

## ORIGINAL ARTICLE

**The Nature of Psychological Reactance  
Revisited: A Meta-Analytic Review**

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*Psychological reactance (Brehm, 1966; Brehm & Brehm, 1981) has been a long-standing topic of interest among scholars studying the design and effects of persuasive messages and campaigns. Yet, until recently, reactance was considered to be a motivational state that could not be measured. Dillard and Shen (2005) argued that reactance can be conceptualized as cognition and affect and made amenable to direct measurement. This article revisits Dillard and Shen's (2005) questions about the nature of psychological reactance and reports a test designed to identify the best fitting model of reactance. A meta-analytic review of reactance research was conducted (K = 20, N = 4,942) and the results were used to test path models representing competing conceptualizations of reactance. The results offer evidence that the intertwined model—in which reactance is modeled as a latent factor with anger and counterarguments serving as indicators—best fit the data.*

doi:10.1111/j.1468-2958.2012.01443.x

Psychological reactance theory (Brehm, 1966; Brehm & Brehm, 1981) has a rich history in research on persuasive communication (for a review, see Burgoon, Alvaro, Grandpre, & Voloudakis, 2002). Distinct from constructs and theories designed to explain and predict successful influence attempts, psychological reactance is often invoked as a reason that a persuasive message or campaign was unsuccessful (Hornik, Jacobsohn, Orwin, Piesse, & Kalton, 2008; Ringold, 2002). In essence, a message inadvertently threatens the freedom of a target audience and creates psychological reactance, which in turn motivates the audience to restore their freedom through means such as derogating the source (Smith, 1977), adopting a position that is the opposite of what is advocated in the message (Worchel & Brehm, 1970), or perceiving the object or behavior associated with the threatened freedom to be more attractive (Hammock & Brehm, 1966). Until recently, psychological reactance has been considered an intervening variable that could not be directly measured and only inferred based on responses to a freedom threat (Brehm & Brehm, 1981).

Dillard and Shen (2005) argued that, to advance our understanding of the role of reactance in persuasive messages and campaigns, this construct must be conceptualized more concretely and made amendable to direct measurement. They forwarded and tested four possible conceptualizations of reactance as cognition and/or affect.

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The results of their two experiments provided support for the intertwined model of reactance in which reactance is conceptualized as consisting of anger and counter-arguments “intertwined to such a degree that their effects on persuasion cannot be disentangled” (Dillard & Shen, 2005, p. 147).

Since the time of Dillard and Shen’s (2005) research, several studies have been conducted and shown evidence generally consistent with the intertwined model (e.g., Quick, 2012, Quick & Kim, 2009; Quick & Stephenson, 2007, 2008; Rains & Turner, 2007). Yet few attempts have been made to evaluate the intertwined model relative to the other three conceptualizations of reactance offered by Dillard and Shen (2005) or conceptualizations offered by other scholars (Rains & Turner, 2007). The dearth of studies is particularly noteworthy given concerns raised about the few experiments that have tested competing conceptualizations of reactance (Kim & Levine, 2008a, 2008b, 2008c).

The purpose of this project is to revisit the question that motivated Dillard and Shen’s (2005) original research and reconsider how researchers should conceptualize psychological reactance. To this end, a meta-analytic review of reactance research was conducted and the results were used to construct path models testing alternate conceptualizations of reactance. Using meta-analytic data to test competing reactance models makes it possible to conduct a rigorous evaluation and determine the best fitting model representing psychological reactance. Through better understanding of the nature of reactance, it will be possible to advance scholarship on its role in persuasive messages and campaigns. In the following sections, research on reactance and persuasive communication is reviewed focusing specifically on recent efforts to reconceptualize psychological reactance.

## Literature review

### Early conceptualization of reactance

Psychological reactance theory (Brehm, 1966; Brehm & Brehm, 1981) explains how individuals respond when a freedom has been threatened or lost. Reactance is defined as a “motivational state directed toward the reestablishment of [a] threatened or eliminated freedom” (Brehm, 1966, p. 15). The theory outlines the nature of freedom, ways in which freedom may be threatened, and possible outcomes of reactance. Notably, reactance is conceptualized as an “intervening, hypothetical variable” that “cannot be measured directly” (Brehm & Brehm, 1981, p. 37). Outcomes such as source derogation (Smith, 1977), adopting a position or behavior opposite from the position or behavior advocated (Worchel & Brehm, 1970), or perceiving the behavior or object associated with the threatened freedom to be more attractive (Hammock & Brehm, 1966) are used to infer the existence of reactance.

Dillard and Shen (2005) took issue with Brehm and Brehm’s (1981) conceptualization of reactance as a motivational state that cannot be measured. They argued that the “primary limiting factor in the application of reactance theory to persuasive campaigns is the ephemeral nature of its central, explanatory construct” (p. 14). To

advance research on psychological reactance theory and better understand its role in the failure of persuasive messages, conceptualizing and operationalizing reactance in more concrete terms is critical. Dillard and Shen (2005) further contend that advances made in research on persuasive communication since Brehm's (1966) initial work on the theory warrant reconsidering the nature of reactance using contemporary constructs that are amenable to direct measurement.

### **Reactance as cognition and/or affect**

To address the issue of how reactance should be conceptualized, Dillard and Shen (2005) advanced the claim that reactance might be considered cognition and/or affect. Drawing from the cognitive response approach to persuasion (Petty, Ostrom, & Brock, 1981), they argued that reactance might be, in part or whole, counterarguing. The cognitive response approach assumes that the impact of a message on attitudes is mediated by cognition. In hearing or reading a persuasive message, individuals generate cognitions that can be in agreement or disagreement with the message. Dillard and Shen (2005) contend that it is plausible that individuals respond to freedom-threatening messages with unfavorable cognitions about the message (i.e., counterarguments). Other scholars have posited a link between reactance and counterarguing. Silvia (2006), for example, raised the possibility that message rejection in response to a freedom threat might be caused by unfavorable cognitions resulting from reactance. Conceptualizing reactance as counterarguing is also notable because it makes it possible to operationalize and measure reactance using thought-listing procedures (Cacioppo & Petty, 1981).

A second possibility advanced by Dillard and Shen (2005) is that reactance might be conceptualized as negative affect in the form of anger. Such a conceptualization is consistent with descriptions of reactance as "hostility" (Berkowitz, 1973, p. 311) and "a negative emotional state" (Eagly & Chaiken, 1993, p. 571). Having one's freedom threatened is similar in form to some of the causes ascribed to anger. Nabi (1999, 2002), for example, describes anger as occurring when one's goal attainment is impeded. Lazarus (1991) contends that anger results from a demeaning offense to one's ego identity (e.g., one's entitlement to enact a freedom). The action tendency associated with anger is also commensurate with some of the responses to reactance outlined by Brehm and Brehm (1981). Anger motivates behaviors such as attacking and rejecting (Dillard & Peck, 2001).

