Defensive Reactions to Threatening Health Messages: Alternative Structures and Next Questions

JAMES PRICE DILLARD
Pennsylvania State University, USA

ERIC MECZKOWSKI
Egg Strategy, USA

CHUN YANG
Louisiana State University, USA

Defensive reactions offer an explanation for why people reject persuasive messages. Surprisingly, little research has focused on the basic question of how they are structured with regard to one another. Understanding this would enable more informed theorizing. Using data from two studies (*N* = 849 and *N* = 311), we tested four possible structures via confirmatory factor analysis, frequency analysis, and latent profile analysis. Results indicated that defensive reactions are best conceptualized as several related concepts that are positively correlated but cannot be reduced to a single phenomenon. Having addressed the structure issue empirically, we conclude with a series of questions that may guide efforts to explicate the concept known as defensive reactions.

Keywords: defensive reactions, defensive processing, health, persuasion, Ebola, tanning

It is often assumed that the primary motivation for persuasion research is to better understand processes that lead to opinion change. A question of equal weight asks why people do *not* change their minds. Indeed, individuals who are most susceptible to risks are often the most likely to dismiss messages intended to reduce their risk. This seemingly counterproductive action has been explained by the claim that vulnerable individuals engage in defensive reactions, such as suppressing thoughts about the risk, denying its existence, or derogating the source of the message.

Remarkably little thought has been devoted to fundamental questions about the nature of defensive reactions (van't Riet & Ruiter, 2013). Are they properly conceived as one phenomenon or several? Do they form natural groupings? Can one substitute for another? Ultimately, all of these questions are concerned with issue of how defensive reactions are structured with regard to one another. Absent clear understanding

---

James Price Dillard: jpd16@psu.edu
Eric Meczkowski: emeczkowski@gmail.com
Chun Yang: cyang10@lsu.edu
Date submitted: 2017–05–17

of this foundational issue, we cannot begin the work of researching their antecedents and effects, much less designing techniques to overcome defensiveness. Hence, the question of structure serves as the primary motivation for this project. Toward that end, four logically distinct structures were identified and evaluated in two data sets, one focused on the threat of Ebola and the other on the dangers of indoor tanning.

Motivating Defensive Reactions

What might prompt defensive reactions? The literature suggests two causes. First, the notion of defensive reactions has been closely associated with theories of threat appeals. From Hovland, Janis, and Kelley (1953) to So (2013), writers have argued that when individuals see no efficacious means of eliminating danger, they turn to defensive reactions as a means of reducing their fear. This can be seen as a special case of emotional regulation, a literature that examines why individuals seek to amplify or accentuate various emotions (e.g., Koole, 2009).

Defensiveness is also expected in circumstances in which an individual, who is already committed to some line of behavior, is then exposed to a message that is inconsistent with the commitment. For example, a smoker might be reminded that smoking causes cancer. This can be viewed narrowly as an instance of dissonance arousal followed by an effort at dissonance reduction. It is also possible to see this type of defensiveness more broadly as affect management aimed at maintaining the self-concept (Steele, 1988) and self-esteem (Tesser, 2000). From this perspective, dissonance reduction is another form of emotion regulation.

Types of Defensive Reactions

The phrase *defensive reactions* is a superordinate term for what might be a diverse array of phenomena. Indeed, Hovland et al. (1953) posited three separate forms of defensive reactions: Individuals might (a) avoid the threatening message via inattention, (b) exhibit aggression toward the message source, or (c) attempt to evade future exposure to threatening messages through careful selection of situations or media. Van't Riet and Ruiter (2013) suggest that there are four types of defensive reactions: avoidance, denial, reappraisal, and suppression. Other writers offer catalogs that vary in number and content (Blumberg, 2000; Fransen, Smit, & Verlegh, 2015). Possibly the longest list to date is offered by McQueen, Vernon, and Swank (2013), who favor a seven-factor scheme that includes informational and behavioral opting out, blunting, self-exemption, denial of immediacy, counterarguing, and risk normalization.

