ORIGINAL ARTICLE

Psychological Reactance and Persuasive Health Communication: A Test and Extension of the Intertwined Model

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This manuscript reports 2 experiments that were conducted to test and extend the work of J. P. Dillard and L. Shen (2005) examining the cognitive and affective processes involved in psychological reactance. In particular, the studies reported here (a) examined the best-fitting model of reactance processes and (b) tested 3 factors that may affect reactance including argument quality, severity of the consequences associated with the message topic, and magnitude of the request made in the message. The results showed that the intertwined cognitive–affective model was the best-fitting model of reactance processes. Magnitude of the request was the only variable that affected reactance. The implications of these findings for research on reactance and persuasive health campaigns are discussed.

Although a great deal of research has been conducted to understand factors that lead to attitude change, scholars have recently argued that more attention should be paid to resistance processes (Burgoon, Alvaro, Grandpre, & Voloudakis, 2002; Dillard & Shen, 2005; Jacks & Cameron, 2003). The import of exploring how individuals resist attitude change is evidenced by the failure of persuasive health campaigns (Backer, Rogers, & Sopory, 1992; Hornik, 2002; Salmon & Murray-Johnson, 2001), as well as those campaigns resulting in relatively small effect sizes (Snyder, 2001). In the broader context of research on resistance to persuasion, psychological reactance (Brehm, 1966) has been offered as one cause for message rejection (Burgoon, Alvaro, et al., 2002). Ringold (2002), for example, attributes the failure of campaigns aimed at reducing alcohol consumption among young adults to reactance, arguing that interventions such as educational efforts, warnings, and legal restrictions have "produced boomerang effects … largely consistent with the conditions necessary to, and responses predicted by, psychological reactance theory" (p. 51). Through limiting or

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threatening freedoms, health messages such as those evaluated by Ringold have the potential to elicit reactance and, as a result, lead individuals to ignore the message, perform the opposite of the behavior advocated (i.e., the boomerang effect), or otherwise attempt to restore their threatened or lost freedom.

Although psychological reactance has been widely researched (see Burgoon, Alvaro, et al., 2002, for a review), few studies have examined the cognitive and affective processes comprising reactance (Eagly & Chaiken, 1993).[1] One exception is the work of Dillard and Shen (2005) in which they conceptualized reactance as the negative cognitions and affect resulting from a threat to one's freedom and tested four different models of reactance processes. Along with Dillard and Shen, we contend that understanding the chain of cognitive and affective responses involved in reactance is essential to developing effective persuasive messages in the future. Thus, we set out to achieve two goals in this study. The first goal was to determine the relationship between cognition and affect in reactance. Working from Dillard and Shen's operationalization of reactance as counterarguments and anger, we tested the intertwined model and dual-process model of reactance along with a third possibility: the linear affective–cognitive model. A second goal of this study was to examine factors that exacerbate or reduce reactance. Three variables (argument quality, severity of consequences, and magnitude of the request) were assessed.

Rationale

Reactance defined

Psychological reactance was first defined by Brehm (1966) as the "the motivational state directed toward the reestablishment of [a] threatened or eliminated freedom" (p. 15) According to Brehm and Brehm (1981), there are four elements that are fundamental to reactance theory: freedom, threat to freedom, reactance, and restoration of freedom. Individuals must perceive a concrete sense of freedom and have knowledge of it in order for reactance to occur; that is, the notion of freedom cannot be abstract. Threats to freedom can originate from a more powerful social agent through threats of punishment or loss of reward or from someone of lower status through an irreversible act that eliminates materials necessary for freedom. Once a threat is present, some attempt to restore the threatened or lost freedom is made. Brehm explains,

> If a person's behavioral freedom is reduced or threatened with reduction, he [or she] would become motivationally aroused. This arousal would presumably be directed against any further loss of freedom and… the reestablishment of whatever freedom had already been lost or threatened. (p. 2)

Although the boomerang effect—in which individuals engage in the behavior associated with a threatened freedom to restore that freedom (Brehm & Sensenig, 1966)—has received a great deal of attention as a means by which individuals respond to a freedom-limiting message, the restoration of threatened or lost freedom

may take many forms (Brehm, 1966; Burgoon, Alvaro, et al., 2002). In the context of social influence, reactance can prompt freedom-restoring responses that lead individuals to reject a message and, thus, cause persuasive campaigns to be ineffective. Studies in which there is a clear attempt to restrict or eliminate individuals' freedoms suggest that reactance causes message rejection in the form of increased liking for the activity or choice that was threatened (Brehm, Stires, Sensenig, & Shaban, 1966; Hammock & Brehm, 1966), derogating the source (Kohn & Barnes, 1977), denial of the threat (Worchel, Andreoli, & Archer, 1976), enacting a different freedom to gain a feeling of choice and control (Wicklund, 1974), and a boomerang effect in one's position on an issue (Worchel & Brehm, 1970).

Modeling reactance processes and outcomes

Although research on psychological reactance has been conducted for a half-century, conceptual definitions of reactance have, until recently, been marked by a lack of precision. As noted by Dillard and Shen (2005), reactance has historically been conceptualized largely by its antecedents and outcomes. Brehm (1966) first referred to reactance as a "motivational state" occurring in response to a threatened or eliminated freedom (p. 9). Reactance has also been defined as a "negative emotional state" (Eagly & Chaiken, 1993, p. 571), "motivational force" (Sachau, Houlihan, & Gilbertson, 1999, p. 612), and "hostility" (Berkowitz, 1973, p. 311). Such broad conceptualizations may be an artifact of Brehm's (Brehm & Brehm, 1981) assertion that reactance cannot be measured directly and can only be studied via its persuasive outcomes. Dillard and Shen took issue with this idea, arguing that such a notion of reactance is nonfalsifiable and, thus, problematic for social scientists. Accordingly, they forwarded four possible models of reactance as cognition and/or affect.

The first model that Dillard and Shen (2005) presented was the single-process cognitive model proposing that reactance is purely cognitive. This model posits that reactance comprises negative thoughts (i.e., counterarguments). Scholars of cognition have long argued that message reception and attitudes are mediated by message-processing variables (see Petty, Ostrom, & Brock, 1981). The cognitive response approach to persuasion maintains that message receivers attempt to relate new information to their existing knowledge base regarding the topic. To this end, a receiver can generate cognitions that agree, disagree, or are entirely neutral about the issue. Hovland, Lumsdaine, and Sheffield (1949) argued that persons protect themselves from threatening messages by counterarguing. In the single-process cognitive model, reactance is conceptualized as negative thoughts that occur in response to a freedom-threatening message.

The second model that Dillard and Shen (2005) tested, the single-process affective model, is based on the idea that reactance is manifested as anger (Dillard & Meijnders, 2002; Nabi, 2002). Anger is a secondary emotion, activated after processing surrounding stimuli (Izard, 1977; Planalp & Fitness, 1999). Common conceptualizations of anger involve the following: (a) an aggression-based response to assessing a relevant threat in one's environment (Rubin, 1986), (b) an emotion

identified by certain physiological arousals and the cognition of resentment (Novaco, 1994), (c) an emotion triggered when one's goal to preserve his or her ego is thwarted (Lazarus & Lazarus, 1994), or (d) a response to having one's goals impeded upon (Nabi, 1999, 2002). Unlike emotions that do not involve fault (e.g., depression, sadness), or those in which the individual is at fault (e.g., shame, guilt), when people feel angry, loss is often "…blamed on another person" (Lazarus, 1991, p. 218). Accordingly, the action tendency for angry individuals is to launch "an attack on the agent held to be blameworthy of the offense" (Lazarus, 1991, p. 226). Thus, this second model of reactance proposes that reactance is the experience of hostile and aggressive feelings; that is, reactance is synonymous with feelings of anger.