Working from the notion that reactance might be considered anger and/or counterarguments, Dillard and Shen (2005) proposed models representing distinct conceptualizations of reactance. The first two models presented reactance as being commensurate with either anger (i.e., single-process affective model) or counterarguing (i.e., single-process cognitive model). The final two models recognized the possibility that reactance might be both cognition and affect. Reactance is conceptualized in the dual-process model as counterarguing and anger serving separate and unique functions. In the intertwined model, reactance is conceptualized as an amalgam of anger and counterarguing. In addition to the four conceptualizations

proposed by Dillard and Shen (2005), Rains and Turner (2007) offered a fifth possible model representing a unique conceptualization of reactance as cognition and affect. Drawing from Zajonc's (1980, 1984) work, as well as research in cognitive science (LeDoux, 2000), they argued that anger might precede counterarguing in reactance. In the linear affective-cognitive model, reactance is conceptualized as a process in which anger is a proximal antecedent to counterarguing.

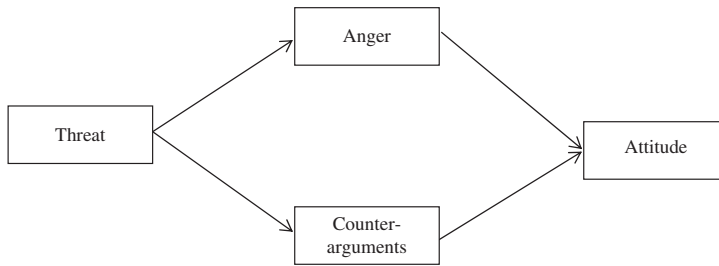
Dillard and Shen (2005) conducted two experiments comparing the two single-process, dual-process, and intertwined models and found support for the intertwined model. Freedom threat was manipulated and the four conceptualizations of reactance were modeled as mediating the relationship between freedom threat (as well as trait reactance and the interaction between freedom threat and trait reactance) and attitudes. Of the four models, the intertwined model best fit the sample data from both experiments. Rains and Turner (2007) tested the models proposed by Dillard and Shen (2005) along with the linear affective-cognitive model. As in Dillard and Shen's (2005) experiments, the intertwined model best fit the sample data. Beyond Rains and Turner's (2007) research, several studies have been conducted by Quick and colleagues that generally support the intertwined model (Quick, 2012; Quick & Considine, 2008; Quick & Kim, 2009; Quick & Stephenson, 2007, 2008).

### **The present study**

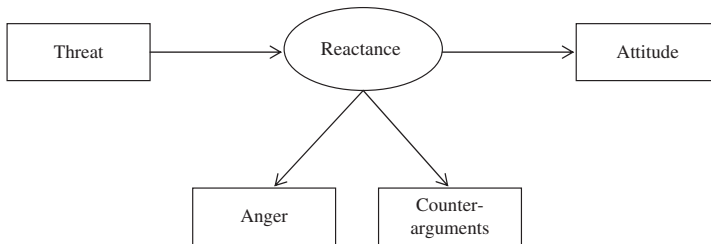
Research examining the intertwined model offers some evidence that reactance can be conceptualized and modeled as an amalgam of anger and counterarguing (Quick, 2012; Quick & Considine, 2008; Quick & Kim, 2009; Quick & Stephenson, 2007, 2008; Zhang & Sapp, 2011). Yet few attempts have been made to evaluate and compare the single-process models, dual-process model, or linear affective-cognitive model relative to the intertwined model. Although evidence consistent with the intertwined model has been reported in several studies, models representing other conceptualizations of reactance may have, if considered, outperformed the intertwined model. The studies conducted by Dillard and Shen (2005) and Rains and Turner (2007) represent the only published attempts at comparing models representing competing conceptualizations of reactance.

These two works, however, have been critiqued. Kim and Levine (2008a, 2008b, 2008c) contend that the materials used in Dillard and Shen's (2005) two experiments confound insult and/or message strength with freedom threat. Moreover, they argue that, because the zero-order correlation between counterarguments and attitudes was not significant and significantly smaller than the zero-order correlation between anger and attitudes, counterarguing was not likely responsible for the significant path from reactance to attitudes reported by Rains and Turner (2007). Kim and Levine's critiques raise questions about the only two published studies that attempted to evaluate competing reactance conceptualizations.

Being able to conceptualize and operationalize reactance in more concrete terms has a great deal of utility for advancing research on the role of psychological reactance in persuasive message campaigns. Through developing a more complete



**Figure 1** Dual-process model.



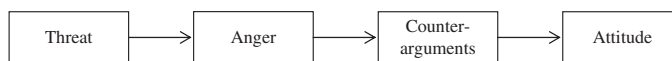
**Figure 2** Intertwined model.

understanding of what reactance is, scholars will be better situated to explain and predict its role in the failure of messages and campaigns. Accordingly, determining whether the intertwined model represents the best explanation of reactance is critical. The goal of this project is to conduct a comprehensive evaluation of the two single-process and three dual-process models. A meta-analytic review (Hedges & Olkin, 1985; Hunter, Schmidt, & Jackson, 1982) of reactance research was conducted and the results were used to test path models representing competing conceptualizations of reactance. Following the general procedures used by Dillard and Shen (2005), the five conceptualizations of reactance represented in the single-process models, dual-process model, linear affective-cognitive model, and intertwined model were modeled as mediating the relationship between freedom threat and attitude. Because reactance is a response to freedom threat and reactance has been argued and shown to influence attitudes, modeling reactance as a mediator of the relationship between freedom threat and attitude offers a means to evaluate effectively the five competing conceptualizations of reactance. The dual-process, intertwined, and linear affective-cognitive models are illustrated in Figures 1–3. The following research question serves as guide for the analyses:

RQ: What is the model of psychological reactance that best fits the data?

## Method

The procedure used to answer the research question involved two distinct steps. Six random-effects model meta-analyses (Hedges & Vevea, 1998) were conducted



**Figure 3** Linear affective-cognitive model.

to identify the sample-weighted mean correlations among freedom threat, anger, counterarguments, and attitude in reactance research. Meta-analysis is a procedure for synthesizing the results from a body of research (Hedges & Olkin, 1985; Hunter et al., 1982). As such, the results of the meta-analyses provide robust estimates of the relationships among freedom threat, anger, counterarguing, and attitude.

The results of the meta-analyses were used to test path models corresponding to the five competing models of psychological reactance. Using meta-analytic data to test the competing models makes possible a rigorous approach to determine the best-fitting model of reactance. The procedures used to conduct the meta-analyses are presented in the following paragraphs. Information regarding the tests of the path models is presented in the Results section.

