

ORIGINAL ARTICLE

Examining the Role of Trait Reactance and Sensation Seeking on Perceived Threat, State Reactance, and Reactance Restoration

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The present investigation sought to advance Psychological Reactance Theory (PRT) by examining whether trait reactance and sensation seeking influence the magnitude of a perceived threat, state reactance, and reactance restoration. Results revealed that high trait reactant (HTR) and low trait reactant (LTR) individuals and high sensation seekers (HSS) and low sensation seekers (LSS) processed persuasive messages similarly, adding credibility to recent PRT advances. Dogmatic and vivid language were perceived as a threat for most individuals. An interaction between dogmatic and vivid language on perceived threat was found for HTR and HSS for the sunscreen message. An indirect effect connecting language features and state reactance through perceived threat was supported. Regression analysis revealed that trait reactance and sensation seeking predict variables associated with state reactance.

doi:10.1111/j.1468-2958.2008.00328.x

A resurgence of interest in psychological reactance has advanced our understanding of its role in communication research, including what types of language trigger state reactance, the operationalization of state reactance, and the outcomes associated with this aversive state (Dillard & Shen, 2005; Miller, Lane, Deatrick, Young, & Potts, 2007; Quick & Considine, in press; Quick & Stephenson, 2007a, 2007b; Rains & Turner, 2007). A lingering question that remains unaddressed by the extant literature, yet remains important to communication research, is identifying the personality traits that moderate the effects of state reactance (Burgoon, Alvaro, Grandpre, & Voloudakis, 2002; Dillard & Shen, 2005; Miller, Burgoon, Grandpre, & Alvaro, 2006). Therefore, the present study identified and examined two personality variables that not only have conceptual significance in communication research but also are believed to be associated with state reactance (Miller et al., 2006). The two variables are trait reactance and sensation seeking.

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Research suggests that trait reactant individuals routinely rebel against authority figures (Dowd, Wallbrown, Sanders, & Yesenosky, 1994; Seibel & Dowd, 2001). Similarly, sensation seekers strongly dislike preachy messages (Stephenson et al., 1999). Following Psychological Reactance Theory (PRT) and the Activation Model of Information Exposure (AMIE), it is hypothesized that trait reactance and sensation seeking will influence the processing of persuasive health messages.

The present investigation aims to identify specific message features that elicit state reactance, model state reactance as a two-step process featuring both perceived threat and state reactance, and employ a reliable and valid measure of psychological reactance restoration. It is believed that this research extends the existing PRT research in four ways. First, this study evaluated the moderating role of trait reactance and sensation seeking on the processing of persuasive health messages. Of specific interest is whether the personality traits moderated the effects of dogmatic and vivid language on perceived threat.¹ Additionally, this study also answered whether perceived threat mediates the relationship between dogmatic and vivid language on state reactance. Third, we evaluated the relationships between trait reactance and sensation seeking on perceived threat, state reactance, and reactance restoration. Finally, we determined whether trait reactance and sensation seeking interact with one another in predicting the perceived threat, state reactance, and reactance restoration. The focus of this study is consistent with calls by communication researchers to understand the effects of specific message features on communication outcomes and state reactance in particular (Burgoon, Alvaro, Grandpre, et al., 2002; Dillard & Shen, 2005; Miller et al., 2006; Quick & Stephenson, 2007; Rains & Turner, 2007). Moreover, this study contributes new knowledge to the literature on PRT by testing conceptually important moderating variables. Before providing an overview of trait reactance and sensation seeking and their theoretical orientation with state reactance, a brief overview of PRT is provided.

Psychological Reactance Theory

Brehm (1966) introduced PRT as a framework for understanding why individuals may reject persuasive messages. In essence, PRT assumes that individuals cherish their ability to choose among alternatives such that whenever an alternative is threatened or eliminated, state reactance occurs. Brehm conceptualized state reactance as an aversive motivational state that subsequently led individuals to want to restore a threatened or eliminated freedom. Individuals who work with persuasive messages, such as health communication scholars, are frequently interested in gaining a deeper understanding of the underlying mechanisms of state reactance so that they can prevent unintentionally triggering state reactance in their campaigns and interventions.

Although PRT has advanced our understanding of message effects, PRT remains underdeveloped for communication research. Arguably, the next step in advancing PRT is to (a) understand how and which specific message features elicit state

reactance, (b) continue to examine the cognitive and affective mechanisms underlying this effect (Dillard & Shen, 2005; Quick & Stephenson, 2007a; Rains & Turner, 2007), and (c) measure both direct and indirect outcomes that occur as a consequence of state reactance. Although existing communication research has focused more recently on how to operationalize and measure state reactance (Dillard & Shen, 2005; Quick & Stephenson, 2007a), there remains a gap in our understanding of which message features elicit state reactance. Moreover, we know little about how to measure the effects that are theorized by Brehm (1966) to follow psychological reactance. Toward this end, we seek to extend existing research that examines the processing of reactance-inducing messages. We begin by reviewing two message features believed to trigger state reactance.

Language features

To date, communication researchers have identified some of the language features that trigger state reactance. The bulk of this work has examined dogmatic language. Although this language feature has a host of different labels, including controlling (Miller et al., 2007), explicit (Grandpre, Alvaro, Burgoon, Miller, & Hall, 2003), forceful (Quick & Considine, in press), and threat-to-choice language (Quick & Stephenson, 2007a), the description of each message feature resembles Brehm's (1966) early experimental manipulations used to galvanize perceptions of a threat against an established freedom (see Wicklund & Brehm, 1968; Worchel & Brehm, 1970). Dogmatic language is characterized by forceful language that explicitly pressures audiences to conform to a message. For example, in the present study, the dogmatic exercise message used imperatives such as "must" and "need" compared to the nondogmatic message that used less opinionated language such as "consider" and "chance." Existing research has found dogmatic language to be associated with state reactance within the context of alcohol (Dillard & Shen, 2005; Rains & Turner, 2007), condom use (Quick & Stephenson, 2007a), and exercise (Quick & Considine, in press), among others. Therefore, dogmatic language should elicit state reactance.

Beyond dogmatic language, however, few additional language features have been tested. One additional possibility is vivid language. Zillmann and Brosius (2000) have suggested that vivid language evokes more emotions than pallid language and therefore makes the persuasive intent less ambiguous. Furthermore, Zillmann and Brosius reasoned that someone is more likely to remember the content of messages with vivid language (Nisbett & Ross, 1980) because of the added attention given to processing them (Knobloch, Hastall, Zillman, & Callison, 2003). Thus, vivid language perceived to pose a threat to an established freedom would be more apparent and, as a result, state reactance would be likely.

Vivid language is depicted as using descriptive, often graphic, words designed to enhance participants' ability to visualize the consequences of certain behaviors. The present study experimentally manipulated vivid language in sunscreen (among other) messages. Hence, an example of the vivid language used in the message was "overexposure to the sun leads to premature wrinkling, severe skin blisters that ooze

and become crusty, and even skin cancer,” whereas the pallid message contrasted with “overexposure to the sun leads to skin injuries, skin diseases, and in general, declining health.” With a brief discussion of language features believed to be associated with state reactance, we now turn attention to the operationalization of state reactance.

State reactance

Although Brehm (1966) believed state reactance was immeasurable, Dillard and Shen (2005) have since advocated operationalizing state reactance as a latent variable comprised of unfavorable cognitions and anger. They asserted that state reactance should capture the cognitive (Kelly & Nauta, 1997) and affective dimensions of this aversive state (Wicklund, 1974). Quick and Stephenson (2007a) tested Dillard and Shen’s operationalization of state reactance with college students within the context of televised condom ads and found support for measuring state reactance as a latent variable featuring negative cognitions and anger across seven ads. Additionally, Quick and Considine (in press) discovered that operationalizing state reactance as a latent variable comprised of anger and negative cognitions constitutes a valid measure with adults. Rains and Turner (2007) also found support for this operationalization.

According to PRT, state reactance immediately follows a perceived threat (Brehm, 1966; Brehm & Brehm, 1981). Therefore, following Quick and Considine (in press), we argue that state reactance is a two-step process that entails modeling both an induction check and a measure of state reactance. The first step occurs when an individual perceives the threatened freedom. The second step is the response to this threat, where that response is a combination of anger and negative cognitions. This two-step approach, which models perceived threat and state reactance as mediators between reactance-inducing language features and reactance restoration, has received empirical support (Quick & Considine, in press).

Reactance restoration

Reactance restoration, described by Brehm (1966) as an outcome of state reactance, has received considerable attention in the literature. Previously, research showed that reactant individuals expressed negative attitudes (Dillard & Shen, 2005; Rains & Turner, 2007), behavioral intentions in opposition of the message (Buller, Borland, & Burgoon, 1998), poor message evaluations (Grandpre et al., 2003; Quick & Considine, in press; Quick & Stephenson, 2007a), and derogate the freedom-threatening source (Burgoon, Alvaro, Broneck, et al., 2002; Miller et al., 2007). Although each of these studies incorporated conventional measures, they are not all consistent with Brehm’s assertion that state reactance encompasses energizing or motivational qualities.

