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Psychological Reactance and Persuasive Health Communication: A Review of the Literature

*Tobias Reynolds-Tylus**

School of Communication Studies, James Madison University, Harrisonburg, VA, United States

Psychological reactance theory is a commonly relied upon framework for understanding audience members' resistance to persuasive health messages. This review article provides an overview of reactance research in the context of persuasive health communication. The article begins with an overview of psychological reactance theory. The major concepts of the theory are discussed, as well as recent developments by communication researchers in measuring reactance. Following this, contemporary reactance research in the context of persuasive health communication is summarized. An emphasis is placed on research examining message features associated with reactance, as well as the moderating role of trait reactance. The article concludes with a discussion of several promising directions for future research.

Keywords: psychological reactance, persuasion, health communication, anger, freedom threat

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***Correspondence:**
Tobias Reynolds-Tylus
reyno2tj@jmu.edu

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The design of persuasive health messages is of interest to many health communication researchers and practitioners. Many of the actual causes of death in the United States—including tobacco use, dietary behaviors, physical inactivity, alcohol consumption, and sexual practices—are behavior-related, and therefore preventable (Mokdad et al., 2004; Centers for Disease Control Prevention., 2017). Though communication campaigns are often effective at changing individuals' behavior (Anker et al., 2016), in some cases campaign messages can result in audience members adopting behaviors opposite of the recommended action (Byrne and Hart, 2009). In attempting to account for these "boomerang effects" of persuasive messages and campaigns, a commonly utilized theoretical framework is psychological reactance theory (PRT, Brehm, 1966; Brehm and Brehm, 1981).

PRT is based on the foundational principal that individuals cherish their freedom, choice, and autonomy (Brehm, 1966; Brehm and Brehm, 1981). Accordingly, when an external stimulus (e.g., a persuasive message) is perceived to threaten, hinder, or eliminate an individuals' freedom to choose, psychological reactance is hypothesized to occur. Reactance is operationalized as an amalgam of anger and negative cognitions (Dillard and Shen, 2005), preceded by a freedom threat (Quick and Stephenson, 2008). Reactance is a motivational state that provokes individuals to seek to restore their threatened or lost freedom (Brehm, 1966). As health campaigns and messages often directly discourage unhealthy behaviors, or in the case of those that encourage healthy behaviors, implicitly discourage unhealthy ones, promotional health messages may inherently be perceived as freedom threats. This underlines an inherent contradiction that exists when crafting persuasive health messages. Persuasive messages must by necessity be direct in advocating for the recommended action, yet must also balance this need with the inherent consequences of threatening individuals' freedom to choose (Rains, 2013). Given this challenge, PRT provides a theoretical account for understanding and examining resistance to persuasive messages.

The purpose of this article is to provide overview of PRT research in the context of persuasive health communication. First, an overview of PRT is provided. The key theoretical constructs underlying PRT will be introduced, followed by a discussion of the operationalization and measurement of reactance. Next, an overview of PRT research in the context of persuasive health communication will be provided. In particular, an emphasis is placed on message features associated with reactance, as well as the moderating role of trait reactance. The article concludes with a discussion of several promising directions for future research.

PSYCHOLOGICAL REACTANCE THEORY (PRT)

Key Constructs

Freedom

PRT rests on the notion of *freedoms*. Freedoms are beliefs individuals have about the ways in which they may act (Brehm, 1966; Brehm and Brehm, 1981). PRT assumes that for a given person, there are a multitude of freedoms that he or she perceives. Freedoms are defined broadly in PRT to include actions, emotions, as well as attitudes. Individuals are said to possess specific freedoms to the extent that they have knowledge that the freedom exists, and perceive they are able to act on that freedom. Freedoms that are not perceived to exist by definition cannot be threatened or eliminated, and thus, will not arouse reactance if threatened (Brehm, 1966).

Threat to Freedom

As individuals perceive specific freedoms, anything that makes exercising a freedom more difficult represents a *threat to freedom* (Brehm, 1966; Brehm and Brehm, 1981). In the context of persuasion, threats to freedom are most often attempts at social influence. To a certain extent, all persuasive attempts can be considered a threat to one's freedom (Burgoon et al., 2002).

Psychological Reactance

Psychological reactance is "the motivational state that is hypothesized to occur when a freedom is eliminated or threatened with elimination" (Brehm and Brehm, 1981, p. 37). Although any persuasive communication holds the potential to arouse reactance if it threatens or eliminates a previously held freedom, the magnitude of reactance aroused is hypothesized to be positively correlated with the importance of the threatened freedom (Brehm, 1966; Brehm and Brehm, 1981). For many years, researchers lacked a validated measurement of reactance (Quick et al., 2013). Recent research has demonstrated that the reactance is best measured as an amalgam of anger and negative cognitions (Dillard and Shen, 2005; Quick, 2012; Rains, 2013), preceded by a freedom threat (Quick and Stephenson, 2008).

Though Brehm (1966) initially conceptualized psychological reactance as a psychological state, he did leave open the possibility of individual differences in reactions to freedom-threatening stimuli. Later work by Brehm and Brehm (1981) recognized reactance as an individual difference variable, as individuals vary in their needs for autonomy and self-determination (Wicklund, 1974). Highly reactant individuals are characterized by a resistance to rules and regulations, high desire for autonomy, high defensiveness, and low concern for social norms (Dowd et al., 1994; Seibel and Dowd, 2001). Perhaps unsurprisingly, reactance prone individuals have been found to be more likely to engage in risky health behaviors such as tobacco use (Miller et al., 2006) and risky sexual behaviors (Miller and Quick, 2010). In the context of persuasive messaging, research shows that individuals exhibiting high trait reactance experience greater freedom threats, and therefore are more resistant to persuasive attempts (Quick and Stephenson, 2008; Quick et al., 2011; LaVoie et al., 2017). Although many scales have been offered to measure trait reactance (Merz, 1983; Dowd et al., 1991), Shen and Dillard (2005) argue that the scale with the greatest conceptual correspondence to PRT is the Hong Psychological Reactance Scale (Hong and Faedda, 1996).