Drawing on the work of these researchers and others (e.g., Carcioppolo, Chudnovskaya, Gonzalez, & Stephan, 2014; Jacks & Cameron, 2003), we isolated eight variations, which are presented in Table 1 with sample items relevant to indoor tanning. Our process was straightforward: We reviewed the literature on defensive reactions, emotional regulation, and resistance to persuasion. We attempted to identify conceptually distinct themes. Then we borrowed or wrote items to reflect each theme. The list in Table 1 is not meant to be a universally exhaustive list but rather one that we judged as comprehensive for that topic (cf. Fransen et al., 2015; van 't Riet & Ruiter, 2013; Webb, Miles, & Sheeran, 2012). These themes constituted the basic building blocks for the current investigation.

Table 1. Defensive Reactions: Definitions and Sample Items Relevant to Indoor Tanning.

1. Cognitive suppression:[a] Conscious efforts to refrain from thinking about a particular issue (e.g., Gross, 2014; van't Riet & Ruiter, 2013).
    a. I tried to not think about the effects of tanning.
    b. I avoided thinking about the possibility that tanning could harm me.
    c. I made an effort not to think about the effects of tanning.
2. Emotional suppression:[a] Conscious efforts to minimize affective responses (e.g., Gross, 2014; Webb et al., 2012).
    a. I bottled up my feelings about the consequences of tanning.
    b. I tried to keep a lid on my feelings about the dangers of tanning.
    c. I worked to minimize any feelings that I had about tanning.
3. Fatalism:[b] Accepting that a risk exists, but believing that nothing can be done about it (e.g., Carcioppolo et al., 2014; McQueen et al., 2013).
    a. I reminded myself that I could contract melanoma no matter what I do.
    b. I recognized that no matter what I do, I might suffer from the effects of tanning.
    c. I thought I might be destined to get skin cancer: There's really nothing I can do about it.
4. Source/issue derogation:[c] Actively criticizing the source of a message or the message itself (Fransen et al., 2015; Hovland et al., 1953).
    a. I remembered that most of the negative messages that I heard about the effects of tanning are blown out of proportion.
    b. I reminded myself that people generally make too big a deal out of the idea that tanning causes melanoma.
    c. I thought about the fact that most of what I hear about the dangers of tanning is exaggerated.
5. Denial:[c] Making unrealistically low estimates of the likelihood of risk (e.g., Hovland et al., 1953; van't Riet & Ruiter, 2013).
    a. I focused on the idea that tanning might hurt other people, but it's not going to happen to me.
    b. I reminded myself that my chances of suffering any negative effects from tanning are essentially zero.
    c. I told myself that there is no real possibility that tanning will harm me.
6. Bolstering: Focusing on the positive attributes of a risky behavior (Fransen et al., 2015; Jacks & Cameron, 2003).
    a. I thought about the reasons that I like to tan.
    b. I focused on all of the benefits of tanning.
    c. I remembered all of the good things about tanning.
7. Counterarguing:[c] Active efforts to discredit a message by finding flaws in the argument or evidence (e.g., Blumberg, 2000; Jacks & Cameron, 2003).

   a. I thought about why the arguments against tanning were faulty.
   b. I thought about the fact that most of what I've been told about the risks of tanning is wrong.
   c. I reminded myself that the reasons given for not tanning are mostly bogus.

8. Risk normalization:[b] Taking the view that risks are common and, therefore, normal (e.g., McQueen et al., 2013).
   a. Science often changes its position about things such as indoor tanning: What is good today is bad tomorrow.
   b. If I avoided everything that they say is bad for my health, I couldn't do anything.
   c. I thought about the fact that I can't do everything that I'm supposed to do: It would be a full-time job.

---

[a] These factors were combined and renamed *suppression*.
[b] It may be possible to collapse these factors under the heading of *reappraisal*.
[c] These factors were combined and renamed *contesting*.

Hypotheses

If the goal is to understand the basic features of defensive reactions and how the individual concepts relate to one another, it becomes necessary to consider alternative patterns of relatedness and to develop empirical indicators of each. We saw four plausible possibilities.