The first two models forwarded by Dillard and Shen (2005) present reactance as either cognition or affect. Yet, it seems possible that reactance may be both cognition and affect. Consequently, they offer two final models to simultaneously account for these two factors. The dual-process cognitive–affective model poses that cognition and affect are separate and have a distinct impact on attitudes and, subsequently, behavior. This model is consistent with other types of parallel-processing models (Leventhal, 1970; Petty & Cacippo, 1979, 1986) in that the cognitive and affective responses have unique effects on message acceptance. The fourth model, the intertwined-process cognitive–affective model, proposes that reactance is an amalgam of both cognition and affect; but, unlike the third model, this model hypothesizes that cognition and affect are intertwined. In particular, this model holds the position that cognition and affect are so intertwined that "… their effects on persuasion cannot be disentangled." (Dillard & Shen, 2005, p. 147).

Dillard and Shen (2005) tested these four models in an experiment that manipulated high- and low-threat flossing and alcohol consumption messages. They also measured each individual's level of trait reactance (Hong, 1992) and assessed the interaction between the threat manipulation and the trait reactance. Because threat and trait reactance are established antecedents of reactance, they posited that these two factors and the interaction term should precede reactance. Reactance, in turn, should affect attitudes about the health topic and, subsequently, behavioral intentions. Their data showed that the intertwined model of affect and cognition best fit the data in their study.

We conceptualized reactance in this study as the cognitions and affect individuals experience in response to, and directed at, a message, source, or action that is perceived to be freedom threatening or limiting. It should be noted that a perceived threat to one's freedom is a necessary condition for reactance to occur but is not reactance itself. Defining reactance as the antecedent of cognitions and affect—as opposed to conceptualizing cognition and affect as reactance—is problematic because it creates a situation where reactance cannot be measured. We operationalized cognition as negative-relevant cognitions (i.e., counterarguments) against a freedom-limiting message, source, or behavior and operationalized affect as anger in response to a freedom-limiting message, source, or behavior. Although such a conceptualization and operationalization are broader than Brehm's (1966) motivational

state or the negative emotional state described by Eagly and Chaiken (1993), we feel that this approach is of value. First, both are consistent with the work of Dillard and Shen (2005). Second, in considering anger and counterarguments as indicators of reactance, we can assess how strongly these components are associated and if they operate in a linear, separate, or intertwined fashion. Finally, conceptualizing reactance as cognition and affect makes it possible to test factors that may moderate reactance responses in the presence of a freedom-threatening message.

Assuming that reactance is manifested as negative cognitions and anger, it is important, then, to explore how these two factors are related. Dillard and Shen (2005) proposed a dual-process and intertwined model to explain the relationship between these two factors. Although both models are plausible, neither allows for a third possibility—the possibility that emotion might precede cognition. Zajonc (1980, 1984) asserted that we feel emotions before we can engage cognitive interpretations, a view that has been supported by research on subliminal images. Other evidence showing that emotion precedes cognition is that of LeDoux's (2000) work with amygdala and cortical functions, which showed that more neural connections projecting from the amygdala to the cortex exist than otherwise. Accordingly, the limbic system overtakes the cortex suggesting that emotion comes before thinking. In contrast, Lazarus (1991; Lazarus & Lazarus, 1994) argued that people cognitively appraise before they feel, and the appraisal process is not necessarily conscious. We recognize that a stimulus is required for anger to occur (in this case the freedom-limiting message); yet, we also argue that once anger is experienced those feelings will influence cognitive processes. This model is called the linear affective–cognitive model.

The linear affective–cognitive model is consistent with prior research on persuasion and anger. Nabi (2002), for example, contends that anger promotes rigorous message processing. Anger motivates individuals to attend to relevant information and, as a result, facilitates message processing. The results of Nabi's study provided some support for this position. Angry participants engaged in more careful information processing than participants experiencing fear and processed information as thoroughly as the control group. Although the data of Dillard and Shen (2005) fit the intertwined model and indicated that reactance consists of both cognitive and affective components, we cannot rule out the possibility that a fifth model might better explain reactance processes until such a model is tested.[2] Thus, we propose the following research question in our attempt to replicate the results of the study of Dillard and Shen.

> RQ1: Assuming reactance involves affective and cognitive components, is reactance best explained as a dual process, an intertwined process, or as a process where anger precedes cognition?

In addition to illuminating the best-fitting model of reactance, we are concerned about factors that influence reactance processes. Studies have illuminated message features that impact reactance, such as threat-to-choice language (Burgoon, Alvaro, Broneck, et al. 2002; Dillard & Shen, 2005). Other scholars have noted that message

explicitness (i.e., the intent of the source is clear) heightens reactance (Brehm, 1966; Burgoon, Alvaro, et al., 2002). We are interested in further examining whether there are factors that lead to the dissipation of reactance even in the presence of a threat to freedom. In order to develop a better understanding of reactance, we must examine the factors that exacerbate reactance and those factors that diminish reactant responses. Thus, we turn to three variables that are argued to influence reactance processes: argument quality, severity of the threat, and magnitude of the request.

Argument quality

Argument quality is one factor that may intensify or mitigate the cognitive and affective responses that define reactance. A strong argument containing concrete facts and sound evidence may inhibit an individual's anger and negative thoughts. Indeed, Dillard and Shen (2005) contend that offering reasons and justification can mitigate reactance by softening perceptions of intrusiveness. In contrast, a weak message lacking evidence or containing faulty reasoning may fuel reactance processes. Because the message is easily refutable, individuals may develop an array of counterarguments and become angrier. Some evidence for these claims can be found in Chen, Reardon, Rea, and Moore's (1992) study of forewarning. Participants in their study were forewarned of an impending attempt to persuade them and then exposed to a strong or weak persuasive message. Forewarning was argued to induce reactance through making a future threat to the participants' freedom salient. Those who were warned and exposed to a weak message reported notably more negative thoughts than unwarned participants or participants who were warned and exposed to a strong message. To test the influence of argument quality on reactance processes, we propose the following hypothesis:

H1: A strong message will cause less reactance than a weak message.

Severity of the consequences

One limitation of extant research on reactance is that many of the message manipulations threaten a behavior that, ostensibly, does not present realistically severe consequences. For instance, a number of reactance studies have been conducted on the topic of alcohol consumption among young adults (Allen, Sprenkel, & Vitale, 1994; Bensley & Wu, 1991; Engs, Diebold, & Hanson, 1996). Although research is clear that binge drinking can lead to a plethora of negative consequences (e.g., victim in a forced sex situation, driving while impaired, death), students can likely think of a variety of situations where they or their peers drank alcohol irresponsibly and had few if any negative consequences. Hence, counterarguing such a message is easier because of the variety of personal examples the participant can think of. Other reactance studies have employed flossing messages (Dillard & Shen, 2005), which might have been perceived by participants (especially in the high-threat condition) to be exaggerated.

In the previous cases, we cannot rule out the possibility that reactance was increased because the participants perceived that the message was overstated. A persuasive topic with realistic and inherently serious consequences (e.g., AIDS)

and with which message receivers have little personal experience may mitigate reactance responses. In such a case, anger might be decreased because the individuals perceive that the message has their best interest in mind. Moreover, in such a case, counterarguing becomes more difficult because the individuals have fewer personal examples that contradict the message, therefore lowering the number of negative thoughts produced. In fact, researchers studying fear tactics argue that individuals must perceive that an issue is severe and that they are susceptible to the issue before a threat will be processed (Witte, 1994). To address this issue, we propose the following hypothesis:

> H2: A health topic with minor (i.e., non-life-threatening) consequences will cause more reactance than a health topic with substantial (i.e., life-threatening) consequences.