Restoration of Freedom

The fourth component of the theory, restoration of freedom, encapsulates the potential consequences that may occur as a result of reactance arousal. PRT contends that when a perceived freedom is threatened or eliminated, individuals will be motivated to reestablish that freedom (Brehm, 1966; Brehm and Brehm, 1981). Inherent to this prediction is the understanding that reactance is "a motivational state and as such is assumed to have energizing and behavior-directing properties" (Brehm and Brehm, 1981, p. 98). PRT proposes that individuals may act upon this motivation to restore their freedom either directly or indirectly. Direct restoration may include directly engaging in an admonished behavior (e.g., consuming alcohol after exposure to an anti-drinking message), or by resisting an advocated behavior (e.g., refusing a flu vaccination after exposure to a pro-flu vaccination message). This type of direct restoration is often referred to as the boomerang effect (Hovland et al., 1953; Byrne and Hart, 2009), and is perhaps the most intuitive manifestation of freedom restoration.

Considering that direct restoration is not always feasible or suitable, PRT also proposes that individuals may also act to restore their freedom in more indirect ways (Brehm, 1966; Brehm and Brehm, 1981). Indirect restoration may include such responses as increasing one's liking of the threatened choice, vicariously performing the threatened behavior by observing others acting in a freedom restoring manner, derogating the source of the freedom threat, denying the existence of the threat, or by exercising a related freedom to regain feelings of control and choice (Wicklund, 1974; Brehm and Brehm, 1981). For instance, in response to an anti-binge drinking message, individuals experiencing reactance may choose to restore their freedom by increasing their liking for binge-drinking, by associating themselves with those who binge drink, by derogating the source of the message, by denying that binge-drinking is a significant problem, or by using a related substance such as marijuana or cigarettes. Considerable research has demonstrated that reactance arousal is associated with a variety of undesirable persuasive outcomes, including unfavorable message appraisals (Grandpre et al., 2003), unfavorable source appraisals (Miller et al., 2007), as well as decreased attitudes (Dillard and Shen,

2005; Quick, 2012), and intentions (Rains and Turner, 2007) toward the advocated behaviors.

Operationalization of Reactance

In their writings on PRT (Brehm, 1966; Brehm and Brehm, 1981), Brehm and Brehm were reluctant to explicate reactance, the principle mechanism of PRT. This may have been driven by their beliefs about the ability of researchers to adequately measure reactance. As stated by Brehm and Brehm (1981), "reactance has the status of an intervening, hypothetical variable… *We cannot measure reactance directly* [emphasis added], but hypothesizing its existence allows us to predict a variety of behavioral effects" (p. 37). The position that reactance cannot be measured directly is logically consequential, as for many years this relegated reactance—the central and defining concept of the theory—to a proverbial black box. Instead, researchers merely posited the existence of reactance based on observable outcomes such as source derogation (Smith, 1977), the adoption of positions or behaviors opposite from the advocated response (Worchel and Brehm, 1970), or increased liking for threatened choice (Hammock and Brehm, 1966). Unfortunately, without a validated operationalization of reactance, it became too common for researchers to cite reactance as a causal mechanism when study findings indicated the persuasive appeal failed, or when boomerang effects were observed (Quick et al., 2013). It was not until communication researchers began to apply reactance within the context of persuasive health messages that researchers began to challenge the position that reactance could *not* be measured directly.

Spearheading the efforts to validate a measurement of psychological reactance were Dillard and Shen (2005), who conducted a test of four distinct operationalizations of reactance in the contexts of flossing and student alcohol use. Dillard and Shen (2005) disagreed with Brehm and Brehm's (1981) position that reactance could not be measured directly, noting that the "primary limiting factor in the application of reactance theory to persuasive campaigns is the ephemeral nature of its central, explanatory construct" (p. 145). Building from the work of previous researchers, who throughout their application of PRT to various domains have defined reactance in a variety of ways, Dillard and Shen (2005) identified four distinct possible ways to characterize reactance: (a) as a purely cognitive process comprised of counterarguing, (b) as a purely affective process comprised of anger, (c) as a parallel process comprised of cognitive and affective components (i.e., anger and counterarguing have separate and unique effects on persuasive outcomes), or (d) as an intertwined cognitive and affective process (i.e., counterarguing and anger are inseparably intertwined—their effects on persuasive outcomes cannot be disentangled from one another).

To test these four conceptualizations of reactance, Dillard and Shen (2005) conducted two experiments comparing the four models in the context of alcohol consumption and flossing. Freedom threat was experimentally manipulated (high vs. low) and the four distinct conceptualizations of reactance were modeled as mediating the relationship between freedom threat and attitude. Across both health topics, the intertwined cognitive and affective model was found to best fit the data. Furthermore, the observed factor loadings demonstrated that both anger and negative cognitions contributed about equally to individuals' motivation to restore their freedom. Hence, Dillard and Shen (2005) concluded that not only is reactance measurable, but that it is best operationalized as an amalgam of anger and negative cognitions.

The intertwined model of reactance has been further supported by numerous studies. The first to do so was Rains and Turner (2007), who also examined a fifth possible model, whereby reactance is conceptualized as a two-step linear process with anger as the proximal antecedent to counterarguing. Similar to Dillard and Shen (2005), the results of Rains and Turner (2007) also supported the intertwined model as superior to the alternative conceptualizations. Further studies have also found support for the intertwined model as the best fitting model across various health contexts including alcohol consumption (Quick and Bates, 2010; Kim et al., 2013; Richards and Banas, 2015), organ donation (Quick et al., 2011, 2015; Quick, 2012; Scott and Quick, 2012), physical activity (Quick and Considine, 2008), safer sex behaviors (Quick and Stephenson, 2007), antismoking PSAs (Shen, 2010, 2011), graphic cigarette warning labels (LaVoie et al., 2017), and skin cancer prevention (Shen, 2015). A recent meta-analysis by Rains (2013) ($K = 20$, $N = 4{,}942$) only lends further support to the intertwined model as the best fitting model for operationalizing reactance.