#### **Literature search and inclusion criteria**

A literature search was conducted to identify published and unpublished research reports relevant to psychological reactance that were completed before 2012. Including unpublished reports is critical to help mitigate publication bias (Rothstein, Sutton, & Borenstein, 2005). Three strategies were used to locate relevant reports. First, to locate published reports, EbscoHost's *Academic Search Complete*, *Business Source Complete*, *Communication and Mass Media Complete*, *ERIC*, *Medline*, *PsycArticles*, and *PsychInfo* databases were searched. Second, to locate unpublished work, All Academic's database was searched for conference papers and ProQuest's database was reviewed to identify doctoral dissertations and master's theses. The search process for each database followed two steps: A focused search of abstracts was first conducted using the terms "psychological reactance" and "freedom threat," and a more general search was then executed using combinations of the terms "reactance," "freedom threat," "anger," and "counterargue" (e.g., "reactance and anger" and "freedom threat and counterargue"). The third strategy used to locate relevant research reports involved reviewing the approximately 100 reports that had, according to Google Scholar, cited Dillard and Shen's (2005) original work as of January 2012. More than 400 reports were identified and reviewed during the literature search.

Three criteria were established for cases to be included in the sample for this project; each case consisted of a single experiment. First, because the models tested in this project assume a causal relationship between freedom threat and reactance, all cases must have manipulated freedom threat. Freedom threat was conceptualized as a message that explicitly attempted to limit the audience's autonomy. A few published (e.g., Quick & Stephenson, 2007; Rains & Turner, 2007 [Study 2]; Shen, 2010) and unpublished (e.g., Gardner, 2010; Quick & Bates, 2010) cases met the other inclusion criteria but were excluded because freedom threat was not manipulated. Second,

given the objective of examining the affective and cognitive dimensions of reactance, all cases must have included a measure of either anger or counterarguing. Following Dillard and Shen (2005), anger was conceptualized as negative affect included in the broader anger family ranging from irritation to rage in response to a freedom-threatening message. Counterarguments were conceptualized as negative thoughts generated in response to a freedom-threatening message (and distinguished from more general message evaluations, [e.g., Jenkins & Dragojevic, 2010; Kim & Levine, 2008b]). None of the cases that predated Dillard and Shen's (2005) work included measures of anger or counterarguing (e.g., Brehm & Sensenig, 1966; Smith, 1977; Wicklund & Brehm, 1968; Worchel & Brehm, 1970). Third, cases must have included enough information to compute an effect estimate for the relationship between at least two of the following variables: freedom threat, anger, counterarguments, and attitude. In instances where cases met the first two criteria but data necessary to compute effects were missing, the requisite information was requested from the authors.

Among the cases that met the three study criteria, there were cases from at least one dissertation (Quick, 2005) and several conference papers (e.g., Dillard & Shen, 2003; Quick, 2007; Quick & Considine, 2007; Rains & Turner, 2004) that were subsequently published in peer-reviewed journals (Dillard & Shen, 2005; Quick & Considine, 2008; Quick & Stephenson, 2008; Rains & Turner, 2007). In such instances, the version of the case published in a journal was used for the analyses. In addition, there were two instances in which the same data regarding reactance (i.e., associations among freedom threat, anger, counterarguments, and attitude) were used in different projects (Kim & Levine, 2008a, 2008c and Quick, 2010; Quick & Scott, 2009; Quick, Scott, & Ledbetter, 2011). Data from the most recent report were used for the meta-analyses (Kim & Levine, 2008a; Quick et al., 2011). The final sample included 20 total cases ( $N = 4,942$ ). Ten cases were published in peer-reviewed journals, and 10 cases were retrieved from conference papers, conference proceedings, and a master's thesis. All but two of the cases included (or the authors provided) sufficient information to compute associations among at least three of the four variables included in the reactance models. Table 1 reports a complete list and description of all cases in the sample.

### **Operationalizing study variables**

#### *Freedom threat*

Freedom threat was operationalized as a manipulated variable in all the cases in the sample. With one exception, all cases in the sample included language that explicitly attempted to limit participants' autonomy (in the high freedom threat condition) as part of a broader persuasive appeal or message. The one exception was a case in which freedom threat was operationalized using a message that made participants aware of a proposed alcohol ban in their community over which they would have no input (Rains & Turner, 2007). Sample quotes illustrating the freedom threat manipulation used in each case are reported in Table 1.



**Table 1** Descriptive Information for All Cases Included in the Sample

Case	Sample Size	Sample Text from Freedom Threat Manipulation	FT (r)	Effect Estimate(s) Used in the Analyses
Dillard & Shen (2005)—Study 1	196	“As any sensible person can see, there is really no choice when it comes to flossing: You simply have to do it. In fact, the scientific evidence showing a link between gum disease and failure to floss is so overwhelming that only a fool would possible argue with it. . . . Flossing: It’s easy. Do it because you have to! Set a goal for yourself to start to floss everyday during the next week (starting today)!” (p. 152)	.31	Ft .24 An .14 Ca .11 At .22
Dillard & Shen (2005)—Study 2	200	“In fact, any reasonable person has to agree that over-consumption of alcohol is a serious campus problem that demands immediate attention. No other conclusion makes any sense. Stop the denial. There is a problem and you must be part of the solution. So if you drink, drink responsibly. Three drinks is a safe, reasonable, and responsible limit and it’s the limit that you need to stick to. Do it!” (p. 153)	.20	Ft .32 An .37 Ca .45 At -.03
Ivanov et al. (2011)	420	—	.22	Ft .20 An .20 Ca .32 At .35
Kim & Levine (2008a)	392	“Drinking should be banned at MSU and in East Lansing. . . . Support a complete ban on drinking. No students should be allowed to drink alcohol. And this must be strictly enforced” (p. 13)	.30	Ft .17 An .08 Ca .24 At .00
Kim & Levine (2008b)	274	“There are many good reasons to ban cell phones in classrooms at MSU. . . . Cell phones must be banned from classrooms and this ban must be strictly enforced” (p. 14)	.18	Ft .23 An .23 Ca — At -.08
Magid (2011)	226	“You are pouring on the pounds! Don’t drink yourself fat! Stop the denial, any reasonable person would agree: You have to stop drinking soda and other sugary beverages. You need to drink water, seltzer or low-fat milk instead. Be healthy, be safe. We’re not asking you, we’re telling you!” (p. 47)	—	Ft .11 An .24 Ca .20 At .02