Magnitude of the request

A third message feature that may influence reactance processes is the magnitude of the request. Magnitude refers to how large the requested behavior is. A large magnitude request takes a great deal of time or effort to comply with and imposes substantially on an individual. For example, drinking messages that recommend abstinence make a greater imposition than those messages that recommend responsible drinking. Reactance should increase when a message mandates a high magnitude request because freedom is being further limited through the additional or more substantial imposition associated with the request on the time, energy, or finances of message receivers. A large request is also more likely to be deemed improper or inappropriate given the situation and, thus, incite greater levels of reactance (Berkowitz, 1973). Furthermore, it is likely that the severity of the consequences would interact with the magnitude of the request. For example, if a message addresses a low-severity issue and makes a large request, the message receiver should become angrier at the source of the message because the request appears unjustified. But, if the issue is severe and the request is small, the message should garner less anger because the participants should believe that the message was in their best interest and the request does not require much—even if the message threatens their freedom. Likewise, when the issue is severe and the request is large, or the issue is nonsevere and the request is small, reactance is less likely to occur because the request fits the issue. In this sense, this interaction is a "magic cell" interaction in that we expect one condition (i.e., low-severity consequences/large request) to yield more reactance and the other conditions to yield less reactance. We extend the following hypotheses to examine the influence of the magnitude of the request and the interaction between the magnitude and the severity of consequences:

> H3: Individuals asked to perform large task will experience more reactance than individuals asked to perform a small task.

> H4: Severity of consequences associated with a health topic and the magnitude of the request will interact and influence reactance. Individuals asked to perform large task

regarding a topic with minor consequences will experience more reactance than participants in the other three conditions.

Two studies were conducted to address the previous hypotheses and research question. Both studies tested the three competing models of the relationship among affect and cognition in reactance processes. Study 1 also examined whether or not reactance processes are affected by argument quality in the context of undergraduate students' alcohol consumption—a topic that has been linked with reactant responses (Ringold, 2002) and been used in previous research on the topic (Allen et al., 1994; Bensley & Wu, 1991; Dillard & Shen, 2005; Engs et al., 1996). Study 2 assessed the influence of the severity of consequences and magnitude of the request on reactance in the context of a campus health promotion campaign involving a relatively innocuous illness (strep throat) as well as one with serious health consequences (bacterial meningitis).

Study 1

Method

Participants
One hundred and thirty-six students in undergraduate communication courses at a large university in the southwestern United States participated in this study. Seventy-one percent of the participants were female. The mean age of participants was 20.85 years ($SD = 1.88$). Approximately 45% of participants were not of legal drinking age at the time of the study. Most participants (68%) reported drinking alcoholic beverages on two separate occasions per month or less.

Design
A 2 (threat to freedom) $\times$ 2 (argument quality) between-participants design was used. Threat (threat/no threat) and argument quality (strong message/weak message) served as the independent variables.

Procedure and materials
Participants were randomly assigned to one of four conditions corresponding to the 2 $\times$ 2 design. In each condition, participants read what ostensibly appeared to be a photocopied newspaper article (the threat manipulation) and a pamphlet about alcohol use (the message manipulation). Unlike the study of Dillard and Shen (2005), the threat and message strength manipulations were separated in this study. This was done to assess the impact of message strength once participants' freedom had been threatened and, thus, reactance had been induced. Upon reading all study materials, participants completed a thought-listing task and a questionnaire containing measures of the dependent variables.

The threat manipulation consisted of a 175-word article informing students that an alcohol ban was under consideration. The article contained a forceful message explicitly threatening students' freedom, similar to the messages used by

Dillard and Shen (2005) and in early studies of reactance (Brehm & Sensenig, 1966; Snyder & Wicklund, 1976; Worchel & Brehm, 1970). The message stated that university and city officials would impose the ban and students could not offer input:

> A recent news report claims the University of Texas, in collaboration with the City of Austin, is considering a ban on alcohol on campus and in the surrounding areas. A task force comprised of University and City officials will be constructed to formally discuss the merits and limitations of an alcohol ban. Officials from the University of Texas and the City of Austin will then make a decision on the issue. Students will not have input on this decision.

> The alcohol ban would take effect during the second half of the spring semester and would involve all University and private dormitories, fraternities, sororities, and all residences in the West Campus neighborhood. Any University of Texas student caught in possession of alcoholic beverages would be subject to legal and scholastic penalties. Sales of alcohol in these areas would also be prohibited. Concern with the increasing level of alcohol abuse on and around campus has sparked the University and City to consider this issue.

The no-threat induction differed in only the first paragraph and informed students that they would have an opportunity to vote on the ban:

> A recent news report claims the University of Texas, in collaboration with the City of Austin, is giving students the opportunity to vote on a possible alcohol ban on campus and in the surrounding areas. A student-led task force will be assembled to facilitate a formal discussion among students of the merits and limitations of an alcohol ban. All students will then have the opportunity to vote on the issue, and the decision will be made solely on the basis of the student's votes. The University and City will not have input on this decision.

The pamphlets used in the argument quality manipulation contained approximately 30 pieces of information, totaling 450 words, about alcohol use. The strong-message condition contained credible sources (e.g., American Medical Association, Harvard School of Public Health) and specific information and facts (Johnson, 1991). The weak-message condition contained specious information and less credible sources (e.g., "some college students") (Johnson).

Measures
Unless otherwise noted, all items were rated on a 10-point Likert-type scale with the anchors *completely disagree* and *completely agree*. Greater scores indicate more of a variable. Anger was measured with three items: I feel angry, I feel frustrated, and I feel happy. The final item was reverse scored. Attitude toward alcohol use was assessed with five items, with higher scores indicating more negative attitudes about alcohol consumption.[3] Participants rated the degree to which they felt that alcohol consumption is troublesome, terrible, problematic, pleasant, and agreeable. The final two items were reverse scored. The threat manipulation check ($\alpha = .87$) included

three items assessing the degree to which the newspaper article made the participants feel: like my choices were being taken away, like I didn't have any freedom, and trapped. Argument quality (α = .91) was measured with seven items; participants rated the degree to which the pamphlet was smart, well supported, compelling, effective, informative, detailed, and weak. The final item was reverse scored.

Cognitions were assessed with a thought-listing task. Participants were provided with a sheet of paper containing 12 boxes and asked to list all of the thoughts they had while reading the pamphlet about alcohol use. Participants coded their own thoughts. On the page following the thought-listing task, participants were instructed to return to the thoughts they had listed and place a "P" next to thoughts they considered to be positive, "Neg" next to negative thoughts, and "N" next to neutral thoughts. After coding the valence of their thoughts, participants were instructed to return to the thoughts they had previously listed and place "Rel" next to thoughts that were relevant to the information in the pamphlet and "IRR" next to irrelevant thoughts. This procedure is discussed in detail by Petty et al. (1981). To avoid confounding the measures of cognition and affect, thoughts indicating affect were identified using the list of feeling terms compiled by Shaver, Schwartz, Kirson, and O'Connor (1987) and removed from the data set by one of the authors. Tallies were created by one of the authors for negative-relevant thoughts or counterarguments (M = 2.04, SD = 1.52).[4] Because participants coded their own thoughts, it was not possible to compute a reliability coefficient for this measure.

Results

Preliminary analyses

The data were first cleaned and screened following the recommendations established by Tabachnick and Fidell (2001). Univariate descriptive statistics were inspected for all variables to identify and correct out-of-range values. One multivariate outlier was also identified. The value of Mahalanobis distance for one case exceeded the limits established by Tabachnick and Fidell and was removed from the data set. A single confirmatory factor analysis (CFA) was conducted with two factors corresponding to the anger and attitudes measures. All factor loadings for the measures were significant, and the model fit the data adequately, $\chi^2(df = 16) = 21.10$, $p = .17$, root-mean-square error of approximation (RMSEA) = .05, standardized root-mean-square residual (SRMR) = .07.[5] Means, standard deviations, reliability coefficients, and correlations for all variables in Study 1 are reported in Table 1.