Measuring Reactance

Dillard and Shen's (2005) method for measuring reactance involves two procedures. In regards to anger, participants are asked to indicate on semantic-differential scales (0 = *none of this feeling*, 4 = *a great deal of this feeling*) to what degree the message they just read made them feel: (a) angry, (b) irritated, (c) annoyed, and (d) aggravated. Negative cognitions are assessed utilizing the thought-listing technique (Petty and Cacioppo, 1986), whereby participants are asked to write whatever thoughts were in their minds while they read the message. Research assistants then code participants' responses in a four-step process whereby they: (a) unitize the data into psychological thought units, (b) identify and remove affective responses using a list of feeling terms compiled by Shaver et al. (1987), (c) determine whether or not the cognitive responses are relevant or irrelevant to the message, and (d) code the relevant thoughts as either supportive, neutral, or negative. Negative cognitions are then subsequently retained and summed into a single scale to use for data analysis.

Additional Measurements

Following the burgeoning popularity of PRT, researchers began to reassess the validity of Dillard and Shen's (2005) measure of psychological reactance. Though not the primary focus of her study, Lindsey (2005) developed an alternative measure of reactance to bone marrow donation messages using a four-item scale based on Hong's Psychological Reactance Scale (Hong and Faedda, 1996). In order to establish which of the two measures represented the best measure of reactance, Quick (2012) conducted a study to examine the reliability

and validity of both Lindsey's (2005) and Dillard and Shen's (2005) measurements of reactance. Though Quick (2012) found that both measures demonstrated acceptable reliability, he recommended the continued use of Dillard and Shen's (2005) measure due to stronger validity. Specifically, the ability of Dillard and Shen's (2005) measure of reactance to explain greater variance in attitude, reactance motivation, and source appraisals compared to Lindsey's (2005) scale. Furthermore, Quick (2012) cautioned the continued use of Lindsey's (2005) measure due to its inability to reliably distinguish freedom threat from reactance, a distinction that is consistent with Brehm's (1966) earliest theorizing on PRT. Despite Quick's (2012) recommendation in favor of Dillard and Shen's (2005) scale, he did acknowledge the advantage of Lindsey's (2005) scale in terms of measurement economy. Accordingly, Quick (2012) recommended that continued efforts assess how to more effectively and efficiently operationalize reactance.

One method to more efficiently gauge reactance in general, and negative cognitions in particular, is the use of participant coding for assessing their cognitive responses (Quick and Stephenson, 2007; Rains and Turner, 2007). Participant coding has been suggested due to two inherent limitations to Dillard and Shen's (2005) technique for assessing negative cognitions. First, due to the training and time required to implement Dillard and Shen's (2005) technique for assessing negative cognitions (i.e., thought unitization, screening out emotions, removing unrelated cognitions), this method is somewhat unwieldy, particularly outside of laboratory experiments. Second, and perhaps more critically, as thought-listing procedures often result in responses that are ambiguous in their very nature (e.g., "Is this claim true?"), researchers often are left to guess as to whether a participant's thought is positive, negative, or neutral. The rationale for the use of participant coding of responses is straightforward, as by definition, research participants have more direct access to their own evaluations than do researchers. Hence, participants can feasibly provide more valid judgments as to the valence of their thoughts. Although participant coding of responses is a widely used and acceptable alternative (e.g., Rains and Turner, 2007; Quick and Stephenson, 2008), focused research has yet to systematically evaluate whether participant coding does indeed provide more valid judgments than trained coders.

Other work attempting to more efficiently assess reactance has abandoned the thought-listing approach entirely, and instead has relied on semantic-differential scales to assess participants' negative cognitions (Silvia, 2006; Miller et al., 2007; Varava and Quick, 2015; Gardner and Leshner, 2016). For instance, in Gardner and Leshner's (2016) investigation of narrative and other-referencing messages in diabetes self-care education, the authors utilized a three-item measure developed from Silvia (2006) to assess negative cognitions (e.g., "Did you criticize the message you just saw while you were reading it?"). Other work, including Varava and Quick's (2015) examination of adolescents' movie choices, has utilized a two-item scale (e.g., "My thoughts about this movie rating are…" [1 = *negative*] to [7 = *positive*]). The advantage of this technique for assessing negative cognitions is of course, economy of measurement, and the flexibility to implement these measures outside the laboratory (Quick et al., 2015), in more longitudinal studies (Gardner and Leshner, 2016), and among non-college student populations (Varava and Quick, 2015). However, focused research has yet to systematically evaluate if the use of semantic-differential scales provides as equally as valid of an assessment of negative cognitions as does the thought-listing technique.

Modeling Reactance as a Process

Brehm (1966) theorized that psychological reactance should result when a specific freedom has been threatened or eliminated. Accordingly, PRT researchers have encouraged the modeling of reactance as a two-step process with freedom threat preceding reactance (Quick and Considine, 2008; Quick and Stephenson, 2008). The rationale for modeling freedom threat perceptions prior to reactance is that people can experience anger and negative cognitions in response to a message for any number of reasons that may be unrelated to feeling as if their freedom threatened or eliminated (e.g., grammatical errors, poor font choice). Therefore, to test the reactance process in the manner most consistent with Brehm's (1966), theorizing, Quick et al. (Quick and Considine, 2008; Quick and Stephenson, 2008) recommend modeling reactance as a two-step process with freedom threat preceding reactance in order to serve as an induction check. The most commonly used measure of freedom threat is a four-item scale (e.g., "The message tried to make a decision for me") from Dillard and Shen (2005).