Primary Factor(s)

The simplest structure of relationships among defensive reactions is represented by a primary factors model. And the simplest form of this model is one in which all of the items in Table 1 are unidimensional, such that each indicator loads onto a single factor (H1a). On this view, every item taps one and only one latent variable, generalized defensiveness. This would be consistent with Witte and Allen's (2000) decision to aggregate different operationalizations of defensiveness to produce an overall defensiveness score. Alternatively, a multiple factors model treats reactions as separate constructs with varying relationships among themselves and between other variables (H1b). From the standpoint of factor analysis, this position would be supported if the data produced multiple factors that could not be further aggregated. This model makes no prediction concerning frequency of use for any of the reactions. Instead, support would take the form of (a) correlations among the reactions that varied in size or magnitude and/or (b) associations with external reference variables that varied in size or magnitude. A well-fitting confirmatory factor model would be considered consistent with the multiple primary factors approach (McQueen, Swank, & Vernon, 2014).

One and Done

It may be that individuals gravitate to one and only one reaction. In this conception, defensive reactions are assumed to be equally effective, and any one of them is sufficient to reduce the aversive affective state (H2; i.e., one and done). This option recalls the "self-zoo hypothesis" regarding strategies for self-esteem maintenance. Tesser (2000) argues that if different kinds of self-esteem maintenance strategies (e.g., defensive reactions) "serve the same goal, then these behaviors should be substitutable for one another" (p. 292). In other words, if the use of one type of defensive reaction (e.g., cognitive suppression) successfully downregulates unpleasant emotional tension, then the use of a different defensive reaction (e.g., fatalism) is unnecessary—the need to regulate emotion has been satisfied by the first strategy. Although different persons might incline toward different defensive reactions, the one-and-done hypothesis predicts that individuals will report only one reaction. The one-and-done position is a special case of the primary factors model in which multiple factors obtain but correlations among them are uniformly negative.

Styles

The third option anticipates that individuals rely on a fixed set of defensive reactions, but that not all individuals will use the same set. Because each set represents a different combination of reactions, we call this the styles model (H3). On this view, individuals can be classified into groups defined by their preferred collections of defensive reactions. For instance, certain types of people might use cognitive and emotional suppression, whereas another group relies on bolstering and fatalism. In terms of frequency data, this approach requires that some, but not necessarily all, individuals use multiple defensive reactions. It also implies (a) positive correlations among the reactions that constitute a style and (b) negative associations among cross-style reactions. Analysis of the data using a technique such as latent profile analysis must yield groupings of the defensive reactions that are theoretically interpretable.

Second-Order Factors

A final alternative is that different types of defensive reactions reflect a general propensity to regulate affect. Here, different kinds of defensive reactions are indicators of a general latent variable, but there are, nonetheless, meaningful distinctions among the first-order factors. In other words, this constitutes a second-order factor model (H4). In an explicit test of the primary factors versus a single, second-order factor model, McQueen et al. (2013) found no evidence that a second-order model was superior to their primary factors model—but neither was it worse. Thus, strictly in terms of empirical results, either model is acceptable. Assuming that parsimony is valued, a second-order model might be preferred.

The second-order model makes no prediction concerning frequency of use of any specific reaction, only that they all move more or less together. At the level of correlations, evidence favoring this model would include (a) strong positive correlations among the first-order factors that are roughly equal in size that also (b) exhibit parallel associations with external, reference variables (Hunter & Gerbing, 1982). In addition, confirmatory analysis of a second-order model should show equal or better fit to the data relative to the primary factors model.

Method

Data from two studies were used to assess the structure of defensive reactions. Both studies were approved by the Institutional Review Board.