Manipulation checks were performed for the independent variables. Two 2 (threat) × 2 (argument quality) analyses of variance (ANOVAs) were conducted with threat and argument quality as the dependent variables. Participants in the threat condition felt that their freedom was significantly more threatened (M = 7.32, SD = 2.15) than those participants in the no-threat condition (M = 5.43, SD = 2.17), $F(1, 131) = 25.59$, $p < .01$, $\eta^2 = .16$. Participants perceived the strong message (M = 6.56, SD = 1.57) to be significantly more effective than the weak message (M = 4.80,

Table 1 Means, Standard Deviations, Reliability Coefficients, and Zero-Order Correlations Among all Variables in Study 1 ($N = 135$)

Variable	α	M	SD	1	2	3	4	5	6
1. Threat									
2. Argument quality				.02					
3. Interaction				.58*	.60*				
4. Anger	.81	6.95	2.11	.36*	.14	.27*			
5. Negative-relevant thoughts		2.04	1.52	.20*	.09	.23*	.17*		
6. Attitude	.73	5.01	1.34	−.14	.07	−.03	−.31*	−.07	

Note: Correlation coefficients were computed using the following values for threat, argument quality, and the interaction term: For the threat variable, the threat condition was coded 1 and the no-threat condition was coded 0. For message strength, the strong-message condition was coded as 1 and the weak message was coded 0. The interaction term represents the interaction between the threat and the argument quality variables. Higher scores on the attitude measure indicate less positive attitudes about alcohol consumption.
*$p < .05$.

$SD = 2.02$), $F(1, 131) = 31.91$, $p < .01$, $\eta^2 = .19$. Additionally, the Threat × Argument Quality interaction was not significant for perceived threat, $F(1, 131) = 0.14$, $p = .72$, $\eta^2 < .01$, nor argument quality, $F(1, 131) = 0.08$, $p = .78$, $\eta^2 < .01$. These data indicate that the threat and argument quality manipulations were effective.

Reactance and message strength

Structural equation modeling (SEM) was used to test the three models following the procedure used by Dillard and Shen (2005). LISREL 8.7 (Jöreskog & Sörbom, 2005) was used to conduct all analyses. All variables were treated as latent constructs, and attitude was corrected for measurement error by fixing the error term of the corresponding manifest variable to $1 - \alpha$ times its variance. The measurement paths for threat, argument quality, and the interaction term were set to 1.00. In the dual-process model and the linear affective–cognitive model, anger was also corrected for measurement error and the measurement path for cognition was set to 1.00.

Data analysis proceeded in two steps. The first step involved testing the intertwined, dual-process, and linear affective–cognitive models of reactance. The predicted models are displayed in Figures 1–3. Threat (with the threat condition coded as 1 and the no-threat condition coded as 0), argument quality (with the strong-message condition coded as 1 and the weak message coded 0), and the interaction term were specified as the exogenous variables in each of the models.[6] In the intertwined model, these variables were antecedent to reactance. Anger and negative cognitions served as indicators of reactance. Reactance, in turn, predicted attitudes about alcohol consumption. In the dual-process model, the exogenous variables predicted negative cognitions and anger, which in turn predicted attitudes. In the linear affective–cognitive model, the exogenous variables predicted anger which, in
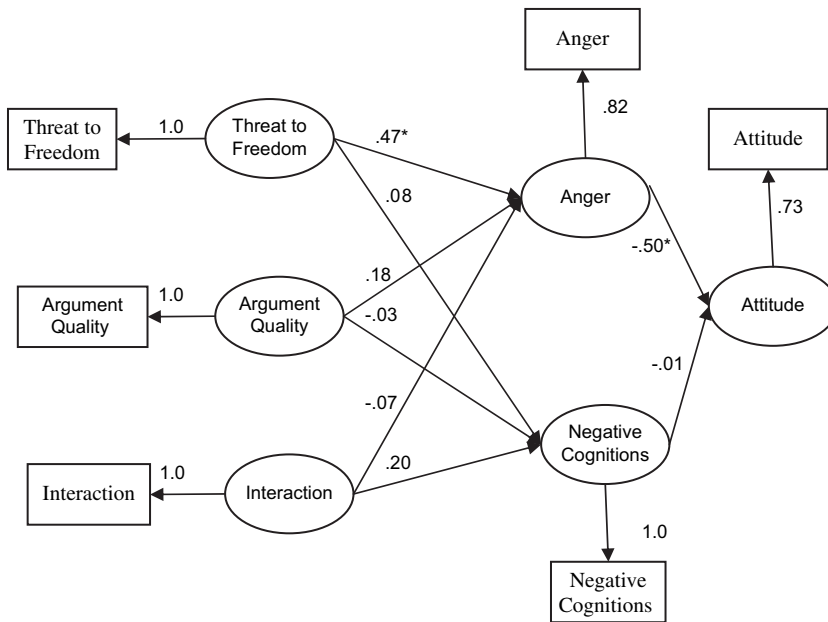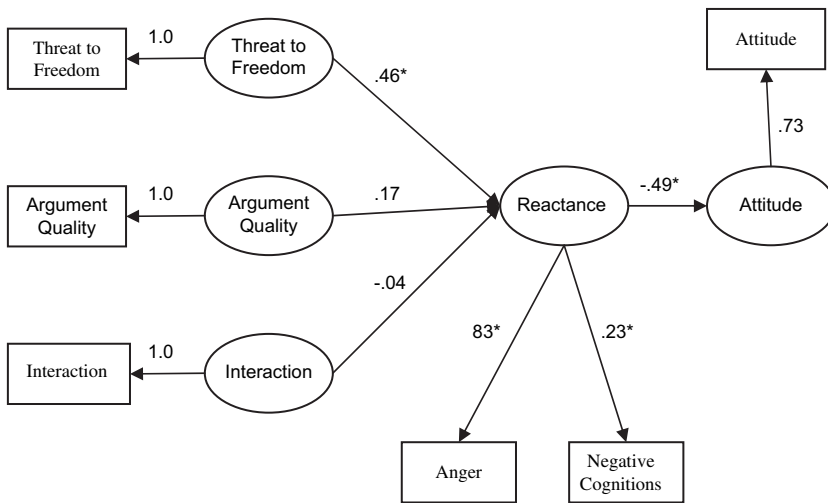
Figure 1 Dual-process model with path coefficients (Study 1).

Note: For the threat variable, the threat condition was coded 1 and the no-threat condition was coded 0. For argument quality, the strong-message condition was coded as 1 and the weak message was coded 0. Greater scores on the attitude measure indicate less positive attitudes about alcohol consumption.

*p < .05.

turn, predicted negative cognitions and, finally, attitudes. The model chi-square along with the dual criteria of Hu and Bentler (1999) (RMSEA ≤ .06, SRMR ≤ .10) was used to assess model fit. The models were compared based on the Bayesian information criterion (BIC; Raftery, 1995) coefficient for each model. The BIC makes it possible to compare the fit of nonnested models; a difference of 2 or more is evidence that the model with a smaller BIC value is a better fit for the data.

The intertwined, dual-process, and linear affective–cognitive models, with path coefficients, are displayed in Figures 1–3. The model chi-squares and alternate-fit indexes displayed in Table 2 indicate that the intertwined and dual-process models fit the sample data adequately. The chi-square test for both models was not significant, and the values for the RMSEA and SRMR met the criteria established by Hu and Bentler (1999). The BIC coefficients, however, indicate that the intertwined model best fit the data. The BIC value for the intertwined model was 6.81 smaller than the BIC value for the dual-process model and 6.70 smaller than the value for the affective–cognitive model. Further, the path coefficients in the intertwined model from threat to reactance and reactance to attitudes were statistically significant, as were the coefficients for the indicators negative cognitions and anger.

Figure 2 Intertwined model with path coefficients (Study 1).

Note: For the threat variable, the threat condition was coded 1 and the no-threat condition was coded 0. For argument quality, the strong-message condition was coded as 1 and the weak message was coded 0. Greater scores on the attitude measure indicate less positive attitudes about alcohol consumption.