REACTANCE AND PERSUASIVE HEALTH COMMUNICATION

Advances by communication researchers have shown that reactance *can* be measured as a latent construct comprised of anger and negative cognitions (Dillard and Shen, 2005; Rains, 2013), preceded by a freedom threat (Quick and Considine, 2008; Quick and Stephenson, 2008). Having a validated measurement of reactance has allowed communication researchers—particularly in the areas of health communication and persuasion—to more directly examine the reactance process as originally conceptualized by the theorists themselves (Brehm, 1966; Brehm and Brehm, 1981). Following the development of a measurement of reactance, communication researchers utilizing PRT have predominantly focused on identifying the message features most likely to stimulate and diminish reactance (see **Table 1** for a summary of the key findings in this area). In this section, research utilizing PRT in the context of persuasive health communication will be reviewed. Specific attention is given to the message features most likely to galvanize or mitigate reactance, as well as the role of trait reactance.

Message Features

Freedom-Threatening Language

One of the most testable propositions stemming from PRT is that persuasive messages using language that more explicitly attempts to limit one's autonomy will elicit greater freedom threat (Brehm and Brehm, 1981). Though a litany of terms has been used in the literature to describe freedom-threatening language, including "controlling language" (Miller et al., 2007,

TABLE 1 | Description of message features and their relationship to reactance.

Message feature	Conceptual definition	Relationship to reactance
Freedom-threatening language	Freedom-threatening language is language that explicitly limits the autonomy of the message recipient (e.g., "you must," "it is impossible to deny," and "stop the denial," see Rains, 2013, Table 1, pp. 54–57).	High freedom threatening language (compared to low freedom threatening language) increases freedom threat and reactance (see meta-analysis by Rains, 2013).
Restoration postscripts	Restoration postscripts are brief statements at the end of a message that emphasize to the message recipient that the decision to comply with the message recommendations is their choice.	Restoration postscripts (compared to a filler postscript) have been shown to reduce freedom threat and reactance in some studies (Miller et al., 2007; Bessarabova et al., 2017) but not others (Quick et al., 2015).
Provision of choice	Messages that provide message recipient with a choice between two (or more) behaviors.	Provision of choice (compared to no choice) has been shown to reduce freedom threat and reactance (Shen, 2015; Reynolds-Tylus et al., 2019).
Narratives	A narrative is "a representation of connected events and characters that has an identifiable structure, is bounded in space and time, and contains implicit or explicit messages about the topic being addressed" (Kreuter et al., 2007, p. 222).	The use of narratives (compared to an expository or didactic style) has been shown to reduce freedom threat and reactance (Moyer-Gusé and Nabi, 2010; Gardner and Leshner, 2016).
Empathy	Empathy is a cognitive and affective process where individuals share the subjective emotional experience of another person, and adopts their point of view. Empathy is aroused by specific message features (see Shen, 2019).	Two studies by Shen (2010, 2011) found that the experience of state empathy reduced freedom threat and reactance.
Message framing	Gain-framed messages emphasize the advantages of adopting the recommended action, whereas loss-framed messages emphasize the consequences of failing to adopt the recommended action.	Loss-framed messages have been shown to elicit greater freedom threat and reactance in some studies (Reinhart et al., 2007; Cho and Sands, 2011; Shen, 2015). Other work has found no difference between the two (Quick and Bates, 2010; Lee and Cameron, 2017). Quick et al. (2015) found that gain-framed messages elicit greater freedom threat and reactance than loss-framed messages.
Message sensation value	Message sensation value is "the degree to which formal and content audio-visual features of a message elicit sensory, affective, and arousal responses" (Palmgreen et al., 1991, p. 219).	There is some evidence that message sensation value (specifically, message novelty) is associated with freedom threat and reactance (Quick, 2013). Xu (2015) found that message sensation value interacts with controlling language such that high sensation value and high controlling messages arouse the greatest anger.
Other-referencing messages	Other-referencing messages emphasize the potential influence of an individual's choices on relevant others (e.g., friends, family, and loved ones), rather than the self.	Evidence from one study Gardner and Leshner (2016) found that the use of other-referencing messages (compared to self-referencing messages) reduced freedom threat and reactance.
Inoculation messages	Inoculation messages are pre-exposure warnings that alert the message recipient that the message they are about to encounter may trigger feelings of freedom threat and reactance.	An initial study by Richards and Banas (2015) found that inoculation messages (compared to a control condition) reduced freedom threat and reactance. In a follow study, Richards et al. (2017) failed to replicate this finding (study 1). They authors did identify a potential boundary condition (i.e., inoculation messages reduce freedom threat and reactance only under conditions of low freedom threatening language; study 2).

p. 222), "dogmatic language" (Quick and Stephenson, 2008, p. 450), "domineering language," (Quick et al., 2015, p. 44), and "forceful language" (Quick and Considine, 2008, p. 483), replete in these experimental manipulations of freedom-threatening language are such phrases as "you must," "it is impossible to deny," and "stop the denial" (see Rains, 2013, Table 1, pp. 54–57). Freedom-threatening language is commonly defined in terms of message explicitness (Searle, 1995). Explicit persuasive messages are clear and direct in the meaning being conveyed, leaving the receiver with little room for interpretation. Implicit messages, by contrast, are less direct and can often convey multiple meanings or interpretations (Miller et al., 2007). Though at times individuals certainly appreciate plain, direct talk due to its frankness (Dillard et al., 1996), more explicit persuasive messages by their very nature are more freedom threatening (Miller, 2015). The ineffectiveness of freedom-threatening language use in persuasive messages has been well-documented across a variety of health contexts including alcohol consumption (Rains and Turner, 2007), drug use (Miller et al., 2007; Quick and Considine, 2008; Quick and Stephenson, 2008), meningitis (Rains and Turner, 2007), sunscreen usage (Quick and Stephenson, 2008), strep throat (Rains and Turner, 2007), and tobacco use (Grandpre et al., 2003). Likewise, the ineffectiveness of freedom-threatening language has been observed across various populations, including adolescents (Quick and Kim, 2009), college students (Miller et al., 2007; Quick and Stephenson, 2008), adults (Quick and Considine, 2008).