Brehm and Brehm (1981) assert that individuals can restore a threatened or eliminated freedom in a number of ways by responding in a manner opposite the threat, performing a behavior similar to the threat, or observing other individuals exercise the threatened freedom. Recently, Quick and Stephenson (2007b) classified these three restoration processes as boomerang effects, related-boomerang effects,

and vicarious-boomerang effects. Boomerang effects occur whenever an established freedom is restored via behavioral, cognitive, or emotional indicators that reestablish the specific freedom being threatened (Brehm, 1966). Related-boomerang effects arise when an individual restores his or her threatened freedom by performing a similar behavior to the threatened freedom. According to Brehm, boomerang effects occur when costs are low, whereas related- and vicarious-boomerang effects arise when costs are high. Vicarious-boomerang effects, often described as indirect restoration (Brehm & Brehm, 1981), occur whenever an individual associates with others or merely observes others perform the threatened behavior.

For example, suppose Rob, Crystal, and June experienced state reactance following exposure to an anti-inhalant ad on television. Rob decided to get high (boomerang effect). Crystal, who also resented the overtly persuasive message, decided to go outside to smoke a cigarette (related-boomerang effect). Although she was not motivated to get high or go outside with Crystal to have a cigarette, June relished the opportunity to be around Rob and Crystal while each performed admonished behaviors. Although Brehm (1966) makes no prediction that all forms of reactance restoration will transpire following state reactance, he does articulate that the presence of state reactance is likely to galvanize various types of restoration depending on environmental and personal circumstances.

With the recent advances in our understanding of how state reactance affects message processing, researchers are left speculating about personality variables that could influence the processing of persuasive messages (Miller et al., 2006). Herein rests the impetus behind this investigation. There exists the likelihood of strong conceptual connection between state reactance and two personality traits in particular, trait reactance and sensation seeking.

Trait reactance

Although the study of state reactance is more established, the study of reactance as a personality trait is more recent (Hong & Faedda, 1996; Shen & Dillard, 2005). Wicklund (1974) states that individuals vary in the level of autonomy they desire. Along these lines, Burgoon, Alvaro, Grandpre, et al. (2002) hypothesized that state reactance is greater among individuals who are autonomous and value their independence, feel their behaviors are being attacked or challenged, and believe they are competent and knowledgeable enough to make their own decisions on an issue. In addition, Dowd and colleagues (Dowd et al., 1994; Seibel & Dowd, 2001) have shown a positive association with autonomy, denial, dominance, independence, interpersonal mistrust, self-sufficiency, lack of conformity, and a lack of tolerance with trait reactance.

Fewer studies, however, have examined the association between trait reactance and state reactance (Dillard & Shen, 2005; Quick & Stephenson, 2007b). For example, Dillard and Shen reported an interaction between trait reactance and perceived threat to freedom on state reactance within the context of flossing, but not binge drinking. In their study, high trait reactant (HTR) individuals perceiving a message to threaten their freedom experienced greater amounts of state reactance than low

trait reactant (LTR) individuals. Most recently, Miller et al. (2006) found that trait reactance was a “prominent predictor” of risky behaviors such as smoking (p. 246).

Sensation seeking

Although PRT provides a theoretical rationale for why trait reactance would influence the processing of persuasive messages with respect to a perceived threat, state reactance, and reactance restoration, it is Donohew et al.'s (1998) theoretical framework that sheds light on why sensation seeking may also influence this process. The AMIE (Donohew et al., 1998) maintains that individuals vary in their optimal level of arousal (e.g., Stephenson & Southwell, 2006). Scholars have historically invoked the AMIE to study sensation seekers, who are individuals with a higher optimal level of arousal (e.g., Zuckerman, 1979). For instance, individuals with sensation seeking tendencies seek out situations or stimuli that are novel, arousing, emotionally complex, or intense (Stephenson et al., 1999). Sensation seekers often fulfill their needs by taking social (e.g., engage in unprotected sex), physical (e.g., sky diving), legal (e.g., driving at excessive speeds), and financial risks (e.g., impulsive purchasing). Consistently, studies demonstrate that high sensation seekers (HSS) are significantly more likely to engage in risky behaviors such as drug use (Stephenson & Palmgreen, 2001) and risky sex (Greene, Kromar, Rubin, Walters, & Hale, 2002; Noar, Zimmerman, Palmgreen, Lustria, & Horosewski, 2006; Sheer & Cline, 1995; Stephenson & Palmgreen, 2001) than low sensation seekers (LSS).

Given the propensity for HSS to engage in risky behaviors, it is not surprising that campaign designers have identified HSS as a target audience for their campaigns (Palmgreen, Donohew, Lorch, Hoyle, & Stephenson, 2001; Palmgreen, Lorch, Stephenson, Hoyle, Donohew, 2007; Stephenson et al., 1999) as message designers create messages that meet HSS' optimal level of arousal (Donohew et al., 1998). Consequently, HSS have a preference for messages that are high in message sensation value (e.g., sound effects, surprise/twist ending, intense images; Morgan, Palmgreen, Stephenson, Lorch, & Hoyle, 2003).

With regard to state reactance, research suggests that HSS are more likely to cognitively process and evaluate favorably those messages that are high in message sensation value (Stephenson, 2002, 2003). In turn, these high sensation value messages may contain vivid language. From this, then, we assume that vivid language will result in increased cognitive processing and favorable evaluations by HSS. Therefore, it is not reasonable to anticipate HSS perceiving vivid language to be a threat to their freedom. However, it is likely that messages containing both vivid and dogmatic language will be perceived as a threat. After all, AMIE states that HSS like intense images and will seek out messages fulfilling this need for arousal. Vivid language will likely meet this need and result in more thoughtful elaboration. Unfortunately, when vivid language is accompanied by dogmatic language, HSS are likely to see the persuasive intent of the message and consequently perceive the message to be a threat.

Although the similarities between trait reactance and sensation seeking have been discussed elsewhere (Miller et al., 2006, 2007), this association could benefit from

additional empirical support. Trait reactant individuals resent being told what to do (Hong & Faedda, 1996). And sensation seekers evaluate so-called preachy messages unfavorably (Donohew, Lorch, & Palmgreen, 1991; Palmgreen et al., 1991). For these reasons, along with the theoretical rationale provided by PRT and AMIE, trait reactance and sensation seeking are likely to influence the magnitude of a perceived threat, state reactance, and reactance restoration after reading a persuasive health message. Thus, H1 through H5 are advanced.

- H1: For both HTR/LTR and HSS/LSS, dogmatic language will be positively associated with perceived threat, with a stronger main effect emerging for HTR and HSS individuals.
- H2: For both HTR/LTR and LSS, vivid language will be positively associated with perceived threat, with a stronger main effect emerging for HTR individuals. Vivid language will not be associated with perceived threat for HSS.
- H3: For both HTR/LTR and HSS/LSS, perceived threat will be positively associated with state reactance, with a stronger main effect emerging for HTR and HSS individuals.
- H4: For both HTR/LTR and HSS/LSS, state reactance will feature a combination of unfavorable cognitions and anger.
- H5: For both HTR/LTR and HSS/LSS, a main effect will emerge connecting state reactance with one, two, or all three modes of reactance restoration: (a) boomerang effects, (b) related-boomerang effects, and (c) vicarious-boomerang effects, with stronger associations emerging for HTR and HSS individuals across all three modes of restoration.

H1 through H5 are graphically depicted in Figure 1.

Along with testing whether trait reactance and sensation seeking influence the associations hypothesized in the proposed model, the present study measured whether dogmatic and vivid language exhibit an indirect effect on state reactance. Media effects researchers have encouraged examining indirect effects to get at the

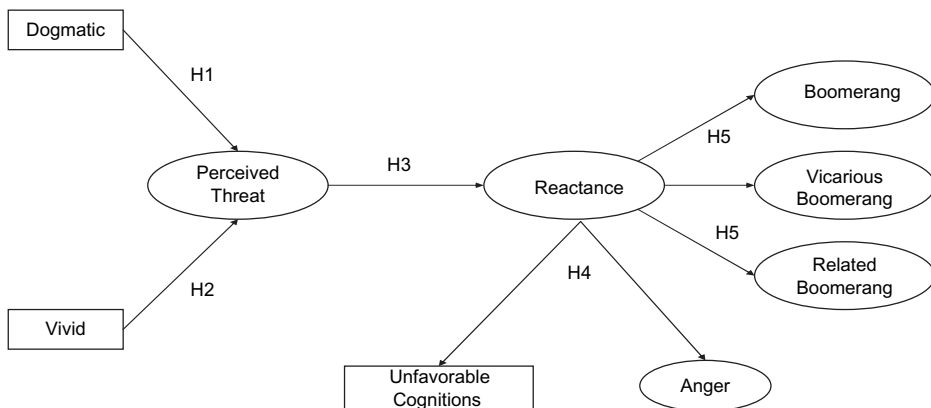


Figure 1 Hypothesized model.

“why” question in quantitative research (Holbert & Stephenson, 2003). Brehm (1966) states that state reactance is preceded by a perceived threat. Therefore, it is anticipated that perceived threat mediates the association between reactance-inducing language features and state reactance. However, a formal test of mediation has yet to be performed in the literature. Thus,

H6: Dogmatic and vivid language will exhibit an indirect effect on state reactance.

