants receiving inoculation messages were more likely to use positive coping strategies (e.g., compensatory restoration) to protect the relationship and deal with the negative jealousy-provoking event.

Recognizing that college students are often nervous prior to and during in-class public speeches, Jackson and associates (2017) tested inoculation as a means of helping students work through these apprehensive emotional responses. In their study, college students who read a message that raised and refuted common worries about public speaking were less likely to experience negative public speaking anxiety—and were more likely to more positively reinterpret remaining public speaking anxiety—than those not inoculated.

Richards and Banas (2014; also see Richards, Banas, & Magid, 2016) used inoculation not as a strategy to protect against a persuasive attempt, but instead, as a strategy to facilitate one. Psychological reactance has the potential to reduce or eliminate the positive effects of a health message (Dillard & Shen, 2005). Hence, after warning study participants that they may feel as if their freedom to choose how to consume alcohol is being threatened by the health message, Richards and Banas's (2014) inoculation message suggested that the reasons and facts provided in the health message are indeed well-founded and, as such, should not be dismissed (i.e., refuted). The outcome of Richards and Banas's (2014) experiment was encouraging because inoculation message recipients, as compared with recipients of the control condition, reported lower threat to freedom, lower experience of psychological reactance, and lower intent to drink alcohol.

Affect: Inoculation Treatment Messages and Attack Messages

In this section, we explore how affect has been operationalized and elicited in inoculation scholarship. Drawing on existing research of affect and inoculation theory, we emphasize an important yet easy to overlook distinction: affect as a message property and affect as an elicited effect.

Affect as a Message Property

Most inoculation and affect studies attempt to manipulate inoculation treatment messages to elicit specific affect responses. Consider, for example, how the first comprehensive study of affect and inoculation designed treatment messages. Pfau and colleagues (2001) described an affective, or "emotional inoculation message" (p. 217), as one "consisting of affect-laden words, anecdotes, and opinionated statements" (p. 217). Cognitive messages used "verifiable evidence" (Pfau et al., 2001, p. 226). But Nabi (2003) pointed out that this type of approach to constructing affective inoculation messages might be a more applicable

test of *argument strength* than of affect. In response, many subsequent studies used the same types of evidence in their affective and cognitive messages but included “emotional triggers” in attempts to elicit emotion. Some studies, however, continued to use the Pfau and associates (2001) approach to affective and cognitive messages (e.g., Pfau et al., 2005; Wigley & Pfau, 2010).

Affect as a Message Effect

Inoculation messages have generated affect, but usually the elicited affect levels are low. Consider, for example, the work of Pfau and his cohorts (2001). Affective material in inoculation messages elicited actual affect responses, but only to a degree. Differences between the messages (affective-anger vs. affective-happiness) were statistically significant, but means were low for both elicited anger (affective-anger message: $M = 2.07$, $SD = 1.74$, $n = 130$; affective-happiness message: $M = 1.66$, $SD = 1.60$, $n = 150$) and happiness (affective-happiness message: $M = 1.48$, $SD = 1.71$, $n = 151$; affective-anger message: $M = 1.04$, $SD = 1.38$, $n = 130$) on a 7-point scale (0–6). The researchers called the effects “modest emotional responses” (p. 232). The researchers reported that their cognitive treatments also elicited anger and happiness, to a degree not statistically different from affective messages. Thus, if we approach the message conditions from an effects-based criterion (but see O’Keefe, 2003), messages were affective *and* cognitive, not one *or* the other. Perhaps, too, argument strength played a role (see Nabi, 2003).

Scholars have also looked at elicited affect in relation to two core components of inoculation: threat and counterarguing. Threat is one of the most important motivational forces in inoculation-conferred resistance (Compton, 2013; Pfau, 1997) yet remained understudied during much of inoculation theory’s development (Compton, 2009). Scholars have surmised that threat is not synonymous with fear (Pfau, 1995), but they have not taken many steps toward determining what threat is (see Compton, 2009). One notable exception is the work of Banas and Richards (2017), whose study makes a convincing case for threat as motivation. Motivation has a clear link to affect. As Fanselow (2018) observed, “The terms emotion and motivation are inextricably linked” (p. 105).