The consistent findings of the various studies investigating freedom-threatening language point to an underlying tension that exists for researchers and campaign designers attempting to create effective persuasive appeals. On one hand, messages with the objective of behavioral change or reinforcement must by necessity be clear in advocating for a specific recommended action. Though explicit persuasive messages are more likely to be understood by message recipients, they are also more likely to incite reactance due to being inherently freedom threatening in nature. Thus, a pervasive challenge for health campaigns is balancing the need to be direct in advocating for desired behaviors while simultaneously avoiding language that may, either explicitly or implicitly, threaten an audience member's freedom to choose their course of action. In attempting to circumvent the negative effects of reactance, while still maintaining clear persuasive messages, researchers have investigated a variety of strategies for reducing freedom threat perceptions in the context of promotional health messages.

Choice-Enhancing Language

Whereas freedom-threatening language has been shown to provoke reactance (Quick et al., 2013; Rains, 2013), the use of more implicit, autonomy supporting, and choice-enhancing language has been shown to diminish reactance arousal (Rosenberg and Siegel, 2018). More implicit messages, often using qualifier terms such as "perhaps," "possibly," and "maybe," are thought to be more successful at achieving desired persuasive outcomes as they more successfully avoid the perception of trying to control behavior (Miller, 2015). For instance, in their examination of pro- and anti-tobacco advertisements, Grandpre et al. (2003) found that adolescents exposed to implicit anti-tobacco message reported being significantly less inclined to smoke in the future than those exposed to explicit anti-tobacco message.

The most commonly examined type of choice-enhancing language are restoration postscripts. Restoration postscripts are brief statements at the end of a message that emphasize to the message recipient that the decision to comply with the message recommendations is their choice (Miller et al., 2007; Bessarabova et al., 2017). Restoration postscripts are a particularly appealing message strategy, as they are thought to overcome the detrimental effects of more explicit, controlling language, while still maintaining the benefit of including clear, directive statements (Miller et al., 2007). Restoration postscripts use such language as, "The choice is yours. You are free to decide for yourself" (Miller et al., 2007, p. 240). The message with the freedom-restoring postscript is then compared to a message with a filler postscript absent this choice-enhancing language (e.g., "We will now ask you some questions about this particular message. Please move to the next step," Miller et al., 2007, p. 240). In an initial study on the topic, Miller et al. (2007) found that college students who read a physical activity message with a freedom-restoring postscript experienced less freedom threat than those in a control condition. Bessarabova et al. (2017) found that the inclusion of a freedom-restoring postscript was effective at reducing freedom threat perceptions among college students exposed to a high threat message promoting recycling behaviors. However, no effect for a freedom-restoring postscript was found for those participants exposed to a low threat message. More recent work by Quick et al. (2015), however, failed to support the effectiveness of freedom-restoring postscripts in the context of radio ads advocating organ donation. However, Quick et al. (2015) study differed from the aforementioned studies in several important ways, including—but not limited to—medium of delivery (radio ad vs. text-message) and postscript dosage (<10 words vs. >50 words).

Provision of Choice

Shen (2015) was the first to investigate the impact of providing behavioral alternatives (i.e., choice) as strategy for reducing freedom threat and reactance. In Shen's (2015) study, undergraduate participants read messages promoting either skin-cancer protection or detection behaviors. Messages either provided participants with one recommended response (e.g., apply sunscreen regularly) or two (e.g., wear protective clothing *or* apply sunscreen regularly). Results revealed that the provision of two behavioral options (compared to one) resulted in significantly less freedom threat and subsequent reactance. Furthermore, this effect was more salient when more explicit, controlling language was used. More recently, Reynolds-Tylus et al. (2019) examined the provision of choice within a cluster of environmental conservation behaviors. Participants were provided with five recommended behaviors (either energy or water conservation) and were either told they had to do all five behaviors (i.e., no choice), or were provided with a choice ("Choose the options that best fit your lifestyle," p. 6). Provision of choice (vs. no choice) resulted in diminished freedom threat, and subsequent reactance.

Narrative Messages

Narratives are defined as "a representation of connected events and characters that has an identifiable structure, is bounded in space and time, and contains implicit or explicit messages about the topic being addressed" (Kreuter et al., 2007, p. 222). In contrast, non-narrative messages "include expository and didactic styles of communication that present propositions in the form of reasons and evidence supporting a claim" (Kreuter et al., 2007, p. 222). Research has shown that narratives are a particularly effective format for delivering persuasive health messages (Slater and Rouner, 2002; Moyer-Gusé, 2008; Bilandzic and Busselle, 2013). Though a variety of mechanisms have been proposed to explain the effectiveness of narratives on persuasive outcomes (see Bilandzic and Busselle, 2013), a common rationale supporting the use of narrative appeals is the ability for narratives to communicate persuasive messages in a manner that obfuscate persuasive intent, subsequently minimizing reactance (Slater and Rouner, 2002; Dal Cin et al., 2004; Moyer-Gusé, 2008).

In a study by Moyer-Gusé and Nabi (2010), undergraduate participants watched either a dramatic narrative or a non-narrative program about the consequences of an unplanned teen pregnancy. Participants in the narrative condition perceived lower persuasive intent than those in the non-narrative condition. Perceived persuasive intent was positively associated with reactance. In turn, reactance was negatively associated with

safer sex intentions both at an immediate posttest and a 2-week follow up. More recent work by Gardner and Leshner (2016) examined the role of narrative verses non-narrative delivery style in written educational materials promoting diabetes self-care (i.e., healthy diet, physical activity). Results revealed that narrative messages generated lower freedom threat, fewer counterarguments, and elicited lower state anger than non-narrative messages. Furthermore, the narrative messages resulted in significantly more positive attitudes toward both the message and the advocated health behaviors.