**Table 1** Continued

Case	Sample Size	Sample Text from Freedom Threat Manipulation	FT (r)	Effect Estimate(s) Used in the Analyses
Martinez et al. (2009)	160	“Living proof of the benefits of safe sex” (p. 11)	.38	Ft .17 An .26 Ca — At —
Miller et al. (2007)	383	“Therefore, you really must exercise to both stay in condition, and to gain strength and vigor. Additionally, you must exercise to keep all of the systems in your body strong and in good physical shape. There are many ways for you to increase physical activity. For example, you should join in sporting activities, and you ought to start running and walking more whenever you can. . . . You really need to exercise, because doing so will help you stay happy while increasing your overall feelings of well-being” (pp. 239–240)	.22	Ft .18 An — Ca — At -.01
Quick & Conside (2008)	247	“It is impossible to deny all the evidence that an individual weightlifting exercise program leads to improvements in your mental and physical health. . . . In fact, any reasonable person absolutely has to agree that these conditions are a serious societal problem that demands your immediate attention. No other conclusion makes any sense. Stop the denial. There is a problem and you must be part of the solution. So if you are not already participating in an individual weightlifting exercise program, you must start right now. You simply have to do it” (p. 491)	.45	Ft .33 An .25 Ca — At —
Quick & Kim (2009)	344	“It is impossible to deny all the evidence that the TMX-890 is the only camera phone for you. In fact, any reasonable person absolutely has to agree that buying anything other than the TMX-890 would be a terrible mistake. No other conclusion makes sense. Stop the denial. The TMX-890 is the only camera phone for you! So if you do not already own this magnificent camera phone, you must buy it right now. You simply have to do it” (p. 778)	.12	Ft .06 An .20 Ca — At —

Table 1 Continued

Case	Sample Size	Sample Text from Freedom Threat Manipulation	FT ( <i>r</i> )	Effect Estimate(s) Used in the Analyses	
Quick & Stephenson (2008)	550	"You simply cannot deny all the evidence that overexposure to the sun leads to skin injuries, skin diseases, and in general, declining health. . . . There is a problem and you must be 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. . . . You must wear a sunscreen with a reasonable SPF level every time you are in the sun to reduce your odds of experiencing the consequences associated with sun overexposure!" (p. 475)	.54	Ft	
				An	.38
				Ca	.25 .46
				At	— —
Quick et al. (2011)	301	"Organ donation is an important issue facing a growing number of citizens living in the United States. As evidenced in the paragraph above, the organ shortage is a major societal problem facing the United States. Stop the denial! Given the need for organ donors, a responsible person would consent to be an organ donor. Becoming an organ donor is something you simply have to do" (p. 678)	.34	Ft	
				An	.07
				Ca	.14 .15
				At	-.02 .12 -.04
Rains & Turner (2007)	135	"A recent news report claims the University of Texas, in collaboration with the city of Austin, is considering a ban of alcohol on campus and in the surrounding areas. . . . 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. . . . 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" (p. 249)	.40	Ft	
				An	.36
				Ca	.20 .17
				At	.14 .31 .07
Richards & Banas (2011)—Study 1	275	Used messages from Dillard & Shen—Study 2	.09	Ft	
				An	.03
				Ca	.07 .30
Richards & Banas (2011)—Study 2	189	Used messages from Dillard & Shen—Study 2	-.03	At	
				Ft	.11 .12 .25
				An	.07
				Ca	-.08 .14
				At	.04 .13 .25

**Table 1** Continued

Case	Sample Size	Sample Text from Freedom Threat Manipulation	FT (r)	Effect Estimate(s) Used in the Analyses
Roubroeks et al. (2010)	79	"You have to set the temperature to 40°" (p. 178)	.41	Ft .28 An .36 Ca .36
Roubroeks et al. (2011)	138	"The washing machine uses a lot of energy, so you really have to set it to 40° instead of always setting it to 60°" (p. 158)	.46	At — Ft .50 An .40 Ca .61 At —
Roubroeks et al. (2009)	89	"The washing machine uses a lot of energy, so you really have to set it to 40° instead of always setting it to 60°" (p. 2)	.48	Ft — An .44 Ca .32 At —
Silvia (2006)	121	"Here are my reasons for wanting a major in advertising at UNCG. They're good reasons, so I know you completely agree with them. Because when you think about it you are really forced to agree with me because this is a universal student issue" (p. 676)	.59	Ft — An — Ca .32 At —
Zhang & Sapp (2011)	223	"You failed the mid-term exam because you were so overwhelmed with extracurricular activities that you did not have time to study. Your professor said: 'You must quit some of your extracurricular activities and focus more on your studies. You must do it!'" (p. 33)	.30	At — Ft —

*Note:* The "FT" column reports the effect estimate for the freedom threat manipulation check. The "Effect estimate(s) used in the analyses" column details the effect estimates extracted from each case and used to conduct the meta-analyses reported in Table 2. Ft = freedom threat; An = anger; Ca = counterarguments; At = attitudes. A dash ("—") indicates that information was not available or reported in the research report.

### *Anger*

Anger was operationalized using self-report measures and/or a thought-listing procedure. The four-item self-report measure originally used by Dillard and Shen (2005) was used in 14 cases (e.g., Miller, Lane, Deatricks, Young, & Potts, 2007; Quick & Stephenson, 2008; Richards & Banas, 2011; Roubroeks, Ham, & Midden, 2011; Zhang & Sapp, 2011). That measure asks participants to rate the degree to which they feel angry, irritated, annoyed, and aggravated. Closed-ended measures that were similar to Dillard and Shen's (2005) measure but contained fewer or different items (e.g., "The message made me mad"; Kim & Levine, 2008b) were used in three cases (Kim & Levine, 2008b; Rains & Turner, 2007; Roubroeks, Ham, & Midden, 2010). Both closed-ended items and a thought-listing procedure were used to assess anger in two cases (Ivanov et al., 2011; Kim & Levine, 2008c). A content analysis of the thought-listing data was conducted to isolate thoughts that reflected feelings of negative affect associated with anger (e.g., frustration and aggravation). In both cases, the results of the thought-listing and closed-ended measures were treated as equivalent; effect estimates were calculated for each measure and the mean for the two measures was computed.

### *Counterarguing*

With two exceptions (Silvia, 2006; Zhang & Sapp, 2011), all the cases in the sample that evaluated counterarguing required participants to complete a thought-listing procedure. Participants were asked to record all the thoughts they had about the freedom threatening message. The valence of thoughts was recorded as was (in many cases) the relevance of thoughts to the freedom-threatening message. Counterarguments generally were operationalized as the number of negative thoughts listed by participants in response to the freedom-threatening message. A majority of cases that assessed counterarguing limited negative cognitions to only those negative thoughts that were relevant to the freedom-threatening message (e.g., Dillard & Shen, 2005; Magid, 2011; Quick et al., 2011; Rains & Turner, 2007; Richards & Banas, 2011). A single-item self-report measure was used in one case along with three approaches to code participant thoughts as counterarguments (Ivanov et al., 2011). Effect estimates were calculated for each measure and the mean for the four measures was computed. Closed-ended measures of counterarguing were used in two cases (Silvia, 2006; Zhang & Sapp, 2011). In both cases, the items used in the counterarguing measures explicitly addressed participants' production of negative thoughts in response to the freedom-threatening message. However, the counterarguing data from Zhang and Sapp's research was excluded from the analyses because one item in their measure confounded behavioral intention with counterarguing.