In addition to testing for interactions within the hypothesized associations across the path coefficients between HTR/LTR and HSS/LSS, the present investigation sought to determine if an interaction exists between dogmatic and vivid language on perceived threat. Miller et al. (2007) found that controlling language and lexical concreteness exhibited a main effect on a host of dependent variable (e.g., attitude toward topic, source expertise), but their results did not detect a statistical interaction between them. Following the third principle of PRT, which states that as the number of threats increase, state reactance also increases (Brehm & Brehm, 1981), as there is exposure to two language features that are perceived to threaten a freedom, state reactance should increase. Therefore,

H7: An interaction between dogmatic and vivid language will occur in predicting perceived threat. Specifically, messages containing both language features will elicit greater state reactance than messages featuring nondogmatic and/or pallid language.

Finally, this investigation sought to add to our understanding about the relationship between trait reactance and sensation seeking on each of the endogenous variables in the model. Therefore, in addition to examining the main effects for each of the personality traits on the aforementioned variables, examining whether these personality traits interact with one another was explored. In line with H1 through H5, HTR and HSS are hypothesized to experience stronger perception of a threat, state reactance, and reactance restoration following exposure to a persuasive message than LTR and LSS. Hence,

H8: A main effect for trait reactance and sensation seeking on perceived threat, unfavorable cognitions, anger, boomerang effects, vicarious-boomerang effects, and related-boomerang effects will be found.

RQ1: Do trait reactance and sensation seeking interact in predicting perceived threat, unfavorable cognitions, anger, boomerang effects, vicarious-boomerang effects, and related-boomerang effects?

Method

Participants and procedures

An experimental 2 (nondogmatic and dogmatic) \times 2 (pallid and vivid) posttest-only design was employed to test the proposed hypotheses. To minimize testing

sensitization, a posttest-only design was employed (Campbell & Stanley, 1963). Undergraduate students ($N = 550$) from communication courses at a large university in the southwestern United States participated to receive extra credit. The mean age was 20 ($SD = 1.92$) years. The majority of participants identified themselves as White or Caucasian (81.4%), whereas 10.1% were Hispanic, 5.3% were of Asian descent, 2.4% were African American, and 0.7% indicated their ethnicity as other. Additionally, most of the participants were female (61.1%).

After providing consent to participate, participants were randomly assigned to two messages. Then, the personality measures were completed by the participants. Next, participants were instructed to read the first (of two) print messages. Immediately afterward, participants completed a 90-second thought-listing task, a state anger scale, and induction check items. Individuals then read the same message again, after which they completed the Reactance Restoration Scale (RRS). This procedure was repeated for both print messages. The questionnaire concluded with demographic questions about gender, age, education level, and ethnicity.

Message design

Participants were randomly presented with two print messages. One message advocated participation in a weekly exercise routine, whereas the second message encouraged sunscreen use. Along with the severity of the consequences of not performing the advocated behavior, a behavioral recommendation was made in each message for each specific behavior (Witte, 1992). The recommendations featured in each message were derived from previous research as well as current Web sites sponsored by the Centers for Disease Control and Prevention and the American Cancer Society (Stephenson & Witte, 1998). Each message contained a variation of dogmatic and vivid language (see Appendix). Finally, eight orders of message presentation were created to guard against an ordering effect. Each message was approximately 165 words in length.

Measures

Induction check

Although both message features were pretested and validated, we measured them in the main study to bolster the validity of the study.² To ensure that the dogmatic messages were perceived as intended, two items on a 7-point strongly agree/strongly disagree scale were used: (a) "This message contained opinionated language" and (b) "This message tried to pressure me." The dogmatic index was reliable for both the exercise ($\alpha = .80$; $M = 4.66$, $SD = 1.89$) and the sunscreen context ($\alpha = .79$; $M = 4.49$, $SD = 1.86$). To check the perceptions of perceived vividness, the following question was asked: "In the message you just read, I felt the description of the consequences of [not exercising/not using the appropriate sunscreen SPF level] was" Following this question were three word pairs to which participants responded on a 7-point continuum, including not sensational–sensational, not vivid–vivid, and not

graphic–graphic. The vividness induction check was reliable for both the exercise ($\alpha = .87$; $M = 4.15$, $SD = 1.63$) and the sunscreen ($\alpha = .89$; $M = 4.35$, $SD = 1.69$) messages.

Trait reactance

Trait reactance was assessed using Hong and Faedda's (1996) 11-item Trait Reactance Scale. For each item, participants responded on a 7-point Likert scale where 1 = *strongly disagree* and 7 = *strongly agree*. The 11-item index was reliable ($\alpha = .77$; $M = 3.63$, $SD = 0.78$).

Sensation seeking

To assess sensation seeking, four items using a 1 = *strongly disagree* to 7 = *strongly agree* scale were employed (Stephenson, Hoyle, Palmgreen, & Slater, 2003). This measure achieved an acceptable, albeit low, reliability ($\alpha = .66$; $M = 4.36$, $SD = 1.06$).

Perceived threat to freedom

An induction check on perceived threat to freedom was performed to ensure that a message was perceived as a threat (Dillard & Shen, 2005). On a 1 = *strongly disagree* to 7 = *strongly agree* Likert scale, the 4-item index was reliable for both the exercise ($\alpha = .92$; $M = 4.14$, $SD = 1.79$) and the sunscreen ($\alpha = .92$; $M = 3.74$, $SD = 1.84$) messages.

Anger

Anger arousal was assessed on a 7-point scale where 1 = *none of this feeling* and 7 = *a great deal of this feeling* (irritated, angry, annoyed, and aggravated; Dillard & Shen, 2005). The 4-item index was reliable for both the exercise ($\alpha = .94$; $M = 2.73$, $SD = 1.65$) and sunscreen ($\alpha = .93$; $M = 2.71$, $SD = 1.59$) messages.

Unfavorable cognitions

For cognitive responses, participants were given 90 seconds to write down the thoughts they had while reading the message. The participant-as-coder method was employed in which participants identified each thought as favorable (in agreement with the message), unfavorable (not in agreement with the message), or neutral (neither in agreement nor in disagreement with the message; Cacioppo, von Hippel, & Ernst, 1997). To reduce overlap between the closed-ended anger items and thoughts that contained affective responses, emotions were extracted by two trained coders using a list compiled by Shaver, Schwartz, Kirson, and O'Connor (1987). The coders established excellent intercoder reliability for the exercise ($k = 1.0$; $M = 2.15$, $SD = 1.86$) and sunscreen messages ($k = 1.0$; $M = 2.53$, $SD = 2.0$). The total number of unfavorable cognitions was used as the cognitive component of state reactance. In testing the hypotheses, unfavorable cognitions and anger formed state reactance. To place both measures on the same metric, both indicators were standardized.

Reactance restoration

Reactance restoration was evaluated with the RRS (Quick & Stephenson, 2007b). The RRS consists of three questions followed by four semantic differential scales. For the

exercise context: (a) Right now, I am _____ to exercise; (b) Right now, I am _____ to be around others who exercise; and (c) Right now, I am _____ to do something totally unhealthy. For the sunscreen context: (a) Right now, I am _____ to use sunscreen the next time I am exposed to direct sunlight for an extended period of time (greater than 15 minutes); (b) Right now, I am _____ to be around others who use sunscreen when they are exposed to direct sunlight for an extended period of time (greater than 15 minutes); and (c) Right now, I am _____ to do something totally unhealthy. For each of the items, participants responded on a 7-point continuum by filling in the blank with the following anchor points: motivated–unmotivated, determined–not determined, encouraged–not encouraged, and inspired–not inspired. All three subscales were reliable across exercise and sunscreen messages: boomerang effects ($\alpha = .94$; $M = 2.76$, $SD = 1.44$; $\alpha = .93$; $M = 3.56$, $SD = 1.46$), vicarious-boomerang effects ($\alpha = .94$; $M = 3.11$, $SD = 1.32$; $\alpha = .96$; $M = 3.93$, $SD = 1.4$), and related-boomerang effects ($\alpha = .96$; $M = 1.99$, $SD = 1.14$; $\alpha = .97$; $M = 2.05$, $SD = 1.21$).

Results

The induction check results are presented first, followed by the analyses pertaining to the hypotheses and research question.

Induction check

Perceived dogmatic language

Exercise messages containing dogmatic language ($M = 5.38$, $SD = 1.55$) were perceived as more opinionated than messages with nondogmatic language ($M = 3.23$, $SD = 1.65$), $F(1, 546) = 218.81$, $p < .001$, $\eta_p^2 = .29$. The effect sizes (r) of dogmatic and vivid language on the dogmatic language induction check were .53 and .18. Messages featuring dogmatic language ($M = 4.89$, $SD = 1.74$) were perceived as more dogmatic than messages with nondogmatic language ($M = 3.29$, $SD = 1.60$) for the sunscreen messages, $F(1, 546) = 199.34$, $p < .001$, $\eta_p^2 = .27$. Effect sizes (r) of dogmatic and vivid language on the dogmatic language induction check were .50 and .22.

Perceived vivid language

Exercise messages containing vivid language ($M = 5.01$, $SD = 1.32$) were perceived as more vivid than messages with pallid language ($M = 3.31$, $SD = 1.33$), $F(1, 542) = 210.14$, $p < .001$, $\eta_p^2 = .28$. The effect sizes (r) of vivid and dogmatic language on the vivid language induction check were .56 and .16, respectively. Within the context of sunscreen usage, messages containing vivid language ($M = 5.33$, $SD = 1.32$) were perceived as more vivid than pallid messages ($M = 3.40$, $SD = 1.33$), $F(1, 542) = 275.66$, $p < .001$, $\eta_p^2 = .34$. Effect sizes (r) of vivid and dogmatic language on the vivid language induction check were .61 and .14.