Ebola Study

The first data set derived from a survey conducted during the 2014 outbreak of Ebola in Dallas, Texas. Responses were collected between October 21 and 29, 2014, which corresponds with the treatment and release of two Dallas-area nurses who had contracted Ebola in the United States. Participants reported their reactions to the outbreak during a time when the news media were rife with claims about the possibility of a larger epidemic (as well as many counterclaims). Indices of defensiveness included cognitive suppression, emotional suppression, fatalism, and source/message derogation. We did not include all eight indices shown in Table 1 due, in part, to space limitations and, in part, for conceptual reasons. On the latter point, denial was not part of the survey, because it is defined as a susceptibility estimate that is unrealistically low. However, according to public health sources, endorsement of the statement "There is virtually no chance that I will contract Ebola" was factually accurate and, therefore, realistic.

Tanning Study

This data set differed from the first in a number of key respects. For one, the threatening topic was the use of indoor tanning beds. In addition, these data were drawn from a two-wave longitudinal survey in which participants viewed a message detailing the consequences of melanoma and what can be done to avoid them. Participants viewed the anti-tanning message in Wave 1, then reported on their defensive reactions in Wave 2. Finally, a broader array of defensive reactions was measured (see Table 1).

Participants and Procedures

Ebola Study

Data were gathered from Qualtrics' online survey panel. Screening questions ensured that approximately half of the sample resided in the Dallas metropolitan area, whereas the remainder was balanced across census regions in the continental United States. After eliminating respondents who failed attention-check items and persons who took more than two hours or less than two minutes to complete the survey, the final sample (N = 849) was 46% male and 54% female, ranging in age from 18 to 64 years (M = 40.59 years, SD = 14.01). The majority of participants (74%) identified as White, 14% as Black or African American, 9% as Hispanic, 5% as Asian or Pacific Islander, 3% as Native American or American Indian, and 2% as Other,[1] without further specifying their race or ethnicity. Six percent identified with multiple ethnicities. Participants provided their responses in a single online session. In response to the question, "In the past couple of months, how often have you encountered information about Ebola on television or radio?"

---

[1] Respondents were allowed to identify with more than one ethnic group, thus the total is greater than 100%.

28% selected response option *never*, 17% chose *once or twice*, 19% chose *3–5 times*, 15% chose *6–10 times*, and 22% chose *more than 10 times*.[2]

Tanning Study

The 311 participants recruited from Qualtrics' online survey panel included 156 women (50%) and 155 men (50%), ranging in age from 18 to 65 years (M = 42.65 years, SD = 13.67). Overall, 83% identified as white, 7% as Black or African American, 3% as Hispanic, and 4% as Asian or Pacific Islander. Fewer than 1% identified as Native American or American Indian, or Other, although 3% reported multiple ethnicities. In total, 145 (47%) participants considered themselves indoor tanners, and 166 (53%) did not.

Responses were collected during a two-part survey. Participants watched an online video message that detailed the consequences of melanoma and advised them to avoid indoor tanning beds altogether. To create the message, we edited a five-minute, professionally produced public service announcement created by the David Cornfield Melanoma Fund (2011). Material that was irrelevant to our purpose was eliminated (e.g., "Dear 16-year-old self. Don't watch the new *Star Wars* movies. They ruin everything."). The remaining material was organized into segments that corresponded with the four components of a threat appeal: susceptibility, severity, response efficacy, and self-efficacy. We also inserted text that summarized the main content of each section. The edited message can be accessed at https://www.researchgate.net/project/Threat-Appeals. Between six and 21 days later, participants took part in a second survey in which they reported on their defensive reactions. These second wave data were used for the current project.

Measures

In both studies, responses to the defensive reaction items were gathered using a Likert-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The items for the Ebola study are given next, whereas the items for the tanning investigation appear in Table 1.

Cognitive Suppression

Four items were used: "I try to not think about Ebola," "I avoid thinking about Ebola," "I make an effort not to think about Ebola," and "If thoughts about Ebola come to mind, I try to think about something else."

Emotional Suppression

[2] Some readers may wonder why we included respondents who reported that they had not encountered information about Ebola when, presumably, this group would have no reason to be defensive. The answer is that to do so increases meaningful variance, which should then contribute to more realistic estimates of factor intercorrelations. This is analogous to including a no-message control group in an experimental study.