### *Attitude*

Attitude was operationalized in the sample using measures that assessed participants' attitudes specifically in terms of the behavior or product addressed in the freedom-threatening message. Sample measures included, but are not limited to, attitudes toward alcohol consumption (Dillard & Shen, 2005; Kim & Levine, 2008c; Rains & Turner, 2007; Richards & Banas, 2011), tooth brushing (Dillard & Shen,

2005), exercising (Miller et al., 2007), organ donation (Quick et al., 2011), mobile phone use in college classrooms (Kim & Levine, 2008b), and sugary beverages and soda (Magid, 2011). Data from cases that included measures of attitude toward the freedom-threatening message (Martinez, Quick, & Stephenson, 2009; Zhang & Sapp, 2011), agreement with the message (Silvia, 2006), evaluations of the message source (Roubroeks et al., 2010), or perceived message persuasiveness (Quick & Considine, 2008) were excluded from the analyses. In the context of this research, one's agreement with a message or source is not commensurate with one's attitude toward a product or behavior. Measures of agreement with a source or message evaluate participants' feelings about having their freedom threatened, whereas attitude toward a product or behavior evaluates the impact of the freedom threat on one's evaluation of a behavior or product. To be consistent, only those cases that included a measure of attitude about a behavior or product were included in the analyses.

In computing effect estimates, the absolute value of the associations between attitude and other variables was used when the valence of the associations were in the predicted direction. In some instances, a freedom threat would be expected to result in more positive attitudes toward a behavior (e.g., threatening one's freedom to consume alcohol or sugary beverages), whereas there are other instances in which a freedom threat would be expected to result in more negative attitudes (e.g., threatening one's freedom to not exercise or not donate one's organs). Accordingly, the valence of the effect estimates for the associations between attitude and the other three variables were first inspected. When the valence of a given effect was in the expected direction, the effect estimate was assigned a positive value; when the valence was in the opposite direction of what would be expected, the effect estimate involving attitude was assigned a negative value.

### **Effect size extraction and computation of weighted mean effects**

Six meta-analyses were conducted to determine the weighted mean associations among freedom threat, anger, counterarguments, and attitude. Each meta-analysis followed the same two-step procedure: First, effect estimates in the form of  $r$ , which represents the zero-order Pearson correlation between a pair of variables, were extracted from research reports in the sample or computed based on means and standard deviations. The sample size associated with each effect estimate was also recorded during this step. In the instance of a dichotomous variable such as freedom threat,  $r$  reflects the difference between the high and low freedom threat conditions (with positive values indicating larger scores in the high-threat condition).

Second, the effect estimates and sample sizes were used to conduct random-effects meta-analyses (Hedges & Vevea, 1998) for each relationship among the four study variables. Fixed-effect meta-analyses revealed significant heterogeneity between cases for each of the six relationships among the four study variables. Given this heterogeneity and the broader objective of generalizing beyond cases included in the samples for each analysis, random-effects meta-analysis was deemed the most

**Table 2** Results of the Meta-Analyses Examining Associations Among the Variables Included in the Reactance Models

	1	2	3	4
1 Freedom threat (low threat = 0)				
2 Anger	$r = .23$ 95% CI [0.17, 0.29] $K = 19; N = 4,757$			
3 Counterarguments	$r = .21$ 95% CI [0.16, 0.27] $K = 17; N = 3,879$	$r = .31$ 95% CI [0.24, 0.39] $K = 14; N = 3,509$		
4 Attitude	$r = .06$ 95% CI [-0.03, 0.14] $K = 11; N = 2,991$	$r = .20$ 95% CI [0.15, 0.25] $K = 11; N = 2,927$	$r = .16$ 95% CI [0.08, 0.23] $K = 9; N = 2,151$	

Note:  $K$  = number of cases included in the analysis.  $N$  = total number of participants in the analysis. Freedom threat is a dichotomous variable in which the low threat condition was coded 0 and the high threat condition was coded 1.

**Table 3** Fit Indices and Model Comparisons for the Three Reactance Models

Model	$df$	$\chi^2$	$p$	CFI	SRMR	BIC	AIC
Dual-process model	2	17.62	<.001	0.70	0.08	6.12	32.95
Intertwined model	2	1.01	.60	>0.99	0.02	-9.83	17.00
Linear affective-cognitive model	3	10.92	.01	0.85	0.07	-5.33	24.80

Note: CFI = comparative fit index; SRMR = standardized root mean square residual; BIC = Bayesian information criterion; AIC = Akaike information criterion.

appropriate procedure for analyzing the data (Borenstein, Hedges, Higgins, & Rothstein, 2009). Random-effects meta-analysis assumes that the cases in a particular sample represent a random sample of the cases that could have been observed in the population. This approach is distinct from fixed-effect meta-analysis in that random-effects models account for the variance associated with sampling error within each case *and* differences between the effects of each case in the sample (Hedges & Vevea, 1998). The computer program Comprehensive Meta-Analysis (Borenstein, Hedges, Higgins, & Rothstein, 2006) was used to conduct the analyses. The weighted mean effect estimate, confidence interval, sample size, and number of cases included for each meta-analysis are reported in Table 2.

## Results

### Testing and evaluating the competing models of reactance

The results of the meta-analyses reported in Table 2 were used to test path models corresponding to the dual-process, intertwined, and linear affective-cognitive models

of reactance. Testing the dual-process model also makes it possible to evaluate the two single-process models; if anger or counterarguments alone are responsible for reactance, the relationships between either variable and both freedom threat and attitude should be nonsignificant. LISREL 8.8 (Jöreskog & Sörbom, 2007) was used to conduct the analyses. In the dual-process model, freedom threat was specified as an exogenous variable antecedent to both anger and counterarguments, which in turn predicted attitude. In the intertwined model, freedom threat was specified as an exogenous variable predicting reactance, which was modeled as a latent factor with anger and counterarguments serving as indicators; reactance was modeled as a casual antecedent of attitude. The linear affective-cognitive model proposed a causal chain in which freedom threat predicted anger, anger predicted counterarguments, and counterarguments predicted attitude. The three models are illustrated in Figures 1–3. In testing all three models, the sample size of 225 was used. This value represents the median sample size among all cases in the sample.