*p < .05.
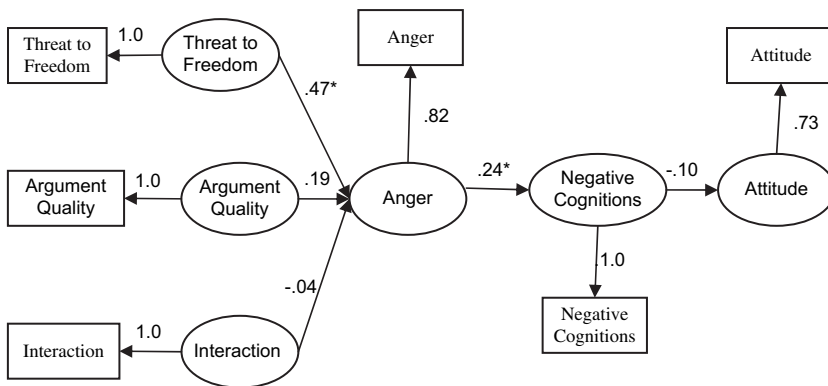
Figure 3 Linear affective-cognitive model with path coefficients (Study 1).

Note: For the threat variable, the threat condition was coded 1 and the no-threat condition was coded 0. For argument quality, the strong-message condition was coded as 1 and the weak message was coded 0. Greater scores on the attitude measure indicate less positive attitudes about alcohol consumption.

*p < .05.

Table 2 Fit Indexes and Model Comparisons for the Intertwined, Dual-Process, and Linear Affective–Cognitive Models in Study

Model	df	χ^2	p	SRMR	RMSEA	BIC
Dual-process model	4	4.16	.38	.04	.02	−15.46
Intertwined model	6	7.16	.31	.05	.04	−22.27
Linear affective–cognitive model	7	18.77	.01	.08	.11	−15.57

SRMR = standardized root-mean-square residual; RMSEA = root-mean-square error of approximation; BIC = Bayesian information criterion.

Given these results favoring the intertwined model, we conducted a formal test of reactance as a mediator of the threat–attitude relationship following the procedure established by Brown (1997) for testing mediator variables in SEM. In brief, this procedure involves three steps and is consistent with the class of methods for testing mediation known as the causal-steps approach (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002) established by Baron and Kenny (1986). The first step involves demonstrating a significant direct effect from the exogenous variable to the mediator. The second step includes showing a significant direct effect from the mediator to the endogenous variable. The final step involves demonstrating that, when controlling for the influence of the mediating variable, the direct effect from the exogenous to the endogenous variable is approximately zero.

To conduct the analysis, we retested the intertwined model including a direct path from threat to attitude. Some of the conditions for establishing mediation do appear to be present. Specifically, the path coefficients (in the model with the direct path from threat to attitudes) indicate that threat was significantly associated with reactance, β = .51, $p < .05$, and reactance was significantly associated with attitudes, $\beta = -.58$, $p < .05$. Further, when controlling for the mediating variable reactance, the direct effect from threat to attitudes was not different from zero, β = .09, $p > .05$. However, the zero-order correlation between threat and attitude is not statistically significant, $r = -.14$, $p = .10$. It is implied in the three steps that the exogenous and endogenous factors are significantly correlated with one another. Thus, the results provide only limited evidence that reactance mediated the threat–attitude relationship.

The second step in the data analysis was to explore the impact of argument quality on reactance processes to test Hypothesis 1. As illustrated in Figure 2, the path coefficients from argument quality, β = .17, $p > .05$, and the interaction term, $\beta = -.04$, $p > .05$, were not significant. Argument quality and the interaction term did not affect reactance perceptions. Hypothesis 1 was not supported.

Discussion

The results of Study 1 provide some evidence that, of the three models tested, the intertwined model provides the best explanation for reactance processes. The intertwined model fit the data better than the other two models, and reactance was greater

in the threat condition and led to more favorable attitudes about alcohol consumption. Negative cognitions and anger were both significant indicators of reactance. Yet, the results of Study 1 are far from conclusive. The dual-process model also fit the sample data adequately—though negative cognitions were not significantly related to any of the three exogenous variables or attitudes. Further, the test for mediation only provided limited evidence that reactance mediated the threat–attitude relationship. Given the outcome of Study 1, we again compared the three models in the Study 2. We also explored the influence of two additional variables that are proposed to affect reactance processes: severity of consequences and the magnitude of the request. Manipulating the severity of consequences necessitated using new health topics. As such, Study 2 focused on encouraging students to enact behaviors that would result in avoiding a communicable illness.

Study 2

Method

Participants
One hundred and twenty-seven undergraduate students at a large university in the southwestern United States participated in Study 2. Participants were more likely to be female ($n = 82$), and the average age of participants was 20.32 years ($SD = 2.93$). A majority of participants self-identified their ethic background as Caucasian ($n = 102$).

Design
A 2 (severity of consequences) $\times$ 2 (magnitude of request) between-participants design was used in this study. The independent variables consisted of the severity of consequences (bacterial meningitis/strep throat) and the magnitude of the request for behavior (small/large). It should be noted that participants' freedom was threatened in all conditions. Given that reactance was conceptualized in this manuscript and previous work (Dillard & Shen, 2005) as the cognitive and affective responses resulting from a threat to freedom, it was imperative to include a specific threat to participants' freedom in each condition. The degree of threat perceived by participants was measured and included in the three models as an exogenous variable. Including perceived threat in the models is consistent with our theorizing about reactance; the amount of threat perceived by participants should have a direct influence on reactance, independent of the manipulated severity of consequences and magnitude of threat variables. Including perceived threat is also essential to test the threat–reactance–attitude relationship.

Procedure and materials
Participants were randomly assigned to read one of four messages corresponding to the 2 $\times$ 2 design. In each condition, participants read a message about a health

condition and a proposed illness prevention program sponsored by the university. The messages followed the same format as in the research of Dillard and Shen (2005) and highlighted the potential consequences of the illness and then included a forceful, freedom-limiting request. Participants were informed that they were required to enroll in an illness prevention program named, "The Healthy Campus Initiative." In all conditions, the message stated: "You have no choice—taking these actions and participating in the Healthy Campus Initiative is something that you simply MUST do."

Bacterial meningitis and strep throat were the two health conditions in the severity manipulation. These two conditions were selected because they share key characteristics; both are particularly relevant to college students, both spread through close contact with others, and neither illness is stigmatized. Yet, bacterial meningitis is substantially more severe than strep throat. Participants were informed that strep throat is a mild condition with few complications; the serious consequences of bacterial meningitis—including seizures, permanent brain damage, and death—were articulated. The five behaviors required in the Healthy Campus campaign were varied to manipulate the magnitude of request. The small request consisted of activities such as: reporting any unclean or unsanitary conditions around campus to the campus cleaning team, wiping down with antibacterial cleaning product any public computer keyboard and/or mouse used at the library (cleaning supplies will be provided by the university), and seeing one's family doctor or scheduling a visit to the campus health center at the first sign of illness. The large request included the following sample activities: wiping down with antibacterial cleaning product any desk at which one sits in university classrooms or the library (cleaning supplies will not be provided by the university), participating in an 8-hour campus-wide cleaning program one Saturday per academic semester, and donating $250 per academic semester to the university for a professional sanitization company to thoroughly clean and sanitize the university.

Measures

Unless otherwise noted, all measures were rated on a 5-point Likert-type scale; larger scores for each measure indicate a greater amount of the variable. Perceived threat was assessed with three items. Participants rated the degree to which the message threatened their freedom to choose, tried to make a decision for them, and tried to pressure them. Anger was measured with the four items: angry, irritated, annoyed, and frustrated. Attitude was assessed with seven items indicating the degree to which participants felt that participating in the Healthy Campus campaign was, for example, beneficial and desirable. Behavioral intention was measured with four items assessing participants' likelihood of performing at least some of the behaviors in the Healthy Campus campaign. Each of the four items was rated on a 10-point scale, with larger values indicating that participants were more likely to participate in the campaign. Manipulation checks were also included to assess perceptions of the severity of consequences and the magnitude of the request. Participants rated six

items to assess severity (α = .92). Sample items include: bacterial meningitis [strep throat] is a serious condition, and people with bacterial meningitis [strep throat] should be concerned for their life. The magnitude of the request was measured with seven items (α = .93). Sample items include: The Healthy Campus Initiative requires too much work, and the Healthy Campus Initiative asks too much of students.