Three items were used: "I try to keep a lid on my feelings about Ebola," "I work to keep my feelings about Ebola under control," and "If I experience feelings about Ebola, I ignore them."

Fatalism

Three items were used: "No matter what they do, some people are going to catch Ebola," "Some people are destined to get Ebola: There is really nothing you can do about it," and "Some people are going to contract Ebola no matter what."

Source/Issue Derogation

Three items were used: "The media have blown the Ebola issue all out of proportion," "In general, people are overreacting to the Ebola issue," and "The government is making too big a deal out of Ebola."

Emotions

We included measures of affective reactions for use as reference variables in tests of parallelism (Hunter & Gerbing, 1982). Four emotions were assessed using two items each, taken from previous research (Dillard & Shen, 2006) and Likert-type scales whose values ranged from 0 (*none of this feeling*) to 4 (*a great deal of this feeling*). The Ebola study measured anger (annoyed, irritated), sadness (sad, depressed), contentment (calm, relaxed), and hope (hopeful, optimistic), whereas the tanning study included anger (annoyed, irritated), sadness (sad, depressed), contentment (calm, relaxed), and happiness (happy, cheerful). These measures were first examined for unidimensionality. With that established, they were used as single-indicator reference variables in analyses of the defensive reaction items.

Results

H1: Primary Factor(s) Model

Confirmatory factory analysis via AMOS 22.0 was used to assess the unidimensional (H1a), first-order factor (H1b), and second-order factor (H4) models. For each of the data sets, age, sex, race (White vs. non-White), and time spent taking the survey were covaried from the matrices used as input to the program. These variables were selected to enable generalization across these social categories. Cross-loadings were not permitted, error-terms were not allowed to correlate with one another, and unit variance identification was used to scale the latent variables.

Evaluation of models was made via fit indices, including (a) χ^2/df, preferred values <3 (Carmines & McIver, 1981); (b) the Comparative Fit Index (CFI), preferred values >.95; (c) Tucker–Lewis Index (TLI), preferred values >.95; (d) the root mean square error of approximation (RMSEA), preferred values <.08; (e) the probability of close fit (PCLOSE), preferred values >.05 (Hu & Bentler, 1998, 1999); and (f) difference in Bayesian information criterion (BIC) coefficients, where values >10 are strong evidence of the superiority of one model over another (Raftery, 1995). We anticipated that the initial models might not fit the data well and expected that we would employ three strategies for improving fit: (a) removing items that performed poorly, (b) splitting or collapsing initial item sets to more or less encompassing factors, and (c) allowing correlated errors between items within a factor.

Ebola Study

Fit statistics showed that a unidimensional model (H1a) was a poor representation of the data (see Table 2). Although it was possible to improve fit by allowing a number of error terms to correlate, no solution apart from the wholesale removal of fatalism and derogation moved the fit coefficients into acceptable territory. Thus, we rejected the unidimensional primary factor hypothesis (H1a) in the Ebola data.

Table 2. Fit Statistics for Confirmatory Factor Analyses.

Model	$\chi^2(df)$	χ^2/df	CFI	TLI	RMSEA (90%	PCLOSE	BIC
Ebola							
Unidimensional	1,907.31* (113)	16.88	.65	.58	.137 (.131–.142)	.00	2,177.07
Four factor	354.8* (95)	3.74	.95	.93	.057 (.051–.063)	.04	745.98
Three factor	285.37* (87)	3.28	.96	.94	.052 (.045–.059)	.31	615.83
Second order	423.67* (95)	4.46	.93	.91	.064 (.058–.070)	.00	700.18
Tanning							
Unidimensional	1055.54* (344)	3.07	.89	.88	.082 (.076–.088)	.00	1,411.40
Unidimensional (revised)	819.92* (269)	3.05	.91	.90	.081 (.075–.088)	.00	1,141.35
Six factor	690.29* (309)	2.23	.94	.93	.063 (.057–.069)	.00	1,247.05
Five factor	733.86* (318)	2.31	.94	.92	.065 (.059–.071)	.00	1,238.96
Five factor (revised)	651.30* (293)	2.22	.94	.93	.063 (.056–.069)	.00	1,139.18
Second order	721.92* (313)	2.31	.93	.93	.065 (.059–.071)	.00	1,095.00

CFI = Comparative Fit Index; TLI = Tucker–Lewis Index; RMSEA = root mean square error of approximation; PCLOSE = probability of close fit; BIC = Bayesian information criterion.
**p* < .001.