It stands to reason that the threat component of inoculation has affective dimensions or effects. Pfau and his colleagues (2001) made such an observation by drawing on Lazarus’s (1991) work. They predicted that “threat should produce a defensive emotion such as anger because it signals goal incongruence. . . . Therefore, to the degree that an inoculation treatment elicits threat, threat should arouse anger” (Pfau et al., 2001, p. 222). Pfau and his colleagues (2009) made a similar argument a decade later, and they discovered that anger-based inoculation messages produce greater threat than happiness-based messages. Indeed, more recently work by Ivanov, Hester, and associates (2020) suggested that threat—both motivational or apprehensive—may be heightened and interact with multiple emotions (e.g., anger, fear, sadness) to yield persistent inoculation effects beyond the initial persuasive attack. In these conceptualizations of emotion and threat, threat is not the same thing as the resulting emotion. Pfau and colleagues (2001) said that “threat should *arouse* anger” (p. 222; emphasis added), which is quite different from suggesting that threat *is* anger. These findings and past theorizing led Compton (2009) to conclude that threat must contain some “dynamic affect features” (p. 6).

Scholars have also considered affect and counterarguing. This focus has been a more recent development, however, as much of the work with counterarguing has been focused on cognitive dimensions (Compton & Pfau, 2005). More recent findings suggest counterarguing is not simply cognitive, but affective as well (e.g., Miller et al., 2013; Pfau et al., 2009; Wigley & Pfau, 2010). Both cognitive- (e.g., Miller et al., 2013) and affective-based (e.g., Pfau et al., 2009) inoculation messages have the capacity to generate negative affect as a part of counterarguing activity, which contributes to increased resistance (Miller et al., 2013).

Some results suggest that even when affective counterarguments are generated, they are fewer in number than cognitive counterarguments. Consider Pfau and colleagues' (2009) finding: "The quantity of cognitive counterarguing output totally dwarfed the quantity of affective counterarguing output" (p. 91) both immediately after the inoculation treatment and during the attack phase. The difference was so great that the researchers questioned whether inoculation generates affective counterarguments at all. Affect matters, the researchers concluded, but affect is not a main force of counterarguing.

Other research suggests a more significant role for affective counterarguing. Wigley and Pfau's (2010) examination of affective counterarguing found that, when affective counterarguing does occur, it is strong—perhaps even stronger than cognitive counterarguing. Perhaps, too, argument strength played a role (see Nabi, 2003). Also pointing to the important role of affect in counterarguing, Miller and colleagues (2013) found, compared with a control condition, cognitive inoculation messages elicit counterarguments containing a greater incidence of negative affect in the form of "anger, irritation, or frustration aimed at either the attack message or its source" (p. 139). Thus, counterarguing, long assumed to be a largely cognitive process (Compton & Pfau, 2005), has more recently emerged as an activity with both cognitive and affective dimensions (e.g., Miller et al., 2013; Pfau et al., 2009; Wigley & Pfau, 2010).

Conclusion

More than 20 years later, Dillard's (1998) call continues to resonate: "The study of communication should be intimately engaged with the study of affect" (p. xxxi). As we have argued in this chapter, the study of inoculation theory, in particular, also benefits from this same attention, and studies have begun to reveal consistencies, including the importance of anger (Compton, 2013).

Nevertheless, there is much we do not yet know about affect and inoculation. In particular, we encourage increased attention to how affect and inoculation matches (or not) the analogic assumptions of inoculation theory; the role of affect in therapeutic inoculation (inoculation messages administered to those disagreeing with the inoculation message; see Compton, 2020); how need for affect (Maio & Esses, 2001) may affect the inoculation process; how specific emotions, like anger and guilt, play a role in resistance and/or are elicited by inoculation messages; and how affect changes (or not) over time during resistance to influence.

If the last few years are an indicator, inoculation research will soon better reflect the important role of affect in inoculation's story, and particularly, the role of affect in inoculation's next chapters. With increasing attention to inoculation as an antidote to mis- and disinformation in particular, it is critical to consider a full range of cognitive *and* affective dimensions to inoculation theory.

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