A thought-listing procedure was used to measure cognitions. Participants were asked to list all the thoughts they had after hearing the threat manipulation. Given that data were collected on the World Wide Web, it was not possible for participants to code their own thoughts. Two trained coders followed the four-step procedure used by Dillard and Shen (2005) to code participants' thoughts. In all cases, intercoder reliabilities were assessed by examining the intercoder agreement with 15% of the cognitions. Once agreement was ensured, the coders coded thoughts independently. All disagreements were resolved via discussion. Responses were first segmented into thought units. Agreement among the coders was 93%. Then, thoughts indicating affect were identified and removed from the data set. Coders relied on a list of feeling terms compiled by Shaver et al. (1987); a unit was coded as affective whenever those terms appeared (κ = .95). The remaining thoughts were coded as relevant or irrelevant to the message and issue (κ = .90). Finally, thoughts were coded as positive, negative, and neutral (κ = .90). A tally was created for negative-relevant thoughts (M = 1.56, SD = 1.95).

Results

Preliminary analyses

Data were screened following the recommendations of Tabachnick and Fidell (2001). A single CFA was conducted with four factors corresponding to the measures of anger, attitudes, behavioral intentions, and perceived threat. All factor loadings for the measures were significant, and, although the model chi-square was significant, the alternate-fit indexes suggest that the model fits the data adequately, $\chi^2(df = 125)$ = 180.30, p = .001, RMSEA = .06, SRMR = .06. Means, standard deviations, reliability coefficients, and correlations for all variables in this study are reported in Table 3. Manipulation checks were also performed for the independent variables. Two 2 (severity of consequences) $\times$ 2 (magnitude of request) ANOVAs were conducted with perceived severity and perceived magnitude of request as dependent variables. Participants felt that meningitis (M = 4.29, SD = .64) had significantly more severe health consequences than strep throat (M = 2.78, SD = .78), $F(1, 123)$ = 142.69, $p <$ .01, η^2 = .53. Participants perceived the large request (M = 3.99, SD = .76) to require significantly more of them than the small request (M = 2.60, SD = .78), $F(1, 123)$ = 103.36, $p <$ .01, η^2 = .45. Additionally, the Severity $\times$ Magnitude interaction was not significant for perceived severity, $F(1, 123)$ = 0.46, p = .50, $\eta^2 <$ .01, nor perceived magnitude of the request, $F(1, 123)$ = 0.40, p = .53, $\eta^2 <$ .01. These data, then, indicate that the experimental manipulations were effective.

Table 3 Means, Standard Deviations, Reliability Coefficients, and Zero-Order Correlations Among all Variables in Study 2 (*N* = 127)

Variable	α	*M*	*SD*	1	2	3	4	5	6	7	8
1. Severity of consequences											
2. Magnitude of request				.01							
3. Interaction				−.58*	.58*						
4. Negative-relevant thoughts	.91	1.56	1.95	.03	.51*	.24*					
5. Anger	.80	2.24	1.14	.00	.44*	.20*	.56*				
6. Attitude	.89	3.46	0.76	.11	−.45*	−.32*	−.53*	−.61*			
7. Behavioral intention	.87	6.04	2.32	.02	−.37*	−.15	−.39*	−.44*	.48*		
8. Perceived threat	.79	3.87	1.59	−.05	.25*	.14	.19*	.37*	−.29*	−.18*	

Note: Correlation coefficients were computed using the following values for severity, magnitude, and the interaction term: For the severity variable, the high severity was coded 1 and the low-severity condition was coded 0. For magnitude of request, the large-request condition was coded as 1 and the small request was coded 0. The interaction variable was coded such that 1 represents the large-request/low-severity condition and 0 represents the other three Request × Severity conditions.
*$p < .05$.

Reactance, magnitude of request, and severity of consequences

SEM was used to test Hypotheses 2–4. LISREL 8.7 was used to conduct the analysis, and all variables were treated as latent constructs. Perceived threat, attitude, and behavioral intentions were corrected for measurement error by fixing the error terms of the corresponding manifest variables to 1 − α times their variance. In the dual-process and linear affective–cognitive models, the measurement paths for anger and cognitions were also corrected for measurement error. The measurement paths for the severity of the health condition, magnitude of the request, and the interaction term were set to 1.00 in both models. Again, the BIC value was used to compare the three models, and the model chi-square, SRMR, and RMSEA (Hu & Bentler, 1999) were used to assess model fit.

As in Study 1, the analyses were conducted in two phases. In the first, the relative fit of the three models was evaluated. For each model, the severity of consequences (with the more severe condition coded as 1 and the less severe condition coded 0) and magnitude of the request (with the large request coded as 1 and the small request coded 0) were specified as the exogenous variables. The interaction term was also specified as an exogenous variable and coded to reflect the specific interaction predicted in Hypothesis 4; the large-request/low severity condition was coded 1 and the remaining three conditions were coded 0.

The three models assessed in Study 2, including path coefficients, are displayed in Figures 4–6. The fit statistics for each of the three models displayed in Table 4 indicate that the intertwined model provided the best fit for the data. The BIC value
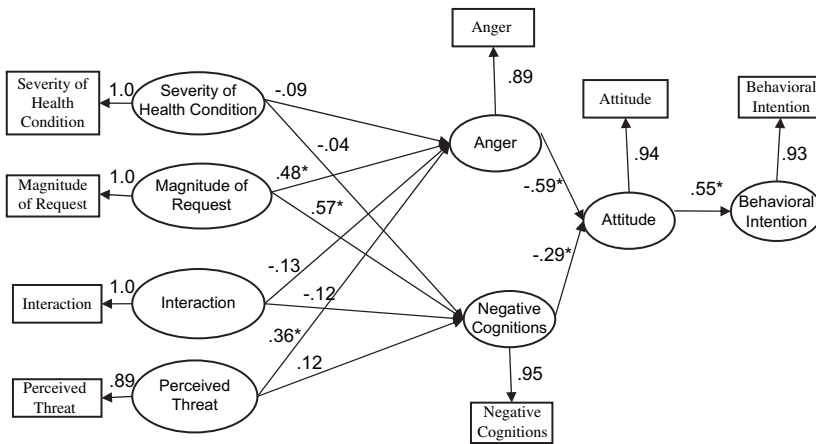
Figure 4 Dual-process model with path coefficients (Study 2).

Note: For the severity variable, the meningitis condition was coded 1 and the strep-throat condition was coded 0. For magnitude of request, the large-request condition was coded as 1 and the small request was coded 0. The interaction variable was coded such that 1 represents the large-request/low-severity condition and 0 represents the other three Request × Severity conditions.
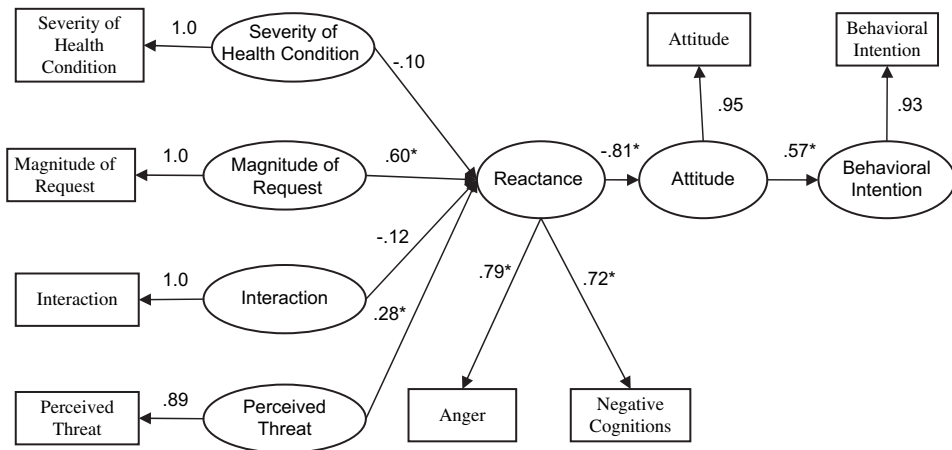

Figure 5 Intertwined model with path coefficients (Study 2).