As shown in Table 2, estimates of fit for the multiple factors model (H1b) were generally favorable. However, two features of the data prompted us to respecify the initial model. First, a nearly perfect correlation (*r* = .94) between the latent indices of cognitive and emotional suppression suggested that these factors should be merged. Second, one of the emotional suppression items (i.e., "I work to keep my feelings about Ebola under control") was dropped for loading poorly (.51) onto the combined suppression index. The resulting solution produced a better fitting model (see Table 2), and the BIC difference of 130.15 was strong evidence of the superiority of the three-factor model. We explored alternatives for further improving model fit, but achieving this required correlated errors between items of different scales, a strategy that we were reluctant to embrace because there was no clear theoretical reason for doing so. Thus, given acceptable fit statistics, we concluded that a model defined by three first-order factors provided a good representation of the data. Standardized factor loadings ranged from barely adequate to moderately high: suppression (.62–.78), fatalism (.59–.83), and source derogation (.60–.83). The latent correlations are given in Table 3. Overall, the results of the Ebola study were supportive of the primary factors model posited in (H1b).

Table 3. Latent Correlations and Observed Descriptive Statistics in the Ebola Data.

	1	2	3	4	5	6	7
1. Suppression	.85						
2. Fatalism	.33	.76					
3. Derogation	.34	−.02	.82				
4. Anger	.18	.08	.17	.83			
5. Sadness	.23	.17	−.13	.40	.68		
6. Contentment	.18	.14	.28	.13	.00	.83	
7. Hope	.15	.05	.21	.15	.15	.69	.82
Mean	2.83	2.81	2.90	1.89	1.53	1.13	1.39
SD	.83	.95	1.14	1.30	1.14	1.15	1.19

Note. N = 849. Alpha coefficients appear in the diagonal.

Tanning Study

The initial test of H1a suggested that the model was a poor fit (see Table 2). Three items (two from fatalism and one from risk normalization) were removed for loading poorly onto the latent variable. However, the revised solution showed only marginal improvement as the fit statistics did not reach acceptable levels. Thus, the tanning data did not support the unidimensional factor hypothesis.

Moving to H1b, our eight-factor model produced a covariance matrix that was not positive definite. The correlation between latent indices of denial and counterarguing (r > 1.00) was evidence of a Heywood case. In addition, correlations between denial and source derogation (r = .97) and derogation and counterarguing (r = .98) suggested to us that these three latent variables ought to be collapsed. From Fransen et al. (2015), we adopted the term *contesting* for the new composite factor. Grouping these items into a single factor provided interpretable parameter estimates, but fit statistics for the six-factor model were mixed (see Table 2). Thus, we explored further modifications. Because the correlation between the two latent indices of cognitive and emotional suppression was high (r = .90), we reduced these measures to a single factor, which resulted in a five-factor model. However, fit indices were still mixed (see Table 2). Next, because of its low loading, we dropped one fatalism item ("I recognized that no matter what I do, I might suffer from the effects of tanning"). This produced a BIC difference of 94, which strongly favored the revised five-factor model. Standardized loadings for the five latent factors were suppression (.63–.83), fatalism (.51–.80), contesting (.76–.86), bolstering (.78–.89), and risk normalization (.67–.71). Because further improvement in fit required cross-factor correlated errors, we judged the revised five-factor model as the best representation of the data we were able to achieve. Overall, the solution was acceptable on most indices and slightly below desirable limits on the CFI and TLI. The latent correlations appear in Table 4. Thus, both data sets were consistent with the primary factors model. We accepted H1b.