Data analytic strategy for hypotheses

Structural equation modeling was employed to test the hypothesized models using full information maximum likelihood estimators in EQS 6.1 for Windows. In defining the model, state reactance was specified as a latent variable featuring two indicator variables: unfavorable cognitions and anger. Language features were specified as single-item observed variables, whereas perceived threat, anger, boomerang, related-boomerang, and vicarious-boomerang effects were treated as latent composite variables (see Holbert & Stephenson, 2002; Stephenson & Holbert, 2003). The adequacy of the omnibus model (global) fit was assessed with the chi-square distributed test statistic, comparative fit index, standardized root mean squared residual, and root mean square error of approximation.

In testing H1 through H5, the multigroup method of testing different models based on the moderating variables of interest, trait reactance and sensation seeking, was employed (see Stephenson, 2003). Thus, before path models were estimated, median splits were employed to differentiate HTR/LTR and HSS/LSS across both message contexts. In total, eight models were constructed. In testing for an interaction, a statistical test using unstandardized path coefficients and their respective standard errors from their structural models was used to determine if path coefficients were statistically different between personality variables (Cohen & Cohen, 1983). In doing so, a *z*-score was calculated by taking the difference of the two unstandardized path coefficients and dividing by the square root of the sum of the squared standard errors. The *z*-score identifies whether the two path coefficients are statistically different. H6 was tested using the product of coefficient test for mediation (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002; see also Holbert & Stephenson, 2003). The seventh hypothesis used univariate analysis of variance (ANOVA) to test for an interaction between dogmatic and vivid language on perceived threat. For H8 and RQ1, which tested for main effects and interactions between trait reactance and sensation seeking on the measured variables within the structural model using multiple regression, trait reactance and sensation seeking were centered (Cohen, Cohen, West, & Aiken, 2003). Individual scores on trait reactance and sensation seeking were entered in Block 1, and the interaction term were entered in Block 2.

In testing the fit of the hypothesized models, Anderson and Gerbing's (1988) two-step approach of assessing both measurement and structural models was used. Each model was consistent with the data.³ Fit indices for each of the 16 models are presented in Table 1. The correlations for the measured variables for each model are provided in Tables 2 and 3. Path coefficients for each of the models are presented in Figures 2 through 5.

In testing the hypothesized associations and differences between HTR ($n = 283$) and LTR ($n = 267$), a median split was performed for both the exercise and the sunscreen data. On a 1–7 scale, data were split at 3.64 on trait reactance for HTR ($M = 4.23$, $SD = 0.49$) and LTR individuals ($M = 2.99$, $SD = 0.46$). A median split was performed on sensation seeking as well, HSS ($n = 288$) and LSS ($n = 262$). On a 1–7

Table 1 Measurement and Structural Model Fit Indices for Exercise and Sunscreen Messages

	χ^2	<i>df</i>	CFI	SRMR	RMSEA (CI)
Exercise measurement model					
HTR	6.70	6	1.0	.02	.02 (0.00–0.08)
LTR	11.67	6	1.0	.03	.06 (0.00–0.11)
HSS	6.96	6	1.0	.02	.02 (0.00–0.08)
LSS	12.23	6	1.0	.03	.06 (0.00–0.11)
Sunscreen measurement model					
HTR	12.36	6	1.0	.03	.06 (0.00–0.11)
LTR	3.82	6	1.0	.01	.00 (0.00–0.06)
HSS	7.76	6	1.0	.02	.03 (0.00–0.09)
LSS	11.12	6	1.0	.03	.06 (0.00–0.11)
Exercise structural model					
HTR	10.40	10	1.0	.03	.01 (0.00–0.07)
LTR	14.32	10	1.0	.03	.04 (0.00–0.08)
HSS	9.90	10	1.0	.02	.00 (0.00–0.06)
LSS	16.51	10	1.0	.03	.05 (0.00–0.09)
Sunscreen structural model					
HTR	14.76	10	1.0	.03	.04 (0.00–0.08)
LTR	7.73	10	1.0	.02	.00 (0.00–0.05)
HSS	14.67	10	1.0	.03	.04 (0.00–0.08)
LSS	11.39	10	1.0	.03	.02 (0.00–0.07)

Note: CFI = comparative fit index; SRMR = standardized root mean squared residual; RMSEA = root mean square error of approximation; CI = confidence interval; HTR = high trait reactant; LTR = low trait reactant; HSS = high sensation seekers; LSS = low sensation seekers.

scale, data were split at 4.25, HSS ($M = 5.19$, $SD = 0.56$) and LSS ($M = 3.45$, $SD = 0.68$). Mardia's normalized estimate revealed that the multivariate distribution of data was normal across all four models.

H1: Dogmatic language and perceived threat to freedom

H1, which predicted that dogmatic language is positively associated with perceived threat to freedom, was supported for HTR, LTR, HSS, and LSS within both contexts. No differences in path coefficients appeared between HTR/LTR and HSS/LSS.

H2: Vivid language and perceived threat to freedom

H2, which predicted a positive association with vivid language and perceived threat to freedom, was supported for HTR, LTR, and LSS for both the exercise and the sunscreen messages. As hypothesized, a positive association was not found between vivid language and perceived threat for HSS within the sunscreen messages. However, this finding was not replicated with exercise messages for HSS. While testing for differences in path coefficients between HTR/LTR and HSS/LSS, the association with vivid language and perceived threat was significantly stronger for LSS than HSS for sunscreen messages ($z = 3.48$, $p < .001$).

Table 2 Correlation Matrix for HTR and LTR Individuals

Variables	1	2	3	4	5	6	7	8
1. Dogmatic	(1.0)	-.01/-.05	.53/.51	.27/.24	.41/.31	.14/.07	.02/.11	.06/.01
2. Vivid	.04/-.03	(1.0)	.19/.18	.07/.10	.07/.11	-.01/-.08	.01/.03	.01/-.02
3. Perceived threat	.56/.55	.15/.22	(1.0)	.30/.30	.58/.52	.20/.16	.08/.22	.01/.13
4. Unfavorable cognitions	.33/.15	.04/.05	.41/.26	(1.0)	.43/.46	.28/.20	.13/.09	.00/.07
5. Anger	.39/.39	.11/.15	.57/.62	.54/.42	(1.0)	.31/.30	.04/.21	.13/.16
6. Boomerang	.12/.17	-.07/.04	.30/.27	.33/.33	.40/.39	(1.0)	.52/.53	.17/.22
7. Vicarious boomerang	.08/.09	-.05/.10	.19/.22	.14/.22	.20/.30	.57/.66	(1.0)	.09/.05
8. Related boomerang	.05/.11	.00/.01	.11/.14	.10/.08	.10/.18	.39/.39	.26/.24	(1.0)

Note: Dogmatic and vivid language were coded as 1, and nondogmatic and pallid language were coded as 0. HTR individuals appear to the left of the slash; LTR individuals appear to the right of the slash. Exercise appears below the diagonal, and sunscreen is above the diagonal. HTR = high trait reactant; LTR = low trait reactant.

H3: Perceived threat to freedom and state reactance

The third hypothesis predicted that perceptions of a threatened freedom would be positively associated with state reactance across all four groups. For the exercise and sunscreen messages, this hypothesis was supported for HTR, LTR, HSS, and LSS. In assessing path coefficient differences between HTR/LTR and HSS/LSS in both contexts, the path was significantly stronger for HTR individuals with respect to sunscreen usage ($z = 4.0, p < .001$).

H4: State reactance operationalization

H4 concentrated on the operationalization of state reactance. Across both contexts, findings from this study provide added empirical support for operationalizing state

Table 3 Correlation Matrix for HSS and LSS Individuals

Variables	1	2	3	4	5	6	7	8
1. Dogmatic	(1.0)	.03/-.09	.56/.47	.28/.24	.41/.30	.15/.05	.04/.09	.07/-.01
2. Vivid	.04/-.04	(1.0)	.11/.28	.03/.15	.02/.20	-.06/-.01	.07/-.01	.03/-.03
3. Perceived threat	.55/.55	.19/.18	(1.0)	.28/.31	.59/.51	.24/.12	.17/.15	.07/.08
4. Unfavorable cognitions	.25/.24	.06/.04	.34/.34	(1.0)	.42/.47	.26/.21	.10/.12	.05/.00
5. Anger	.37/.39	.18/.08	.60/.59	.50/.48	(1.0)	.38/.22	.11/.15	.15/.13
6. Boomerang	.16/.12	.00/-.03	.28/.30	.31/.36	.40/.40	(1.0)	.49/.57	.19/.21
7. Vicarious boomerang	.10/.08	.00/.07	.19/.23	.18/.19	.28/.24	.64/.59	(1.0)	.04/.12
8. Related boomerang	.09/.06	-.02/.05	.15/.10	.09/.09	.16/.15	.36/.46	.20/.34	(1.0)

Note: Dogmatic and vivid language were coded as 1, and nondogmatic and pallid language were coded as 0. High trait reactant individuals appear to the left of the slash; low trait reactant individuals appear to the right of the slash. Exercise appears below the diagonal, and sunscreen is above the diagonal. HSS = high sensation seekers; LSS = low sensation seekers.