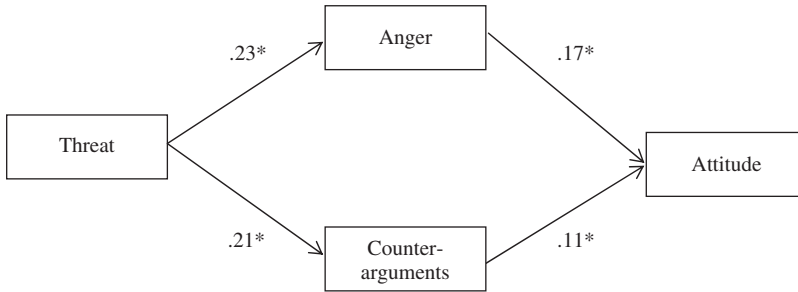
The fit of each individual model was evaluated using Hu and Bentler's (1999) dual criteria of a comparative fit index (CFI) value  $\geq 0.96$  and a standardized root mean square residual (SRMR) value  $\leq 0.10$ . Two fit indices were used to compare the dual-process, intertwined, and linear affective-cognitive models. The Bayesian information criterion (BIC; Raftery, 1995) and Akaike information criterion (AIC; Akaike, 1987) are fit indices that make it possible to compare nonnested models. Models with smaller AIC and BIC values demonstrate better fit; for the BIC, the difference between the two models should be 2 or greater.

The results of the dual-process model were first considered to make it possible to evaluate the two single-process models. The path estimates involving anger and counterarguments were significant in the dual-process model, thus invalidating the two single-process models. The model fit statistics for each of the three remaining models are reported in Table 3, and the path estimates for each respective model are reported in Figures 3–6. Although all path estimates were significant in each of the three models, only the intertwined model met the dual criteria established by Hu and Bentler (1999). Moreover, the AIC value was smallest in the intertwined model, and the BIC value for the intertwined model was 4.5 units smaller than the linear affective-cognitive model and 15.95 units smaller than the dual-process model. Taken together, the model fit indices provide consistent evidence that the intertwined model of reactance best fit the sample data.

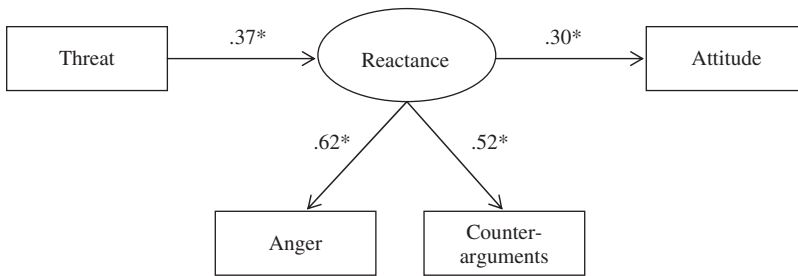
### Post hoc analyses

Two sets of post hoc analyses were conducted to further evaluate the intertwined model. First, the indirect effect between threat and attitude through reactance was examined. Although the zero-order relationship between freedom threat and attitude was not statistically significant (see Table 2), an indirect effect may nonetheless exist (Hayes, 2009). Because contemporary bootstrapping approaches for testing indirect effects (e.g., Preacher, Rucker, & Hayes, 2007) require raw data (see Hayes, 2009, p. 418), the path coefficients and standard errors from the intertwined model

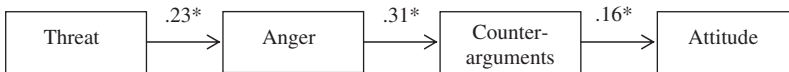




**Figure 4** Path estimates for the dual-process model.



**Figure 5** Path estimates for the intertwined model.



**Figure 6** Path estimates for the linear affective-cognitive model.

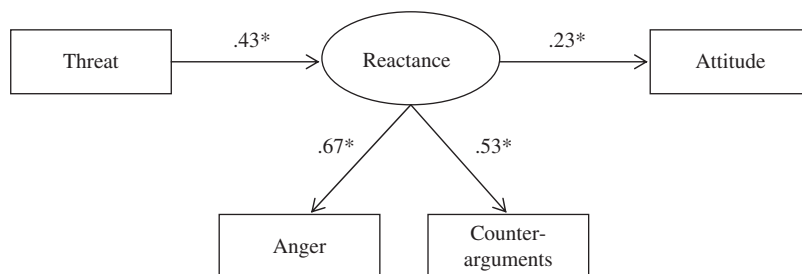
were used to conduct an asymmetric distribution of products test to evaluate the indirect effect (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002; MacKinnon, Lockwood, & Williams, 2004). The asymmetric distribution of products test is a “product of coefficients” approach for testing indirect effects (MacKinnon et al., 2002). An indirect effect is considered significant when its corresponding confidence interval does not include zero. The result of the asymmetric distribution of products test indicates that the indirect effect of threat on attitude through reactance was different from zero (0.11, 95% CI [0.03, 0.23]).

A second post hoc analysis was conducted to evaluate the intertwined model based on the strength of the freedom threat manipulations among the cases in the sample. One could reasonably expect the intertwined model to better fit when freedom threat manipulations produced greater perceptions of freedom threat among participants. Relative to a weaker threat, a stronger freedom threat should produce larger paths from threat to reactance and from reactance to attitude and, ultimately, result in better model fit. Accordingly, the intertwined model was tested using data from cases

**Table 4** Associations Among Study Variables When the Freedom Threat Manipulation Effect Estimates Were Small vs. Medium or Large

	1	2	3	4
1	Freedom threat (low threat = 0)	$r = .29$ 95% CI [0.21, 0.37] $K = 11; N = 2,446$	$r = .25$ 95% CI [0.20, 0.30] $K = 10; N = 2,016$	$r = .04$ 95% CI [-0.03, 0.11] $K = 4; N = 1,024$
2	Anger	$r = .16$ 95% CI [0.08, 0.23] $K = 7; N = 2,085$	$r = .35$ 95% CI [0.24, 0.46] $K = 8; N = 1,903$	$r = .18$ 95% CI [0.09, 0.26] $K = 4; N = 960$
3	Counterarguments	$r = .15$ 95% CI [0.03, 0.25] $K = 6; N = 1,685$	$r = .27$ 95% CI [0.16, 0.38] $K = 5; N = 1,428$	$r = .12$ 95% CI [-0.02, 0.25] $K = 4; N = 889$
4	Attitude	$r = .07$ 95% CI [-0.08, 0.21] $K = 6; N = 1,741$	$r = .21$ 95% CI [0.14, 0.29] $K = 6; N = 1,741$	

*Note:* Correlation coefficients in the bottom half of the matrix are from cases in which the effect estimate for the freedom threat manipulation was small; correlation coefficients in the top half are from cases in which the effect estimate for the freedom threat manipulation was medium or large.  $K$  = number of cases included in the analysis.  $N$  = total number of participants in the analysis. Freedom threat is a dichotomous variable in which the low threat condition was coded 0 and the high threat condition was coded 1.