Empathy

Empathy is psychological state, not a message feature. However, several features of messages have been shown to elicit empathy (see Shen, 2019). Research on the role of empathy and persuasion has suggested that message-induced empathy can enhance persuasion by mitigating psychological reactance (Shen, 2010, 2011). Empathy, derived from the Greek word *empatheia*, meaning "feeling into," can be defined as "sharing the subjective experience of another person" (Campbell and Babrow, 2004, p. 160). There is broad consensus that empathy is comprised of both cognitive and affective components (Lazarus, 1991; Preston and de Waal, 2002; Decety and Jackson, 2004, 2006). Affective empathy refers to the experience of others' emotional experiences—including understanding and sharing others' feelings. Cognitive empathy is characterized by perspective taking (i.e., placing oneself psychologically in another person's circumstances), thus allowing for comprehension and understanding of their point of view (Lazarus, 1991). Accordingly, affective empathy is thought to diminish anger in message processing, whereas cognitive empathy is hypothesized to decrease counterarguing (Shen, 2010, 2011). Evidence in support of the reactance-mitigating function of empathy comes from Shen (2010, 2011). Across two studies, Shen demonstrated that the experience of state empathy during exposure to anti-smoking (Shen, 2010, 2011) and anti-drunk driving PSAs (Shen, 2010) had both a positive direct impact on persuasive outcomes, as well as a positive indirect impact on persuasive outcomes as mediated by psychological reactance.

Message Framing

A large literature has examined the relative effectiveness of gain- vs. loss-framed messages on persuasive outcomes (see O'Keefe and Jensen, 2006, 2007, 2009 for recent meta-analyses). Gain-framed messages emphasize the advantages of adopting the recommended action (e.g., "If you wear sunscreen, you'll have attractive skin," O'Keefe, 2012, p. 4), whereas loss-framed messages emphasize the disadvantages of failing to adopt the recommended action (e.g., "If you don't wear sunscreen, you'll have unattractive skin," O'Keefe, 2012, p. 4). Loss-framed messages are thought to be superior at persuasion due to two primary psychological phenomena: negativity bias and loss aversion (O'Keefe, 2012). Though research on economic behavior shows strong evidence in support of loss-frame messages as superior to gain-framed messages (Levin et al., 1998), meta-analyses of research on message framing in the context of health behaviors has consistently shown no appreciable difference in the effectiveness of gain- vs. loss-framed messages (O'Keefe and Jensen, 2006, 2007, 2009).

Given that meta-analytic evidence has shown no appreciable difference in persuasive outcomes between gain- and loss-framed messages for health promotion (O'Keefe and Jensen, 2006, 2007, 2009), researchers have suggested the need to further examine mediating and moderating variables to better understand the effects of message framing (e.g., Rothman and Updegraff, 2011). Psychological reactance has been proposed as an explanation for the relative differences in the effectiveness of gain- vs. loss-frame messages (Reinhart et al., 2007; Quick and Bates, 2010; Cho and Sands, 2011; Quick et al., 2015; Shen, 2015). The experience of reactance has been hypothesized to be a factor that offsets negativity bias, thus undermining the effectiveness of loss-framed messages (Shen, 2015). Furthermore, as loss-framed messages often use more controlling language (Cho and Sands, 2011), loss-framed messages may be inherently more freedom threatening than gain-framed messages. Moreover, loss-framed message have been shown to arouse greater fear (Shen and Dillard, 2007), and previous work has demonstrated that fear appeal messages can lead to greater reactance arousal (Shen, 2011). Thus, researchers investigating reactance as a mediating mechanism have proposed that loss-framed messages should arouse greater reactance, and subsequently lead to more unfavorable persuasive outcomes (Reinhart et al., 2007; Quick and Bates, 2010; Cho and Sands, 2011; Quick et al., 2015; Shen, 2015).

The empirical evidence on the impact of message framing and psychological reactance, however, has been somewhat mixed. Reinhart et al. (2007), found consistent evidence for the impact of message frame on reactance across three studies, such that gain-framed messages elicited lower reactance and more favorable message evaluations toward organ donation messages. Quick and Bates (2010), however, found no effect of message frame (gain vs. loss) on freedom threat perceptions in the context of anti-drinking messages. Cho and Sands (2011) found evidence that a loss-framed message produced a greater perceived threat to freedom in sun safety messaging. However, no direct effect of the loss-framed message on reactance was observed. Shen (2015) found that loss-framed skin cancer protection and detection messages resulted in a greater freedom threat, and subsequently reactance, than gain-framed messages. Contrary to their expectations, Quick et al. (2015) found that a gain-framed organ donation message aroused higher freedom threat than a loss-framed message. Lee and Cameron (2017) found that a loss-framed weight loss message elicited less favorable cognitive appraisal than a gain-framed message. However, no difference was observed between the gain- and loss-frame messages in terms of freedom threat, anger, or counterarguing.

Message Sensation Value

Message sensation value refers to "the degree to which formal and content audio-visual features of a message elicit sensory, affective, and arousal responses" (Palmgreen et al., 1991, p. 219). Messages high in sensation value are dramatic, exciting, and novel (Morgan et al., 2003). High sensation messages are thought to be more persuasive than low sensation messages as they distract receivers, and thus, reduce counterarguing (Petty et al.,

1976; Kang et al., 2006). Furthermore, high sensation messages are thought to be particularly appealing to high sensation seekers, as these messages meet their psychobiological needs for activation (Palmgreen et al., 2002; Stephenson, 2003). Quick (2013) found partial support for the role of perceived message sensation value as a message strategy for deterring reactance. In Quick's study (Quick et al., 2013), undergraduates were exposed to a series of anti-marijuana PSAs. Participants rated the ads in respect to three aspects of message sensation value: dramatic impact, emotional arousal, and novelty (Palmgreen et al., 2002). Only perceived message novelty was found to have an effect on participants' freedom threat perceptions. Specifically, the more that individuals perceived an anti-marijuana PSA to be unique, the less they perceived that the ad was trying to threaten their freedom.