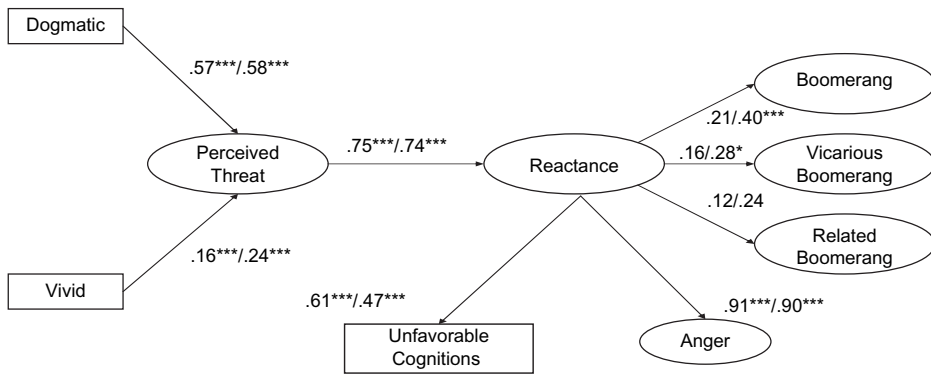


Figure 2 HTR and LTR path coefficients for exercise messages.

Note: HTR individuals appear to the left of the slash; LTR individuals appear to the right of the slash. HTR = high trait reactant; LTR = low trait reactant. * $p < .05$. ** $p < .01$. *** $p < .001$.

reactance as a latent variable comprised of unfavorable cognitions and anger for HTR, LTR, HSS, and LSS (Dillard & Shen, 2005; Quick & Stephenson, 2007a; Rains & Turner, 2007).

H5: State reactance and boomerang, related-boomerang, and vicarious-boomerang effects

H5, which predicted a positive association with state reactance and reactance restoration, received partial support. For boomerang effects, within the context of exercise, the predicted relationships were significant for LTR and HSS. A significant association emerged for HTR and HSS connecting state reactance and boomerang

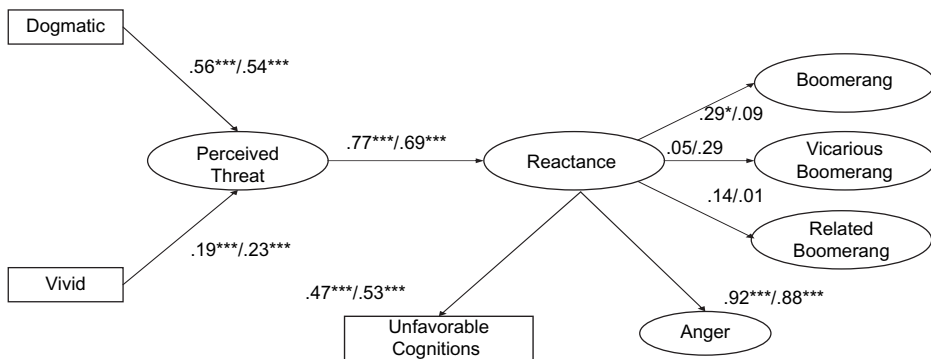


Figure 3 HTR and LTR path coefficients for sunscreen messages.

Note: HTR individuals appear to the left of the slash; LTR individuals appear to the right of the slash. HTR = high trait reactant; LTR = low trait reactant. * $p < .05$. ** $p < .01$. *** $p < .001$.

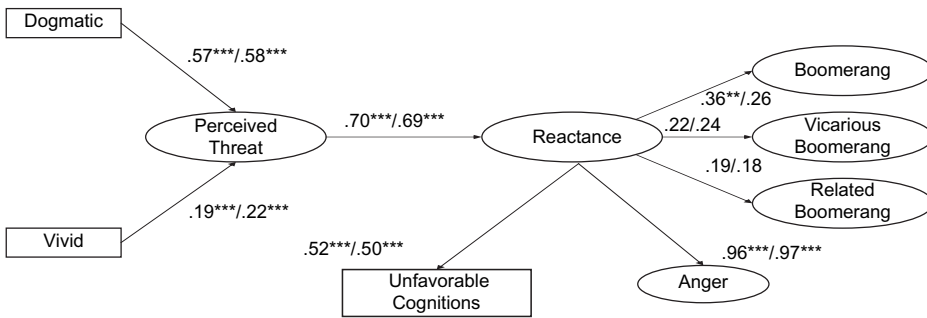


Figure 4 HSS and LSS path coefficients for exercise messages.

Note: HSS appear to the left of the slash; LSS appear to the right of the slash. HSS = high sensation seekers; LSS = low sensation seekers. * $p < .05$. ** $p < .01$. *** $p < .001$.

effects following exposure to sunscreen messages. A significant association with vicarious-boomerang effects and state reactance was found for LTR within the context of exercise messages. For the sunscreen messages, this path approached significance for LTR ($p = .08$). Hence, H5 received partial support. Regarding reactance restoration, no differences in path coefficients appeared between HTR/LTR and HSS/LSS.

H6: Indirect effect for language features on state reactance

In addition to testing for a direct effect between perceived threat and state reactance, an indirect effect was examined for H6 connecting language features to state reactance through perceived threat. For both the exercise and the sunscreen messages,

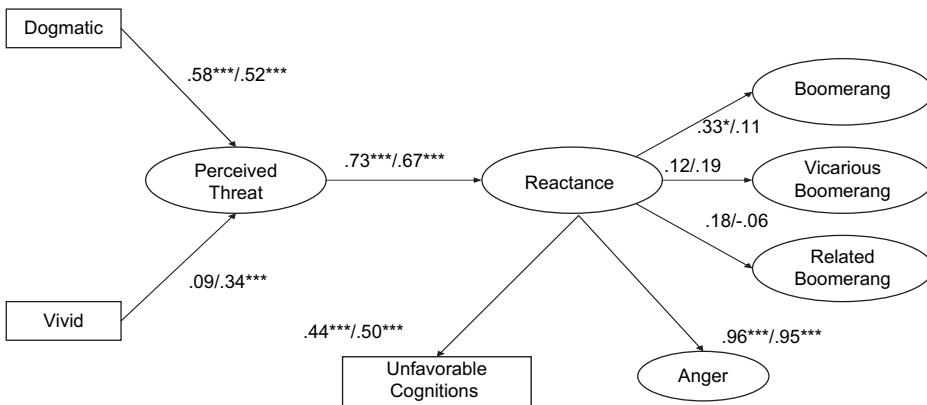


Figure 5 HSS and LSS path coefficients for sunscreen messages.

Note: HSS appear to the left of the slash; LSS appear to the right of the slash. HSS = high sensation seekers; LSS = low sensation seekers. * $p < .05$. ** $p < .01$. *** $p < .001$.

a z-score product for the mediation of perceived threat on dogmatic language and state reactance revealed that perceived threat successfully mediates this relationship for HTR, LTR, HSS, and LSS at $p < .001$ (Craig, 1936; Holbert & Stephenson, 2003). Perceived threat also mediated the relationship between vivid language and state reactance for HTR, LTR, HSS, and LSS for the exercise and sunscreen messages at $p < .001$.

H7: Dogmatic and vivid language interaction on perceived threat

The seventh hypothesis predicted that dogmatic and vivid language would interact to predict perceived threat. Results revealed that a significant interaction emerged for HTR individuals within the sunscreen context, $F(1, 260) = 5.69, p < .05, \eta_p^2 = .02$. Participants exposed to the message containing both dogmatic and vivid language perceived the message to be the more threatening than participants receiving either one or neither of these message features. Similarly, following exposure to sunscreen messages, an interaction between dogmatic and vivid language approached significance for HSS, $F(1, 284) = 3.42, p = .07, \eta_p^2 = .01$. No other interactions were found.

H8: Trait reactance and sensation seeking main effects

Whereas H1 through H5 tested for differences in path coefficients within the hypothesized model, the eighth hypothesis examined the association with personality traits with perceived threat, state reactance, and reactance restoration. Within the context of exercise, trait reactance was a significant predictor of perceived threat ($\beta = .09, t = 1.99, p < .05$), anger ($\beta = .18, t = 4.04, p < .001$), boomerang ($\beta = .15, t = 3.36, p < .001$), related-boomerang ($\beta = .12, t = 2.65, p < .01$), and vicarious-boomerang effects ($\beta = .15, t = 3.43, p < .001$). For sunscreen messages, trait reactance was a predictor of perceived threat ($\beta = .13, t = 2.80, p < .01$), anger ($\beta = .15, t = 3.37, p < .001$), boomerang ($\beta = .14, t = 2.96, p < .01$), related-boomerang ($\beta = .12, t = 2.61, p < .01$), and vicarious-boomerang effects ($\beta = .13, t = 2.81, p < .01$). For both message contexts, trait reactance did not predict unfavorable cognitions.

Sensation seeking was a significant predictor of vicarious-boomerang effects following exposure to the exercise messages ($\beta = .13, t = 2.97, p < .01$). Within the context of sunscreen, sensation seeking predicted unfavorable cognitions ($\beta = .10, t = 2.10, p < .05$), anger ($\beta = .09, t = 1.96, p = .05$), boomerang ($\beta = .10, t = 2.18, p < .05$), and vicarious-boomerang effects ($\beta = .13, t = 2.76, p < .01$). Trait reactance appeared to be a more robust antecedent of the aforementioned variables than sensation seeking.