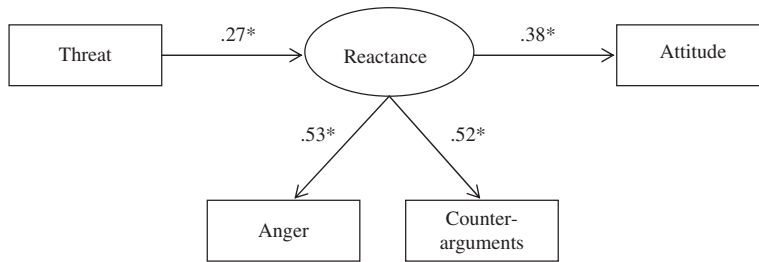
**Figure 7** Path model and estimates when the freedom threat manipulation effects were medium or large. Model summary:  $\chi^2 (df = 2) = 1.49, p = .47, CFI > 0.99, SRMR = 0.02, BIC = -9.34, AIC = 17.49$ .

in which the freedom threat manipulation produced a small effect (Cohen, 1988;  $r < .30$ ) and those that produced a medium or large effect ( $r \geq .30$ ).

The effect estimates for the freedom threat manipulation were first computed for all but one of the cases in the sample. Magid (2011) conducted a manipulation check during a pretest, but made changes to the freedom-threatening messages before the main study. Because the pretest manipulation check may not accurately estimate the strength of the manipulation used in the main study, this case was excluded from this post hoc analysis. The effect estimates associated with the freedom threat manipulation check for each case are reported in Table 1. Two groups were constructed involving the seven cases in which the freedom threat manipulation produced a small effect (range:  $r = -.03$  to  $.22$ ) and the 12 cases in which the freedom threat manipulation produced a medium or large effect (range:  $r = .30$  to  $.59$ ). Meta-analyses were conducted to estimate the associations among the four variables included in the intertwined model for cases producing a small freedom threat and cases producing a medium or large threat. The results of the meta-analyses are reported in Table 4. Associations among cases in which the threat manipulation produced a small effect are reported in the bottom half of the matrix.

Two path models were tested to evaluate the intertwined model under conditions in which the freedom threat manipulation produced small effects or medium and large effects. To facilitate comparisons of the two models, the median sample size among all cases ( $N = 225$ ) was used for the analyses. The path estimates and fit statistics for each model are reported in Figures 7 and 8. The results do not provide evidence that the intertwined model better fit the data when the freedom-threat manipulation was stronger. Instead, the intertwined model met the dual criteria established by Hu and Bentler (1999) in both samples.

Tests of the indirect effects from threat to attitude through reactance were also conducted following the procedures outlined previously. The indirect effects from threat to attitude through reactance were different from zero in both the low (0.10, 95% CI [0.01, 0.23]) and medium/high threat samples (0.10, 95% CI [0.01, 0.20]). In summary, although the fit indices suggest the intertwined model fit the data from



**Figure 8** Path model and estimates when the freedom threat manipulation effects were small. Model summary:  $\chi^2 (df = 2) = 0.51, p = .77, CFI > 0.99, SRMR = 0.01, BIC = -10.32, AIC = 16.51.$

both samples, the intertwined model did not better fit the data when the freedom threat manipulation was stronger.

## Discussion

The purpose of this study was to revisit questions raised by Dillard and Shen (2005) regarding the nature of psychological reactance. A meta-analytic review of reactance research was conducted, and the results were used to test and evaluate path models representing competing conceptualizations of psychological reactance. The results indicate that the intertwined model best fit the sample data. The findings from this study and their implications for psychological reactance theory and research on persuasive communication are discussed in the following paragraphs.

### The intertwined model

Dillard and Shen (2005) argued that, to advance research on the implications of psychological reactance for persuasive messages and campaigns, the nature of reactance must first be better understood. Consistent with Dillard and Shen's (2005) original work and Rains and Turner's (2007) test, the results of the analyses show that the intertwined model—in which reactance was modeled as a latent factor with anger and counterarguing serving as indicators—best fit the sample data. The intertwined model outperformed the dual-process and linear affective-cognitive models. The fact that the data used to test the path models were generated from a meta-analytic review of reactance research is noteworthy. The intertwined model best fit the aggregate data available from 20 cases reporting associations among freedom threat, anger, counterarguing, and attitudes.

Although the path models demonstrate that the intertwined model best fit the sample data, the size of the path coefficients in the intertwined model and the results of the meta-analyses reveal several issues that warrant consideration. The absolute sizes of the relationships among some of the variables were smaller than what might be expected. The zero-order correlation between anger and counterarguments was  $r = .31$ . Given that these two variables are the sole indicators of reactance in the intertwined model, one might question whether this relationship is sufficient. In

addition, the estimate for the path between threat and reactance was .37. Reactance is the product of a freedom threat and, as such, one might expect that the relationship between these two variables is stronger. The results in Table 2 also indicate that there was no zero-order correlation between freedom threat and attitudes. The confidence interval for the meta-analysis of these two variables included zero. Baron and Kenny (1986) suggest that a relationship between an exogenous variable and outcome variable is a necessary precondition for mediation. Without first demonstrating such a relationship, the status of reactance as a mediator of the relationship between threat and attitudes might be questioned. Finally, the results of the post hoc analyses examining the strength of the freedom-threat manipulations used among cases in the sample were inconsistent with expectations. The intertwined model did not better fit the data from cases in which the freedom-threat manipulation produced a medium or large effect relative to those cases in which the manipulation produced a small effect.

Yet, several factors should be considered in evaluating the preceding issues. The estimate for the relationship between anger and counterarguments and the path from freedom threat to reactance are what can be considered medium-sized effects (Cohen, 1988). In addition, the fact that the data for this project was derived from both published and unpublished studies of reactance is worth noting. Given the potential for inflated effect estimates due to publication bias (Rothstein et al., 2005), including unpublished cases makes possible a relatively conservative test of the intertwined model. Furthermore, the freedom-threat manipulations were relatively weak across cases in the sample. The weighted mean effect estimate for the freedom threat manipulations used in the sample was  $r = .32$  (95% CI [0.24, 0.39],  $K = 19$ ,  $N = 4,585$ ). Weak freedom-threat manipulations may have attenuated the path estimate from freedom threat to reactance and may be at least partially responsible for the lack of a relationship between freedom threat and attitude. Finally, Baron and Kenny's (1986) approach to mediation has been critiqued and, in particular, scholars have argued that an indirect effect may exist in instances when there is no zero-order relationship between an exogenous variable and outcome variable (e.g., Hayes, 2009). Indeed, the test of the indirect effect from freedom threat to attitude through reactance in the intertwined model was significant. Finally, although the intertwined model did not better fit the data from cases in which the freedom threat manipulation produced a medium or large effect, the model did sufficiently fit the data from both samples.

In sum, of the five models considered, the intertwined model best fit the sample data. In addition, the indirect effect in the intertwined model was significant. However, the absolute sizes of paths in the intertwined model were relatively modest as was the zero-order relationship between anger and counterarguments. Taken as a whole, the results of this study offer tentative support for the intertwined model.