More recent work by Xu (2015) examined the interaction between message sensation value and controlling language. Across two studies, undergraduate participants were exposed to anti-drunk driving PSAs (study 1) and anti-smoking PSAs (study 2) that varied in message sensation value (high vs. low) and controlling language (high vs. low). Across both topics, perceived message sensation value was positively associated with perceived ad persuasiveness. A consistent pattern of findings emerged in respect to the interaction between message sensation value and controlling language, such that messages with high sensation value and low controlling language were perceived as the most effective. Interestingly, high sensation value messages with high controlling language consistently aroused the most state anger, suggesting high sensation value messages may be particularly likely to arouse reactance when controlling language is used. However, Xu's (2015) study assessed only the affective component of reactance (i.e., state anger) but not the cognitive component (i.e., counterarguing).

Other-Referencing Messages

Other-referencing messages emphasize the potential influence of an individual's choices on others, typically friends, family, and loved ones. Self-referencing messages, in contrast, emphasize the direct personal consequences of one's behavior (Gardner and Leshner, 2016). Gardner and Leshner (2016) manipulated other-referencing messages in education materials promoting diabetes self-care messages by emphasizing the potential benefits or harmful consequences of the diabetic's lifestyle choices on others (e.g., "When your kids, grandchildren or friends watch your food choices, what lessons are they learning?" p. 742). In contrast, self-referencing messages emphasized the personal consequences of the diabetic's lifestyle choices rather than the impact of these choices on others (e.g., "After spending so much time not feeling or looking the way I wanted to, I said to myself, 'You have to do something, and do it now!'" p. 742). Gardner and Leshner's (2016) findings supported a main effect of other-referencing messages on reactance, such that other-referencing messages were rated as less freedom threatening, and generated less anger and fewer counterarguments than self-referencing messages. Furthermore, and in support of PRT, other-referencing messages produced significantly more positive attitudes toward the message and the advocated health behaviors.

Inoculation Messages

Inoculation theory (McGuire, 1961, 1964), based on the analogy of medical inoculation against disease, proposes that people become more resistant to persuasion if they are forewarned in advance of a subsequent persuasive attempt, and if they are preemptively given arguments to refute the ensuing persuasive appeal (Banas and Rains, 2010; Compton, 2013). Following the analogy of medical inoculation against disease, just as a vaccine injects a weakened version of a virus sufficient to avert infection but strong enough to produce antibodies, the provision of weakened versions of persuasive arguments should confer individuals with protection against stronger persuasive attempts in the future (McGuire, 1961, 1964). Richards and Banas (2015) were the first to examine if it was possible to decrease reactance to health messages by utilizing a pre-exposure inoculation message warning. In the inoculation treatment condition, undergraduate participants read a message prescript that forewarned that the brochure they were about to read might threaten their freedom ("After reading through the information, you might feel that your freedom to choose how you will consume alcohol is being threatened," p. 455). The inoculation message also provided information to the participant as to why they should not feel threatened by the proceeding message (i.e., "the facts that are reported are pretty powerful when you think about them, and the suggestions that are proposed about drinking responsibly actually make a lot of sense," p. 455). Participants in the control condition read a short passage about the history of sushi. Results revelated that inoculation messages diminished freedom threat perceptions, and subsequently reactance. In a follow-up study, Richards et al. (2017) failed to replicate these findings in their first experiment. In their second experiment, Richards et al. (2017) found that an inoculation message can diminish reactance, but only under conditions of low freedom threatening language—an inoculation message was found to be no more effective than a control message when freedom threatening language was high.

Trait Reactance

In Brehm's (1966) original formulation of PRT, reactance was conceptualized as a situationally aroused psychological state. Accordingly, classic reactance research predominantly focused on the antecedents and behavioral consequences of reactance following experimentally induced restriction of alternatives (see Burgoon et al., 2002; Chadee, 2011). Though Brehm's (1966) original conceptualization of psychological reactance did not specifically discuss reactance as an individual trait, he did recognize the possibility that individuals may differ in their reactions to freedom-threatening stimuli. In their later refinement of PRT, however, Brehm and Brehm (1981) acknowledged reactance could indeed be conceptualized as an individual trait, as this conceptualization was consistent with the theory's original formulation that individuals differ in their needs for autonomy and self-determination (Brehm, 1966; Wicklund, 1974).

Following the development of a validated measurement for trait reactance as a latent disposition to respond to freedom-threatening stimuli (Hong and Faedda, 1996), contemporary researchers have been able to investigate both the direct and

indirect effects of trait reactance. A growing body of work suggests that trait reactance has a direct effect on risky health behaviors, and as such researchers have argued that trait reactance is an important audience segmentation variable (Miller et al., 2006; Quick et al., 2009; Miller and Quick, 2010). Specifically, Miller et al. (2006) found that trait reactance was a strong predictor of smoking initiation among adolescents. Similarly, Miller and Quick (2010) found trait reactance predicted both tobacco use and risky sexual behavior, even after controlling for other known behavioral predictors. A particularly consequential finding of Miller and Quick's (2010) study was that trait reactance was shown to be a stronger predictor of risky health behaviors than sensation seeking, a construct which has been widely used as a primary audience segmentation variable. Extending these findings to an adult population, Quick et al. (2009) demonstrated that trait reactance had both a direct and indirect effect (as mediated by anger) on individuals support for indoor air policies. More recently, LaVoie et al. (2017) found that high trait reactant individuals experienced greater freedom threat, anger, and perceived greater source domineeringness in response to graphic cigarette warning labels than their low trait reactant counterparts. Similarly, Richards and Larsen's (2017) found that college students high in trait reactance experienced greater freedom threat to a sexual health message than those low in trait reactance.