RQ1: Trait reactance and sensation seeking interactions

RQ1 examined whether trait reactance and sensation seeking interact with one another in predicting the aforementioned variables. Across both message contexts, no interactions were found. Further examination of the relationship between trait reactance and sensation seeking revealed that the traits were correlated ($r = .38, p < .001$). Tolerance values less than .10 indicate the presence of multicollinearity

(Cohen et al., 2003). Although the tolerance value did not suggest the presence of multicollinearity, the association with trait reactance and sensation seeking inflated the standard errors of the independent variables, thus reducing the magnitude of the *t* ratios (Cohen et al., 2003).

Discussion

During the 5 years following Burgoon, Alvaro, Grandpre et al.'s (2002) review of PRT, communication researchers have wrestled with methods of operationalizing reactance as a state and trait, identifying reactance-inducing language features and establishing measures of reactance restoration. More recently, communication researchers started speculating about personality variables that may moderate state reactance, namely, trait reactance and sensation seeking (Dillard & Shen, 2005; Miller et al., 2006). To date, no investigation had examined the role of both traits with respect to perceiving specific language features as a threat, state reactance, and reactance restoration. The results of this study, then, serve to inform the design and evaluation of persuasive messages within a PRT framework.

Language features, perceived threat, state reactance, and reactance restoration

A major objective of this investigation was to determine whether trait reactance and sensation seeking influenced the processing of health-related persuasive messages. In doing so, specific language features were hypothesized to elicit state reactance for HTR, LTR, HSS, and LSS. Dogmatic language was perceived as a threat to personal freedoms by HTR, LTR, HSS, and LSS individuals. This finding has received ample empirical support (Dillard & Shen, 2005; Miller et al., 2007; Quick & Consideine, in press) and further bolsters Brehm's (1966) assumption that all individuals cherish their ability to choose among alternatives. From these investigations, it appears that dogmatic language is not likely to make a message persuasive.

Vivid language has received considerably less attention. Witte's (1992) extended parallel process model advocates the benefits of using vivid language to convey the severity of a threat when designing fear appeal messages. The vivid language literature suggests that individuals spend more time processing vivid messages because it evokes emotion, makes the persuasive intent apparent, and, as a result, is more memorable than pallid language (Knobloch et al., 2003; Nisbett & Ross, 1980; Zillmann & Brosius, 2000). For these reasons, it was hypothesized that vivid language would be positively associated with a perceived threat. The results of the present study show that HTR, HSS, LTR, and LSS perceived vivid language to threaten their freedom to choose when presented with an exercise persuasive message. The results were similar for the sunscreen messages except that no association emerged for HSS. For them, the use of vivid language was not perceived as a threat. In fact, HSS like intense images as explained by Donohew and colleagues' AMIE (Donohew, Palmgreen, & Duncan, 1980; Donohew et al., 1998; Stephenson & Southwell, 2006). HSS cognitively process messages that meet their need for sensation value

(Stephenson, 2002, 2003). The description of how skin blisters ooze and become crusty likely achieved the desirable sensation value and met the sensation seekers' need for arousal. However, the consequences associated with not exercising (e.g., clogged arteries, heart attack, overweight) simply may have not. Future research should examine the role of vivid language on state reactance for sensation seekers in contexts such as drug use or risky sex.

Although main effects for both dogmatic and vivid language were found for HTR, HSS, LTR, and LSS on perceived threat within the exercise context, an interaction between dogmatic and vivid language was detected for HTR and HSS within the context of sunscreen usage. Specifically, HTR and HSS exposed to messages containing dogmatic and vivid language perceived these messages to threaten their freedom to choose. HTR individuals perceived both language features to be a threat; therefore, an interaction did not come as a surprise given Brehm's (1966) second principle, as threats increase, state reactance increases. We know that HSS like and cognitively process messages with intense images and therefore were likely to process these sensational messages (Stephenson, 2002, 2003; Stephenson et al., 1999). Therefore, in the sunscreen context, it was not surprising that HSS did not perceive vivid language to be a threat. It is likely that the vivid sunscreen message grabbed the attention of HSS, which also brought increased attention to the dogmatic language. Given that HSS do not like preachy messages (Donohew et al., 1991; Palmgreen et al., 1991), it only makes sense that a message containing both dogmatic and vivid language was perceived as a threat. Why this interaction was found in the context of sunscreen and not exercise raises questions. Two explanations seem reasonable. First, the consequences associated with not exercising may not have met HSS' optimal level of arousal. Second, perhaps the rigorous nature of exercise was inviting to HSS, whereas using sunscreen was less accepted by the participants. Future research should continue to examine reactance arousal following exposure to multiple threats.

When assessing differences in association with perceived threat and state reactance, the relationship was greater for HTR than LTR individuals within the context of sunscreen usage. This finding is consistent with the literature on trait reactance (Hong & Faedda, 1996). HTR individuals are more prone to experience reactance following a perceived threat to an established freedom. The association was similar between HTR and LTR for sunscreen usage. No differences were found between HSS and LSS for either context.

The relationship between language features and state reactance (Dillard & Shen, 2005; Rains & Turner, 2007) and perceived threat and state reactance is well documented (Quick & Considine, *in press*); however, testing for an indirect effect on language features and state reactance through perceived threat remained unexplored. Examining indirect effects, along with direct effects, has been encouraged by media effects scholars (Holbert & Stephenson, 2003). Results from this investigation found an indirect effect between language features and state reactance for HTR, LTR, HSS, and LSS within both contexts. In other words, perceived threat mediates the relationship between language features and state reactance.

Following Dillard and Shen (2005), the present investigation hypothesized that state reactance would be comprised of unfavorable cognitions and anger (Dillard & Shen, 2005; Quick & Stephenson, 2007a; Rains & Turner, 2007). These hypotheses were supported across all four groups. Rains and Turner encouraged future research to measure the strength of loadings between unfavorable cognitions and anger on state reactance. In their study, anger had a much stronger loading on state reactance than unfavorable cognitions within the context of alcohol, but both variables loaded similarly in the meningitis and strep throat messages. Anger had a stronger association with state reactance for HTR, LTR, HSS, and LSS across both contexts in this study. In the present study, anger appeared to be driving the state reactance construct, which is consistent with earlier PRT work (Brehm, 1966; Wicklund, 1974), suggesting that reactance may be more emotionally driven than cognitive. This issue clearly warrants further research.

In examining the forms of reactance restoration across both personality types, results revealed that various forms of reactance restoration were employed, a finding consistent with Brehm and Brehm (1981). Within the context of sunscreen, state reactance was positively associated with boomerang effects on HTR individuals although this association emerged for LTR individuals following exposure to exercise messages. Why state reactance and a boomerang effect were positively associated for HTR individuals within the context of sunscreen usage and not exercise remains unclear. Similarly, the positive association with state reactance and a boomerang effect for LTR individuals within the context of exercise is a bit surprising. Issue involvement may moderate this association and should be examined in the future. A positive association with state reactance and boomerang effects appeared for HSS within both contexts, whereas no relationship was found between state reactance and boomerang, related-boomerang, or vicarious-boomerang effects for LSS. In short, HSS were likely to restore their threatened freedom by not expressing motivation to perform the advocated behavior.

Trait reactance and sensation seeking as antecedents

Another objective of this investigation was to assess the relationship between trait reactance and sensation seeking on perceived threat, state reactance, and reactance restoration. Perceiving a message to be a threat was predicted by trait reactance in both contexts. Trait reactant individuals value their independence and resist attempts by others that suggest specific actions (Dowd et al., 1994). Sensation seeking was not an antecedent to perceived threat. After all, consistent with AMIE, H2 revealed that HSS did not perceive vivid language to be a threat in the sunscreen messages (Donohew et al., 1998; Morgan et al., 2003).

State reactance is communicated via anger (Wicklund, 1974) and unfavorable cognitions (Kelly & Nauta, 1997). Results from this investigation revealed that trait reactance and sensation seeking were predictors of both indicators within certain contexts. Unfavorable cognitions were predicted by sensation seeking within the context of sunscreen messages but not by trait reactance within either message

context. Anger was predicted by trait reactance for both message contexts, whereas sensation seeking predicted anger arousal for the sunscreen messages. Perhaps sensation seeking did not predict anger within the context of exercise due to the vigorous nature of exercise. After all, HSS like participating in adventurous behaviors (Zuckerman, 1979). Therefore, being told to perform adventurous and rigorous activities (e.g., exercise) may not anger HSS compared to less stimulating activities (e.g., using sunscreen). Discovering whether this finding replicates with more risky behaviors (e.g., binge drinking) would be a welcome addition to the literature.

Although associations with state reactance and reactance restoration were modest for trait reactance and sensation seeking, both personality traits predicted various boomerang effects. Specifically, trait reactance predicted all three types of boomerang effects on the exercise and sunscreen messages. HTR individuals privilege their autonomy and independence and resist external attempts to induce compliance (Hong & Faedda, 1996; Shen & Dillard, 2005). Results from this investigation indicate that trait reactance predicted multiple restoration methods to protect an established freedom, a finding consistent with PRT (Brehm & Brehm, 1981). This outcome is important for practitioners evaluating the effectiveness of persuasive messages. Measuring traditional boomerang effects alone may not tell the complete story, particularly with LTR individuals. Miller et al. (2007) demonstrated that individuals can restore their threatened freedom by derogating the source of the message. Depending on a host of factors, including the perceived costs associated with restoring a threatened freedom, a classic boomerang effect will likely not reveal other forms of restoration such as vicarious- and related-boomerang effects.