Note: For the severity variable, the meningitis condition was coded 1 and the strep-throat condition was coded 0. For magnitude of request, the large-request condition was coded as 1 and the small request was coded 0. The interaction variable was coded such that 1 represents the large-request/low-severity condition and 0 represents the other three Request × Severity conditions.
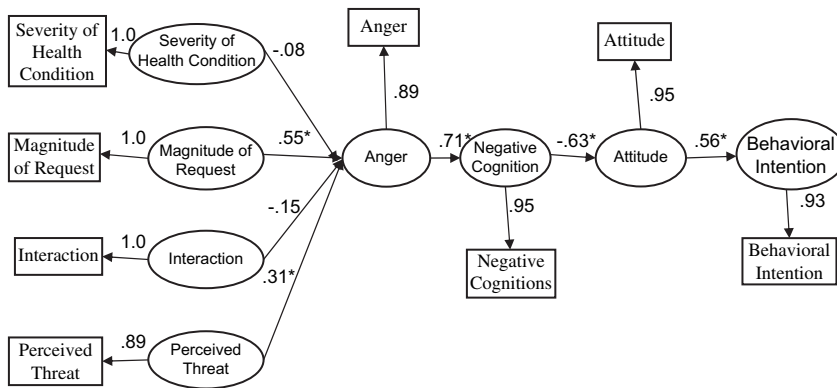
*$p < .05$.

Figure 6 Linear affective–cognitive model with path coefficients (Study 2).

Note: For the severity variable, the meningitis condition was coded 1 and the strep-throat condition was coded 0. For magnitude of request, the large-request condition was coded as 1 and the small request was coded 0. The interaction variable was coded such that 1 represents the large-request/low-severity condition and 0 represents the other three Request × Severity conditions.

$*p < .05$.

for the intertwined model was 30.85 smaller than the BIC value for the dual-process model and 23.78 smaller than the value for the linear affective–cognitive model. The intertwined model fits the data acceptably, $\chi^2(df = 14) = 20.61$, $p = .11$, RMSEA = .06, SRMR = .04. Additionally, the path coefficients from perceived threat to reactance, reactance to attitudes, and attitudes to behavioral intention were statistically significant. The coefficients for negative cognitions and anger, as indicators of reactance, were statistically significant.

As in Study 1, we again conducted a test of reactance as a mediator of the perceived threat–attitude relationship following the procedure established by Brown (1997). We retested the intertwined model including a direct path from perceived threat to attitude. It should be noted that the zero-order correlation between perceived threat and attitude was statistically significant, $r = -.29$, $p < .01$. In regard to

Table 4 Fit Indexes and Model Comparisons for the Intertwined, Dual-Process, and Linear Affective–Cognitive Models in Study 2

Model	df	χ^2	p	SRMR	RMSEA	BIC
Dual-process model	11	36.93	<.01	.08	.14	−16.36
Intertwined model	14	20.61*	.11	.04	.06	−47.21
Linear affective–cognitive model	15	49.23	<.01	.10	.14	−23.43

SRMR = standardized root-mean-square residual; RMSEA = root-mean-square error of approximation; BIC = Bayesian information criterion.

the three steps for testing mediation, the path coefficients for the model including the direct path from perceived threat to attitudes indicate that threat was significantly associated with reactance, $\beta = .28$, p < .05, and reactance was significantly associated with attitudes, $\beta = -.81$, p < .05. Further, when controlling for the mediating variable reactance, the direct effect from threat to attitudes was approximately zero, $\beta = .01$, $p > .05$. These results indicate that reactance completely mediated the relationship between threat and attitudes.

The second step in the analysis involved examining the influence of the magnitude of the request, severity of the consequences, and interaction between the two variables on reactance processes to test Hypotheses 2–4. As illustrated in Figure 5, the path coefficient from magnitude of request to reactance was statistically significant, $\beta = .60$, $p < .05$. However, the path coefficients from severity of consequences, $\beta = -.10$, $p > .05$, and the interaction term, $\beta = -.12$, $p > .05$, to reactance were not significant. In summary, the results support Hypothesis 3 and indicate that a large magnitude request causes more reactance than a request of small magnitude. The severity of consequences did not affect reactance, and the interaction between magnitude and severity on reactance was not significant. Hypotheses 2 and 4 were not supported.

Discussion

The results of Study 2 offer some support in favor of the intertwined model. The BIC value for the intertwined model was substantially smaller than the value for the other two models. Further, the chi-square test of model fit was statistically significant for the dual-process and affective–cognitive models, but not for the intertwined model—indicating that the intertwined model was the only model to achieve a close fit of the data. Finally, only the intertwined model met the alternate-fit criterion established by Hu and Bentler (1999).

In regard to Hypotheses 2–4, the path coefficient from the magnitude of the request to reactance was significant. Reactance was exacerbated when the request was large but mitigated when the request was small. The severity of the consequences and the interaction between magnitude and severity did not influence reactance processes. The results of Studies 1 and 2 as well as the practical and theoretical implications of these findings are considered in the following section.

General discussion

Dillard and Shen (2005) wrote with regard to their data, "Additional tests would strengthen our certainty about the generalizability of the results" (p. 160). One purpose of our two experiments was to provide such tests. We argued for the importance of fully understanding the cognitive and affective process of reactance and, as such, desired to provide additional tests of the two cognitive–affective models (i.e., the dual-process model and the intertwined model) that Dillard and Shen proposed. Moreover, we argued for an additional possible reactance model, a linear

model proposing that affect leads to cognition. Therefore, the studies reported here were aimed at examining the generalizability of the intertwined-process model (as compared to other models) as well as factors that might exacerbate or dissipate reactance. We questioned whether there are conditions under which people will not react negatively, even in the face of a freedom-limiting message. In particular, we predicted that argument quality, severity of the consequences associated with the message topic, and magnitude of the request made in the message would influence reactance processes. The data reported here were partially consistent with hypotheses.

These data provide some evidence that, of the models tested, the intertwined model best explained the relationship between cognition and affect in reactance processes. The intertwined model is unique from the other two models in that affect and cognition are modeled as indicators of reactance. Consistent with the findings of Dillard and Shen (2005), the intertwined model best fit the data in both Study 1 and Study 2. Further, it is noteworthy that reactance was assessed among two different health topics. In contrast with promoting the reduction or cessation of a behavior in which a number of participants engaged in Study 1, Study 2 focused on encouraging students to enact behaviors that would result in avoiding an illness. As such, the consistent findings in support of the intertwined model offer at least some evidence of its external validity.

Of the three factors with the potential to influence reactance processes, only magnitude of request had an impact on the intertwined model. Reactance was exacerbated when the request was large but reduced when the request was small. One explanation for this result is that a large magnitude request imposes greater limitations on one's time, energy, or finances. A small request, on the other hand, is less likely to be perceived as an imposition on receivers. Thus, reactance may be reduced when the size of the request is relatively small.

Although we posited that a strong argument could mitigate counterarguing, these data reveal that argument quality has no significant influence on reactance. When freedom was limited, participants became angry and generated negative cognitions regardless of the quality of the message. Although it is possible that this finding is related to a lack of construct validity or that the quality of the arguments was not even considered by participants, the manipulation check was effective suggesting that these two possibilities are unlikely. It may be that participants engaged in some form of heuristic processing: Once they perceived a threat to their freedom, the actual arguments supporting the threat may be unimportant.

Notably, the severity of the consequences did not influence reactance. We expected that participants would recognize that the source of the message had their best interests in mind (i.e., protecting them from a potentially life-threatening illness) and that such thoughts would lower anger and negative cognitions. Yet, that was not the case. A few explanations could account for this outcome. It may simply be that, as noted by Brehm (1966) and Burgoon, Alvaro, et al. (2002), any message aimed at attitude change might be internalized as a threat to freedom and have the potential to induce reactance—even when the message is in the best interest of the

audience. Alternatively, the results may be an artifact of the severity manipulation. We do not have data on students' feelings toward the university, but it is possible that they did not perceive that the school had their best interest at heart and, therefore, the induction did not have the desired effect. Future examinations might vary the source to rule out this option. Additionally, although meningitis is clearly more severe than the flu, it might not be severe enough for the predicted effect to occur. Future researchers might examine reactance in contexts where people have truly heightened concern (e.g., terrorism preparedness).