Table 4. Latent Correlations and Descriptive Statistics in the Tanning Data.

	1	2	3	4	5	6	7	8	9
1. Suppression	.87								
2. Fatalism	.92	.65							
3. Contesting	.93	.91	.94						
4. Bolstering	.89	.77	.82	.85					
5. Risk normalization	.88	.88	.83	.80	.71				
6. Anger	.15	.12	.15	.28	.07	.85			
7. Sadness	.00	−.07	−.03	.06	−.12	.62	.83		
8. Contentment	.56	.54	.51	.63	.43	.18	−.02	.89	
9. Happiness	.58	.59	.55	.62	.46	.17	−.03	.87	.93
Mean	2.39	2.69	2.02	2.48	2.63	1.27	1.62	1.02	.89
SD	.96	.97	.96	1.12	1.03	1.22	1.31	1.13	1.13

Note. N = 311. Alpha coefficients appear in the diagonal.

H2: One and Done

Building on the results of the primary factors analyses, we created binary variables for each defensive reaction index. Responses from 1 (*strongly disagree*) to 3 (*neither agree nor disagree*) were coded as zero, and scores greater than 3 were assigned a value of 1. The results are given in Table 5 but can be summarized as follows: Roughly one-third of the participants in the two studies reported experiencing two or more defensive reactions. When interpreting this number it is worth bearing in mind that substantial numbers of respondents had no real reason to be defensive (e.g., nontanners). Thus, values in Table 5 underestimate the true proportion of multireaction respondents. The result argued against the one-and-done model.

Table 5. Proportion of Respondents Reporting Defensive Reactions.

Number of defensive reactions reported	Ebola data N = 849	Tanning data N = 311
0	29%	55%
1	36%	16%

2	23%		7%	
3	12%	35%	6%	28%
4	0%		4%	
5	0%		11%	

The correlation matrices were also used to evaluate H2, which predicted negative associations among the reactions. As Tables 3 and 4 reveal, this pattern was not present. Rather, the data showed correlations that ranged from large positive coefficients to values that are functionally zero. Overall, our analyses found no evidence supportive of the one-and-done idea in either data set. We rejected H2.

H3: Defensive Processing Styles

Our third hypothesis proposed distinct styles of defensiveness between groups of individuals. This prediction was evaluated via latent profile analyses in Mplus Version 7, which allowed us to examine the heterogeneity of the pattern of defensive reactions between participants. We relied on several fit statistics, including the Akaike information criterion (AIC), the Bayesian information criterion (BIC), and the sample-size adjusted BIC (SABIC). All of these information criteria coefficients allow comparisons between models, where values of 10 or greater are taken as strong evidence of the superiority of the model with the smaller value (Kass & Raftery, 1995). It is expected that the statistics will decline in magnitude until the optimal solution is reached, then increase as the number of classes in the solution grows.

The bootstrap likelihood-ratio test (BLRT) and the Lo–Mendell–Rubin statistic (LMR) enable probability comparisons between the current model (k) and a model with one fewer latent classes ($k - 1$). Significant p values indicate that the latent class k model is preferable, whereas nonsignificant values indicate that the $k - 1$ model has superior fit. We also applied the criterion of interpretability. Acceptable solutions must not only fit, they must be theoretically meaningful.

Ebola Study

Fit statistics are provided in the top portion of Table 6. As can be seen, analyses were conducted for one through eight groups. There was no solution for which AIC, BIC, and SABIC stopped decreasing. The BLRT produced similar results. Thus, these four statistics all indicated that the styles approach did not offer a viable account of the structure of defensive reactions However, the nonsignificant LMR statistic for the five-class solution (p = .064) and the significant LMR for the four-class solution (p < .001) indicated that the best fitting number of classes was four.

Table 6. Fit Statistics for the Latent Profile Analysis.