These findings were not as consistent for sensation seeking. For the exercise messages, sensation seeking predicted vicarious-boomerang effects. Within the context of sunscreen, sensation seeking again predicted vicarious-boomerang effects along with boomerang effects. Across both contexts, sensation seeking was an antecedent to vicarious-boomerang effects, which suggests that sensation seekers are likely to restore their threatened freedom through other avenues, but how remains unknown. Following the sensation seeking literature, HSS would likely seek out more stimulating experiences than not exercising or not wearing sunscreen (Zuckerman, 1979).

In sum, the results indicated that trait reactance and sensation seeking are related and, as a result, inflated the standard errors within this investigation, which decreased the *t* values (Cohen et al., 2003). Thus, findings from this investigation represent a conservative estimate of their effect on the dependent variables of interest. The association with trait reactance and sensation seeking may also explain why an interaction was not found between both personality traits on perceived threat, state reactance, and reactance restoration.

Limitations and future research

Examining the influence of personality differences on perceived threat, state reactance, and reactance restoration moves the PRT literature forward although inherent

limitations hinder the external validity of the results. First, the nature of the experiment limits the magnitude of the conclusions. Relying on print messages containing such strong language to measure state reactance hinders the generalizability of this study. Although the external validity is limited, the trade-off is an internally valid study (Campbell & Stanley, 1963; Cook & Campbell, 1979). The reliability of the 4-item sensation seeking scale was low although Stephenson et al.'s (2003) evaluation of this measure was also low ($\alpha = .66$). Despite a low reliability, in their study, the Brief Sensation Seeking Scale-4 (BSSS-4) reflected similar associations to longer sensation seeking scales (Zuckerman et al., 1993) with respect to attitudes and risky behaviors such as marijuana use. That is, even though the reliability of the BSSS-4 was low, the validity of the scale has been established. College students represent a valid sample to measure reactance arousal regarding exercise and sunscreen usage. However, future research should examine trait reactance and sensation seeking with heterogeneous populations with respect to age, ethnicity, and gender. Also, relying on print messages, absent of visual pictures, to capture vivid images presents a limitation. Additional research should explore reactance restoration strategies with more emotional topics such as alcohol consumption or secondhand smoke. Finally, the majority of PRT research has sampled predominantly from individualistic cultures. This investigation was no exception. Future work should sample from culturally diverse audiences (Hofstede, 1980).

In conclusion, the present investigation advances our understanding of PRT in five important ways. First, the structural model accurately depicted the processing of persuasive messages for HTR, LTR, HSS, and LSS individuals, thus adding credibility to the model. Second, the association with perceived threat and state reactance was stronger for HTR than LTR for the sunscreen message. Also, for the sunscreen messages, HSS did not perceive vivid language to be threatening. Additionally, an indirect effect was found for HTR, HSS, LTR, and LSS with dogmatic and vivid language on state reactance within both contexts. Fourth, an interaction between dogmatic and vivid language on perceived threat was found for HTR and HSS within the context of sunscreen usage. Finally, trait reactance and sensation seeking were significant predictors of many of the variables associated with state reactance. Results from this investigation suggest that trait reactance and sensation seeking are viable moderators to include when examining the role of state reactance in processing persuasive messages, particularly trait reactance.

Notes

- 1 The original experiment was a 2 (dogmatic and nondogmatic) \times 2 (explicit and implicit) \times 2 (vivid and pallid) design. However, the results indicated that explicit recommendations on how much one should exercise and what level of sunscreen one should wear had no effect on perceived threat to freedom and, thus, explicit language was not discussed in this manuscript.
- 2 The pretest analysis was designed as an induction check prior to the main study. A factorial ANOVA was used to evaluate the effectiveness of the exercise and sunscreen

message inductions for dogmatic and vivid language. A 2 (dogmatic language and nondogmatic language) \times 2 (vivid and pallid) posttest-only experimental design was conducted to pretest both message features with college students ($N = 222$). Participants were exposed to messages containing a variation of dogmatic and vivid language. The measures employed to ensure that the messages were perceived as intended duplicated those reported in the manuscript. The dogmatic index was reliable within the exercise ($\alpha = .82$; $M = 4.56$, $SD = 1.91$) and sunscreen ($\alpha = .77$; $M = 4.11$, $SD = 1.95$) context. The induction yielded a significant main effect for perceived dogmatic language for exercise, $F(1, 215) = 25.21$, $p < .001$, $\eta_p^2 = .11$. Beyond the induction check, the effect sizes (r) of dogmatic and vivid language on the dogmatic induction were .32 and .17. Similarly, the sunscreen dogmatic induction check generated a significant main effect for dogmatic language, $F(1, 217) = 26.16$, $p < .001$, $\eta_p^2 = .11$. Effect sizes (r) of dogmatic and vivid language on the dogmatic induction check were .32 and .05. Similar to the dogmatic measure, the vivid language index was reliable across both exercise ($\alpha = .85$; $M = 4.21$, $SD = 1.48$) and sunscreen ($\alpha = .90$; $M = 4.51$, $SD = 1.56$) contexts. The vivid language induction check for exercise produced a significant main effect for perceived vivid language, $F(1, 214) = 37.04$, $p < .001$, $\eta_p^2 = .15$. The effect sizes (r) of dogmatic and vivid language on the vivid language induction check were .05 and .32. Similarly for sunscreen, the induction yielded a significant main effect for perceived vivid language, $F(1, 217) = 62.82$, $p < .001$, $\eta_p^2 = .22$. Effect sizes (r) of dogmatic and vivid language on the vivid language induction check were .01 and .47.

- 3 Following the request of an anonymous reviewer, measuring a direct effect between language features and reactance was examined. The Lagrange multiplier statistic suggested that adding a path connecting either message feature to state reactance would not significantly improve the fit of any of the eight models.

Acknowledgments

The authors would like to thank Jake Harwood and Jim Dillard along with two anonymous reviewers for their insightful suggestions. Also, the authors are grateful to Sheena Charanza, Emily Hill, Nicholas Wood, and Jordan Winterfeld for their contribution to this project.

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Appendix

Dogmatic/vivid message exercise message

You simply cannot deny all the evidence showing that exercise saves you from dying of a massive heart attack, clogged arteries, morbid obesity, and being stressed out of your mind. Just look around you to see all the stressed out, overweight _____ (University mascot) on this campus. If you are at all reasonable, you will agree that these are serious issues for students at XX University. They demand your immediate attention. You must participate in a weekly exercise routine in order to significantly improve your health. You must stop the denial. There is a problem and you must be a part of the solution. If you are not exercising, you must start right now. You simply have to do it. After all, you definitely do not want to die from a massive heart attack, clogged arteries, morbid obesity, or be freaking out do you? As you can see, the choice is crystal clear: You simply must participate in a weekly exercising routine in order for you to live a much healthier life!

Dogmatic/pallid exercise message

You simply cannot deny all the evidence showing that exercise leads to improvements in your cardiovascular, respiratory, and mental health. Just look around you to see all of the _____ (University mascot) who are facing the consequences of not exercising. If you are at all reasonable, you will agree that these are serious issues for students at XX University. They demand your immediate attention. You must participate in a weekly exercise routine in order to significantly improve your health. You must stop the denial. There is a considerable problem and you must be a part of the solution. So if you are not already participating in an exercise program, you must start right now. You simply have to do it. After all, you definitely do not want to suffer from cardiovascular, respiratory, and mental health complications do you? As you can see, the choice is crystal clear: You simply must participate in a weekly exercising routine in order for you to live a much healthier life!

Nondogmatic/vivid exercise message

There is pretty good evidence that exercise saves you from dying of a massive heart attack, clogged arteries, morbid obesity, and being stressed out of your mind. In fact, there is evidence right here on this campus of stressed out, overweight _____ (University mascot). Most people would agree that these issues are a fairly serious campus problem at XX University that needs to be addressed soon. By participating in a weekly exercise routine you are more likely to improve your health. You have a chance to be a part of the solution to this problem if you choose. So if you are not already participating in an exercise program, why not consider it? After all, do you want to die from a massive heart attack, clogged arteries, morbid obesity, or be freaking out? As you can see, we will leave the conclusion up to you regarding your participation in a weekly exercise program: By choosing to participate in a weekly exercise routine you are more likely to live a much healthier life.

Nondogmatic/pallid exercise message

There is pretty good evidence that exercise leads to improvements in your cardiovascular, respiratory, and mental health. In fact, there is evidence right here on this campus of the consequences associated with not participating in a weekly exercise routine. Most people would agree that these issues are a fairly considerable campus problem at XX University that needs to be addressed soon. By participating in a weekly exercise routine you are more likely to improve your health. You have a chance to be a part of the solution to this problem if you choose. So if you are not already participating in a weekly exercise program, why not consider it? After all, do you want to suffer from cardiovascular, respiratory, and mental health complications? As you can see, we will leave the conclusion up to you regarding your participation in a weekly exercise program: By choosing to participate in a weekly exercise routine you are more likely to live a much healthier life.