The results of this research have implications for the design of persuasive health campaigns, offering insight into the cognitive and affective processes that occur when an audience's freedom is limited and reactance is induced. An obvious recommendation that can be derived from this research is to avoid limiting the freedoms of the target audience. It should be noted, however, that although the manipulations used in these two studies included very clear and direct threats to the participants' freedom, it is unclear how drastic a threat must be before receivers experience reactance. David, Cappella, and Fishbein (2006) provided the National Youth Anti-Drug Media campaign as one such example. The campaign aired public service announcements, "Responsibility, Your Anti-Drug," featuring a little girl hit by a group of stoned adolescent drivers in one ad and a little boy who drowned because of his older brother who was getting high instead of babysitting in another ad (Office of Drug Control Policy, 2006). Published data evaluating this campaign indicated that the intentions to use marijuana for the 14- to 18-year-old subgroup actually increased in the postcampaign period (Hornik et al., 2001). Additionally, in instances where limiting an audience's freedom is unavoidable (e.g., avoiding hazardous chemicals), message designers would be well served to incorporate message elements to manage the potential negative cognitions and anger aroused in the audience. One such means, drawn from the results of this study, is to try to make requests appear as small in magnitude as possible. Another potential approach for message designers is to employ tactics that increase positive feelings (e.g., enthusiasm).

The results of this study point to a few key directions for future research. These two experiments, along with the work of Dillard and Shen (2005), provide some support for the intertwined model in which anger and counterarguments are indicators of reactance. Granted this foundation, future research should be conducted to test the relative importance of counterarguing and anger in reactance processes. In Study 1, anger had a much stronger relationship with the latent variable reactance than did negative-relevant thoughts. Yet, in Study 2 and in the two studies of Dillard and Shen, the loadings for these two factors were similar. It would be worthwhile for future research to explore the conditions, if any, under which each of these two factors may be more or less dominant in reactance responses. A key step in this process would be to apply different approaches for measuring anger and negative cognitions. Scholars could assess an individual's anger and negative cognitions at multiple time-points during a study to see how these two components of reactance

are associated over time. This would also provide scholars with insights into the dynamic nature of reactance processes.

Further, focused examinations should be conducted exploring the role of conterarguing in greater detail. Although it is clear that people who experience reactance may counterargue, the quality of, types of, and confidence in those counterarguments are unclear. Regarding the quality and type of counterarguments, Cameron, Jacks, and O'Brien (2002) examined five unique kinds of negative-relevant thoughts used to resist being persuaded (note their different definition of the term counterarguing): counterarguing (direct rebuttal of message arguments), attitude bolstering (support arguing), source derogation (insulting the source, dismissing his or her expertise or trustworthiness, or otherwise rejecting his or her validity as a source of information), negative affect (getting angry, irritated, or otherwise upset), and assertions of confidence (explicitly asserting that nothing or no one could ever change one's opinion). In the present study, negative affect was specifically coded for and included in the model; however, we do not know the frequency of the other types of thoughts. This is critical, given that the data of Cameron et al. (2002) revealed that counterarguing and ratings of negative affect were effective in conferring resistance to attitude change and the other types of strategies were less effective at making people resistant to future change (also see Jacks & Cameron, 2003). Silvia (2006), in his two experiments on reactance, did examine types of strategies employed and found that when receivers had freedom threatened at the beginning of the message (but not at the end), counterarguing and source derogations increased. Given that source derogations are less effective at conferring longer term resistance, scholars should examine the moderating variables impacting the kinds of counterarguments individuals produce. The underlying message is that future studies must code the content of the negative-relevant thoughts instead of only counting them.

The confidence participants have in their thoughts will also impact their resistance to change. In fact, Tormala and Petty (2002, 2004) found that if people perceive a message to be high quality and they are aware that they are being resistant (i.e., being metacognitive), use of resistance strategies will be positively correlated with attitude confidence. Yet, if participants perceive the message to be low quality, this relationship disappears. People who are more confident in their negative thoughts are more resistant to change. Moreover, Tormala and Petty (2004) proposed that counterarguing is unique from other forms of resistance in that it is an active strategy that involves careful consideration of the evidence; therefore, individuals must be able and motivated to counterargue. Hence, it is likely that other strategies (e.g., source derogations) would be employed if motivation and ability were low. Understanding the types of resistance strategies people make use of will help campaign designers plan more effective messages in that they can employ arguments that directly address the specific kinds of thoughts raised by audience members. For example, if we know that in certain conditions people are likely to employ source derogations, message designers can take extra caution with the source they use.

As with most research, this study is not without limitations. One limitation worth noting is that the threat manipulation was separated from the message strength manipulation in Study 1; participants received the threat manipulation prior to reading the alcohol information pamphlet containing the argument strength manipulation. However, the topic addressed in the threat and argument strength manipulations was the same. Further, this procedure made it possible to examine the influence of argument strength once participants' freedom had been threatened (and, presumably, reactance was induced). A second limitation is that undergraduate students served as participants in both studies. Because students were from universities in the United States, the notion of personal freedom and autonomy may be especially salient. Future research should examine reactance processes among other cultures—especially those who may be less sensitive to personal autonomy. Although the use of undergraduate students may hinder the generalizability of the individual studies, it was necessary to make it feasible to conduct separate experimental investigations involving over 250 participants. The nature of the topics addressed in each study also was highly relevant to undergraduate students.

The claim of Burgoon, Alvaro, et al. (2002, p. 215) that "People do not appreciate being told how to behave" is echoed in the outcome of this investigation. The two experiments reported here leave unchallenged the notion that messages that limit freedom are ineffective. However, the results of this study offer some support for the intertwined model as the best-fitting model of reactance processes and, thus, provide insights into the cognitive and affective responses that lead individuals to reject freedom-limiting messages. Through the continued efforts of scholars of social influence, it will be possible to fully understand the implications of psychological reactance in persuasive health communication.

Acknowledgment

Notes

1   Eagly and Chaiken (1993) assert that "researchers who have used reactance theory to generate predictions or to explain obtained persuasion findings have rarely included measures that may provide evidence of subjects' cognitive processing (e.g., though-listing, recall)" (p. 571).
2   The results of Dillard and Shen (2005) showed that reactance is not comprised of a single process; that is, reactance is both affect and cognition. As such, we only explore those models that conceptualize reactance as both affect and cognition.
3   It should be noted that attitudes toward alcohol were assessed, and not attitudes toward an alcohol ban. This was done because we felt that attitudes toward alcohol would be more variable (i.e., less susceptible to a ceiling effect) than a measure of attitudes toward a ban on alcohol.

4   We attempted to code for thoughts that explicitly addressed participants' freedom but only found five such thoughts across both data sets. However, we feel that this is not an indication that people do not have freedom-related thoughts. Rather, we think that thoughts related to freedom are implicit in other negative-relevant cognitions about the message and source. Such thoughts took the form of implicitly recognizing that one's freedom was threatened and registering disapproval of the freedom-threatening message, such as: "Wiping down a desk before sitting down would be a hassle," "Hell no I'm not paying 250 bucks so somebody can come clean," and "I thought the requirement of participation is ridiculous."

5   The CFAs conducted for the two studies reported in this manuscript were evaluated by assessing the factor loadings, model chi-square statistic, and the dual criteria established by Hu and Bentler (1999) regarding fit indexes: $RMSEA \leq .06$ and $SRMR \leq .10$.

6   Although perceived threat to freedom is implied in our discussion of reactance processes as a mediator between the threat induction and the reactance, we did not include it in testing the models for Study 1. Including perceived threat would have made it impossible to test the interaction term; it is not possible to interpret the results of an interaction between an exogenous and an endogenous variable. We do, however, assess the role of perceived threat in Study 2.

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