### **Implications for research on psychological reactance and persuasive communication**

The findings from this study have important implications for research on psychological reactance theory, as well as the role of reactance in the design and effects of persuasive messages and campaigns. First, synthesizing reactance research makes it

possible to gain insights about message features that can create perceptions that one's freedom has been threatened. Several of the sample quotes from the freedom-threat manipulations reported in Table 1 include explicit examples of what Miller et al. (2007, p. 222) refer to as "controlling language" and Quick and Stephenson (2008, p. 450) call "dogmatic language." Such language is "powerful and directive in nature . . . adher[ing] to Grice's [1975] co-operative principle by being task efficient, clear, unambiguous, and brief," while also making clear the source's intent (Miller et al., 2007, p. 223). Replete in the sample quotes are phrases such as: "you must," "it is impossible to deny," "you have to," and "do it." Examining the specific message features used to operationalize freedom threat is valuable to help better understand the mechanisms and outcomes of reactance.

Second, and more generally, the results of this study highlight an underlying tension that exists in designing persuasive messages and campaigns. Messages designed with the objective of behavior change must necessarily (implicitly or explicitly) limit an audience's freedom. Advocating reductions in binge drinking or increased cancer screening behaviors, for example, effectively limits an audience's freedom to perform (i.e., binge drink) or not perform (i.e., cancer self-exam) these behaviors. Yet, as demonstrated by the results of this project, such restrictions may undermine the effectiveness of a persuasive message. Through creating reactance, freedom threatening messages can have a significant negative impact on attitudes. A pervasive challenge faced by campaign message designers is balancing the need to offer directives for behavior change with the potential consequences of threatening an audience's freedom.

Third, the results of this project have practical implications for researchers studying reactance. Researchers can with some confidence continue conceptualizing psychological reactance as an amalgam of anger and counterarguing. Although the intertwined model has been applied in several studies, it has rarely been evaluated relative to other possible reactance models. Because the data used to test the path models were derived from a meta-analytic review of reactance research, the analyses reported in this study represent a robust test of the intertwined model in comparison with models representing other possible conceptualizations.

Finally, the findings of this study can serve to bolster research examining the implications of reactance in the context of persuasive messages and campaigns. Understanding that reactance consists of anger and counterarguing makes it possible to leverage research on those two topics in investigating the effects of reactance and developing methods of mitigating reactance. For example, recent research has been conducted examining use of narrative as a means to minimize the impact of reactance (e.g., Gardner, 2010; Moyer-Gusé & Nabi, 2010). This research is grounded in the basic notion that, because narrative can help reduce counterarguing, it might also serve to quell reactance. The findings from this study help provide a solid foundation for such endeavors by offering evidence that counterarguing is central to experiencing reactance.

### Limitations

In considering the results of this study, three potential limitations should be noted. First, although including unpublished works in the meta-analyses is a key strength of this project, some scholars might question the quality of those unpublished works and their potential influence on the results. To examine the implications of the unpublished cases included in the sample, random-mixed meta-analyses (Hedges & Pigott, 2004) were conducted to test for differences in the associations among freedom threat, anger, counterarguing, and attitude between published and unpublished cases. The results, which are available on request, show no differences in the mean effect estimates reported in published and unpublished cases for any of the associations among the four variables. The unpublished cases did not unduly influence the results of the meta-analyses reported in Table 2.

Second, the tests of homogeneity associated with the fixed-effects meta-analyses first conducted to examine the relationships reported in Table 2 were all significant. Heterogeneity between studies was one reason that random-effects models were used in this project. Although exploring the source of the heterogeneity for each of the relationships reported in Table 2 would be valuable, such explorations were beyond the scope of this project. Moderators are one possible cause of heterogeneity. Beyond considering whether or not cases were published, it would have been worthwhile to test for other possible moderators related to methodological artifacts. Most notably, measurement reactivity stemming from the ordering of measures used in each case might have had a systematic impact on the results. Unfortunately, however, not enough information was provided in most cases to make such a test possible.

Finally, all the studies in the sample were completed after Dillard and Shen's (2005) initial work. Research conducted before Dillard and Shen's (2005) study did not measure anger or counterarguing (e.g., Brehm & Sensenig, 1966; Wicklund & Brehm, 1968; Worchel & Brehm, 1970) and, as a result, was not included in the sample. Although the inability to include research by J. Brehm and other influential reactance scholars is unfortunate, this necessary omission is perhaps not all that surprising given that much of the work on reactance has been grounded in the assumption that reactance is an unmeasurable, intervening state. Indeed, almost two decades ago, Eagly and Chaiken (1993, p. 571) remarked 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., thought-listing, recall)." Yet there is no reason to expect that, had early reactance works included measures of anger and counterarguing, the results of this study would have been different.

### Future directions for reactance research

The findings from this project suggest several directions for future research on psychological reactance theory and the intertwined model. First, a valuable endeavor would be to correlate self-report data regarding reactance, which served as the basis



for this project, with neurological and physiological data. These more objective neurological and physiological data may help uncover new insights about psychological reactance and responses to freedom threats. Second, given the focus of this study on testing competing models of reactance, potential moderators were not widely considered beyond the strength of the freedom threat manipulations used among cases in the sample and whether cases were published. The presence of significant heterogeneity among the fixed-effects analyses for the relationships reported in Table 2 suggests that moderators may exist. Future research might examine moderators that represent conditions under which the intertwined model better or worse fits the data from a sample as a means to evaluate it further as an explanation of psychological reactance. As previously noted in the discussion of measurement reactivity, the ordering of measures assessing cognition, affect, and attitudes is one factor that might affect the fit of the intertwined model. Finally, future research could examine the tension inherent in persuasive messages and campaigns between necessarily limiting an audience's freedom by attempting to change their attitudes or behavior and creating reactance. Researchers should explore message strategies that make possible directives for behavior that achieve an optimal balance of maximizing behavior change and minimizing reactance.

## Conclusion

Although psychological reactance has been a longstanding topic of interest among scholars studying the design and effects of persuasive messages and campaigns, research has been limited by an inability to define and measure reactance concretely. The results of this project offer evidence consistent with the intertwined model in which reactance is conceptualized as an amalgam of anger and counterarguments in response to a freedom threat. With a better understanding of what reactance is and how it might be directly measured, scholars are positioned to more fully understand its role in persuasive message and campaigns.

## Acknowledgments

The author would like to thank John Courtright and the two anonymous reviewers for their helpful feedback as well as the following scholars who shared supplementary information about their research: John Banas, Liz Gardner, Bobi Ivanov, Yoav Magid, Claude Miller, Brian Quick, Adam Richards, Maaïke Roubroeks, Paul Silvia, Monique Turner, and Qin Zhang.

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