Dogmatic/vivid message sunscreen message

You simply cannot deny the evidence showing that overexposure to the sun leads to premature wrinkling, severe skin blisters that ooze and become crusty, and even skin cancer. If you are at all reasonable, you must agree that the problems resulting from _____ (University mascot) not wearing a sunscreen with a reasonable SPF level is a serious problem at XX University that demands your immediate attention. You must stop the denial. There is a problem and you must be a part of the solution. So if you are going to be out in the sun, you must protect your skin by wearing a sunscreen with a reasonable SPF level. You simply have to do it. After all, you definitely do not want to experience premature wrinkling, skin blistering, and skin cancer, do you? As you can see, the choice is crystal clear: You must wear a sunscreen with a reasonable SPF level every time you are in the sun in order to reduce your odds of experiencing the consequences associated with sun overexposure!

Dogmatic/pallid exercise message

You simply cannot deny all the evidence that overexposure to the sun leads to skin injuries, skin diseases, and in general, declining health. Specifically, overexposure to the sun can lead to premature aging or skin cancer. If you are a reasonable person, you have to agree that the problems resulting from _____ (University mascot) not wearing a sunscreen with a reasonable SPF level is a serious problem at XX University that demands your immediate attention. You must stop the denial. There is a problem and you must be a part of the solution. So if you are going to be out in the sun, protect your skin by wearing sunscreen with a reasonable SPF level. You simply have to do it. After all, you do not want to experience skin injuries, skin diseases, and in general, declining health do you? As you can see, the choice is crystal clear: You must wear a sunscreen with a reasonable SPF level every time you are in the sun in order to reduce your odds of experiencing the consequences associated with sun overexposure!

Nondogmatic/vivid sunscreen message

There is pretty good evidence showing that overexposure to the sun leads to premature wrinkling, severe skin blisters that ooze and become crusty, and even skin cancer. Most people agree that the problem resulting from _____ (University mascot) not wearing sunscreen with a reasonable SPF level is a campus problem at XX University that needs to be addressed. You have a chance to be a part of the solution to this problem if you choose. So if you are going to be out in the sun, consider protecting your skin by wearing sunscreen with a reasonable SPF level. Choosing to wear sunscreen with a reasonable SPF level when outside is a reasonable way to reduce your risk of skin cancer. After all, do you want to experience premature wrinkling, skin blistering, and skin cancer? As you can see, we leave the choice up to you. The choice is yours to wear sunscreen: By wearing sunscreen with a reasonable SPF level every time you are in the sun you will reduce your odds of experiencing the effects associated with sun overexposure.

Nondogmatic/pallid sunscreen message

There is pretty good evidence that overexposure to the sun leads to skin injuries, skin diseases, and in general, declining health. Most people agree that the problem resulting from _____ (University mascot) not wearing sunscreen with a reasonable SPF level is a campus issue at XX University that needs to be addressed. You have a chance to be a part of the solution to this problem if you choose. So if you are going to be out in the sun, consider protecting your skin by wearing sunscreen with a reasonable SPF level. Choosing to wear sunscreen with a reasonable SPF level when outside is a reasonable way to reduce the probability of dermatological injuries. After all, do you want to experience skin injuries, skin diseases, and in general, declining health? As you can see, we leave the choice up to you. The choice is yours to wear sunscreen: By wearing sunscreen with a reasonable SPF level the next time you are outside in the sun you will reduce your odds of experiencing the effects associated with sun overexposure.

The messages in the Appendix contain the implicit recommendation. For copies of the messages containing the explicit recommendation, please contact the first author.

Un examen du rôle du trait de réactance (*trait reactance*) et de la recherche de sensations sur la menace perçue, l'état de réactance (*state reactance*) et la restauration de la réactance (*reactance restoration*)

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Résumé

Cette recherche vise à développer la théorie de la réactance psychologique (TRP) en cherchant à savoir si le trait de réactance (*trait reactance*) et la recherche de sensations influencent la magnitude de la menace perçue, l'état de réactance (*state reactance*) et la restauration de la réactance (*reactance restoration*). Les résultats révèlent que les individus à fort (FoTR) et faible (FaTR) trait de réactance ainsi que les individus à forte (FoRS) et faible (FaRS) recherche de sensations ont traité les messages persuasifs de façon similaire, ce qui ajoute de la crédibilité aux récentes avancées dans la TRP. Le langage dogmatique et vivace était perçu comme une menace pour la plupart des personnes. Une interaction entre le langage dogmatique et vivace sur la menace perçue a été observée chez les FoTR et les FoRS en ce qui a trait au message portant sur la lotion solaire. Un effet indirect associant les caractéristiques du langage et l'état de réactance par le biais de la menace perçue fut appuyé. Une analyse de régression a révélé que le trait de réactance et la recherche de sensations prévoient des variables associées à l'état de réactance.

Zur Rolle von Reaktanz als Merkmal und Sensation Seeking in Bezug auf wahrgenommene Gefahr, Zustandsreaktanz und Reaktanzwiederherstellung

Mit der aktuellen Studie wird der Versuch unternommen, die Psychologische Reaktanz Theorie (PRT) weiterzuführen, indem untersucht wird, ob Reaktanz als Merkmal und Sensation Seeking das Ausmaß von wahrgenommener Gefahr, Zustandsreaktanz und Reaktanzwiederherstellung beeinflussen. Die Ergebnisse zeigen, dass Personen mit hoher (HMR) und niedriger Merkmalsreaktanz (NMR) sowie hohe (HSS) und niedrige Sensation Seeker (NSS) die persuasive Botschaft gleich verarbeiteten – was die Glaubwürdigkeit aktueller Fortschritte in der PRT-Forschung untermauert. Dogmatische und lebhaft Sprache wurde von den meisten Personen als Gefahr wahrgenommen. Für HMR und HSS zeigte sich eine Interaktion zwischen dogmatischer und lebhafter Sprache mit wahrgenommene Gefahr für Botschaften zum Sonnenschutz. Ein indirekter Effekt, der Spracheigenschaften und Zustandsreaktanz über die wahrgenommene Gefahr miteinander verbindet, konnte bestätigt werden. Eine Regressionsanalyse zeigte, dass Merkmalsreaktanz und Sensation Seeking Variablen vorhersagen, die mit Zustandsreaktanz zusammenhängen.

Examinando el Rol del Rasgo de la Reactancia y la Búsqueda de Sensación en la Amenaza Percibida, el Estado de Reactancia, y la Restauración de la Reactancia

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Resumen

La presente investigación buscó avanzar la teoría de la Reactancia Psicológica (PRT) para examinar si el rasgo de la reactancia y la búsqueda de Sensación influyen sobre la magnitud de la amenaza percibida, el estado de la reactancia, y la restauración de la reactancia. Los resultados revelaron que los individuos con alto (HTR) y bajo rasgo de reactancia (LTR) y con alto (HSS) y bajo nivel de búsqueda de sensación (LSS) procesaron los mensajes persuasivos de manera similar, y agregaron credibilidad a los avances recientes de PRT. El lenguaje dogmático y vívido fue percibido como una amenaza para muchos individuos. Se encontró una interacción entre el lenguaje dogmático y vívido y la amenaza percibida para los HTR y HSS en los mensajes sobre protectores solares. Un efecto indirecto conectando las características del lenguaje y el estado de reactancia a través de la amenaza percibida fue sostenido. Un análisis regresivo reveló que el rasgo de la reactancia y la búsqueda de sensación predijeron variables asociadas con el estado de reactancia.

检验性格反判和感官刺激寻求在所感知的威胁、状态反判和反判之修复中的角色

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为推进心理反判理论（PRT）的发展，本研究检验了性格反应和感官刺激之寻求是否会影响所感知的威胁、状态反判以及反判之修复的程度。结果表明：高性格反判（HTR）、低性格反判（LTR）、高感官刺激寻求者（HSS）和低感官刺激寻求者（LSS）处理劝说性信息的方式类似，这为PRT理论的最近进展提供了支持。教条式及和鲜活之语言被大多数人看作是一个威胁。我们发现教条式语言和鲜活语言对HTR和HSS观众在防晒油信息中所感知的威胁有互相作用。连接语言特征和所感知威胁之状态反判的间接效果得到支持。回归分析表明：性格反判和感官刺激寻求可用来预测与状态反判相关的变量。

인지된 위협, 상황 반발, 반발회복에 있어 특성반응화 감각추구의 역할 연구

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요약

심리적 저항 이론(PRT)을 발전시키기 위해 추구되는 현재의 연구는 특성반발과 감각추구가 인지된 위협, 현재 반발, 그리고 반발 회복에 영향을 미치는지를 연구하는 것에 의해 행해지고 있다. 결과들은 높은 정도의 특성반응 (HTR) 그리고 낮은 정도의 특성반응 (LTR)을 보이는 개인들과, 높은정보의 감각추구자 (HSS) 그리고 낮은 정도의 감각추구자 (LSS)들은 비슷하게 설득적 메시지를 지니고 있다는 것을 보여주고 있는데, 이는 최근의 PRT발전에 신뢰성을 더한 것이다. 교조적이고 명백한 언어들은 대다수 개인들에게 위협으로 인지되었다. 인지된 위협에 대한 교조적이고 명백한 언어의 상호작용은 선스크린 메시지를 위한 HTR와 HSS에서 발견되었다. 인지된 위협을 통한 언어특징과 상태재반응을 연계하는 간접적인 효과가 지지되었다. 회귀분석은 특정재반응과 감각추구는 상태재반응과 연계된 변수들을 예측하는 것으로 나타났다.