Further work has also examined the interaction between trait reactance and specific message features. Dillard and Shen (2005) found that trait reactance interacted with freedom-threatening language, such that high trait reactant individuals exposed to more controlling language in a message promoting flossing experienced greater freedom threat. However, this interaction was not replicated in the context of an anti-binge drinking message. Similarly, Quick and Stephenson (2008) found that individuals high in trait reactance demonstrated a stronger association between freedom threat and reactance in response to a message advocating for sunscreen use. However, this finding was not replicated in the context of messages promoting exercise behaviors. In a study examining promotional organ donation messages, Quick et al. (2011) found no two-way interaction between freedom threatening language and trait reactance, but did find a three-way interaction between involvement, freedom-threatening language, and trait reactance, such that those with high-trait reactance and low involvement in the topic demonstrated the greatest freedom threat when exposed to messages with high freedom-threatening language.

FUTURE DIRECTIONS

PRT is a commonly applied framework for understanding resistance to persuasive health messages. Following the development of empirically validated methods for measuring and modeling psychological reactance (Dillard and Shen, 2005; Quick and Stephenson, 2008; Rains, 2013), communication researchers have contributed greatly to our understanding of the message features associated with reactance. As efforts are further made to refine our understanding of reactance, as well as its antecedents and consequences, several promising future directions are apparent.

A variety of strategies for reducing reactance have been identified, including restoration postscripts (Miller et al., 2007; Bessarabova et al., 2017), provision of choice (Shen, 2015; Reynolds-Tylus et al., 2019), narrative appeals (Moyer-Gusé and Nabi, 2010; Gardner and Leshner, 2016), message-induced empathy (Shen, 2010, 2011), gain-framed messages (Reinhart et al., 2007; Cho and Sands, 2011; Shen, 2015), novel messages (Quick, 2013), other-referencing messages (Gardner and Leshner, 2016), and inoculation messages (Richards and Banas, 2015; Richards et al., 2017). Though these studies add to an ever-growing list of the message features associated with diminished or elevated reactance, further examination of message and language features, particularly those that are theoretically derived, will add to our understanding of PRT in particular, as well as our broader understanding of persuasion in general. Furthermore, given the relatively small number of studies examining each of these message features, the existing literature would benefit greatly from replication studies.

Future PRT research should also seek to recruit from more heterogeneous populations. To date, the majority of reactance researchers rely on convenience samples of adolescents or undergraduate students. Unfortunately, investigations of reactance among adult populations are the exception (e.g., Quick et al., 2015; Gardner and Leshner, 2016), rather than the norm. For these reasons, future work may benefit by examining reactance processes across diverse age cohorts, as much of our current knowledge on the message features most likely to mitigate or galvanize reactance are based predominantly on data collected from adolescent and college-aged participants. Whether or not these message strategies remain effective outside these populations is an empirical question worthy of further investigation.

Future work should also continue to refine our measurement of reactance. A recent meta-analysis by Rains (2013) found that anger is a stronger indicator of reactance than negative cognitions ($\lambda = 0.62$ vs. $\lambda = 0.52$). Furthermore, anger was shown to more strongly correlate with attitude ($r = 0.20$) than negative cognitions ($r = 0.16$). Likewise, Rains (2013) meta-analysis found that the zero-order correlation between anger and negative cognitions is somewhat low ($r = 0.31$), perhaps suggesting potential issues with Dillard and Shen's (2005) measurement of reactance. Furthermore, in response to the somewhat cumbersome nature of the thought-listing procedure for assessing negative cognitions (Dillard and Shen, 2005), some authors have adopted alternative approaches for measuring negative cognitions (e.g., Quick et al., 2015; Varava and Quick, 2015), implemented alternative measurements of reactance with inferior validity (e.g., Reinhart et al., 2007), or in some cases simply neglected to assess negative cognitions at all (e.g., Xu, 2015). Clearly, work should continue to develop strategies to more efficiently and effectively gauge reactance, particularly outside of laboratory settings. For instance, future research could compare the thought-listing procedure for measuring negative cognitions (Dillard and Shen, 2005) with alternative measurements of negative cognitions (e.g., Silvia, 2006) in order to demonstrate which method produces more reliable and valid results.

Finally, future research should continue to broaden our understanding of reactance not only as an aversive state antithetical to persuasion, but also as a strategy for empowerment. One illuminating example of how reactance can be harnessed as a persuasive strategy comes from the truth® campaign, a counter-marketing antismoking campaign—arguably one of the most successful public health campaigns in U.S. history (Farrelly et al., 2008; Cowell et al., 2009; Davis et al., 2009). In their campaign messages, the truth® campaign focuses on painting "big tobacco" as a manipulative entity attempting to circumvent teenagers' choices and freedoms through lies and deception. For instance, on the truth® campaign's webpage, they state, "We've always been about exposing big tobacco's lies and manipulation. And while they keep adapting their tactics, we keep it real" (truth®, 2019). Furthermore, the truth® campaign's messages consistently emphasize adolescents' autonomy in making their own informed decisions about tobacco use. "We're not here to criticize your choices, or tell you not to smoke. We're here to arm everyone—smokers and non-smokers—with the tools to make change" (truth®, 2019).

To date, intentionally eliciting reactance as a tool for persuasion has been drastically understudied. Quick et al. (2009) argued that reactance could serve as a motivation for individuals to support air policies prohibiting smoking indoors. Their results revealed that as individuals' anger toward second hand smoke increased, so did their support for clean indoor air policies. As a rhetorical strategy, Quick et al. (2009) advocated for framing opposition to clean indoor air policies as a violation of one's freedom to breathe clean air. Similarly, in the context of political action, Turner's (2007) anger activism model highlights the potential for harnessing anger toward constructive action. According to the anger activism model, anger can facilitate action when the audience is favorable to the position being advocated and feel efficacious in acting to reestablish their threatened freedoms. Among those who have a negative attitude toward the topic, however, anger is likely to inhibit persuasion. More intensive study of the use of reactance as a persuasive strategy would provide invaluable insight for future health promotion efforts.

AUTHOR CONTRIBUTIONS

The author confirms being the sole contributor of this work and has approved it for publication.

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