Data	Number of classes	BIC	AIC	SABIC	BLRT p value	LMR p value
Ebola						
	1	14,473	14,458	14,463	–	–

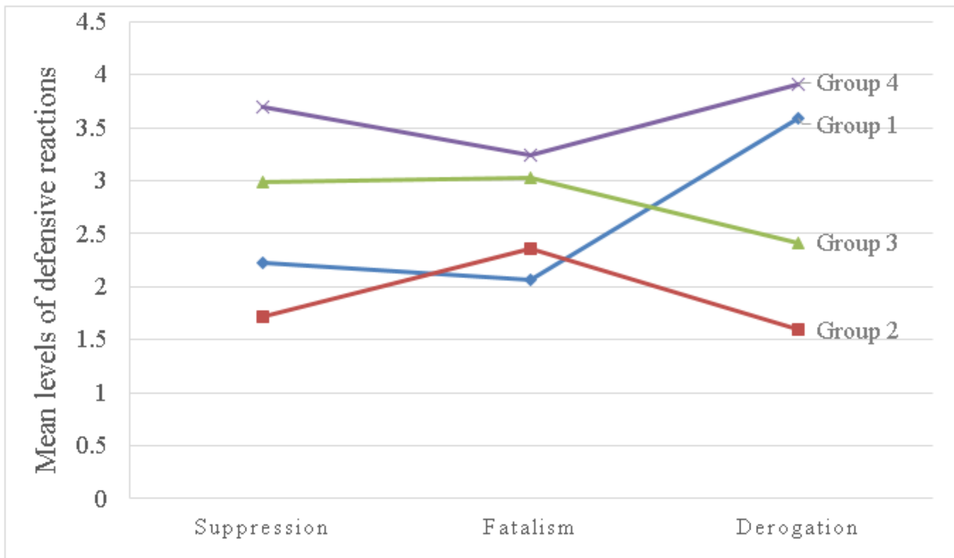
	2	10,946	10,913	10,924	<.001	<.001
	3	9,705	9,653	9,671	<.001	<.01
	4	8,758	8,687	8,711	<.001	<.001
	5	8,298	8,208	8,237	<.001	.064
	6	8,007	7,898	7,934	<.001	.257
	7	7,742	7,614	7,656	<.001	.499
	8	7,530	7,383	7,432	<.001	.286
Tanning						
	1	18,072	18,051	18,056	–	–
	2	8,989	8,943	8,954	<.001	<.001
	3	7,349	7,278	7,295	<.001	<.01
	4	6,453	6,357	6,380	<.001	<.01
	5	6,169	6,048	6,077	<.001	.140
	6	5,934	5,788	5,823	<.001	.302
	7	5,810	5,639	5,680	<.001	.411
	8	5,706	5,510	5,557	<.001	.049

BIC = Bayesian information criterion; AIC = Akaike information criterion; SABIC = ample-size adjusted BIC; BLRT = bootstrap likelihood-ratio test; LMR = Lo–Mendell–Rubin statistic.

To better understand the four-group solution for H3*,* we plotted the means for each group (see Figure 1). This revealed that Groups 2, 3, and 4 were parallel insofar as they differed only in terms of overall intensity. That is, Group 2 was low on all three reactions, Group 3 was moderate on all three, and Group 4 was high on all three. This pattern is compatible with a first- or second-order factor solution but argues against understanding reactions in terms of style groups because the differences are ones of degree, not kind. Group 1 presents a different pattern that could be construed as modest support for styles. We turned to the tanning data to further evaluate that possibility.

Tanning Study

The lower panel of Table 2 presents the fit statistics for the tanning data. They told a story similar to that of the Ebola study. The coefficients for AIC, BIC, SABIC, and BLRT did not point toward an optimal solution of less than eight groups. But, the *p* values associated with the LMR statistic for the four- and five-class solutions were, respectively, significant (p = .01) and nonsignificant (p = .14). Plotting the means for each group showed a clear pattern of stacked groups that differed in degree, but not in kind (see Figure 1). Considered together, the two data sets did not support a styles interpretation of defensive reactions. We rejected H3.



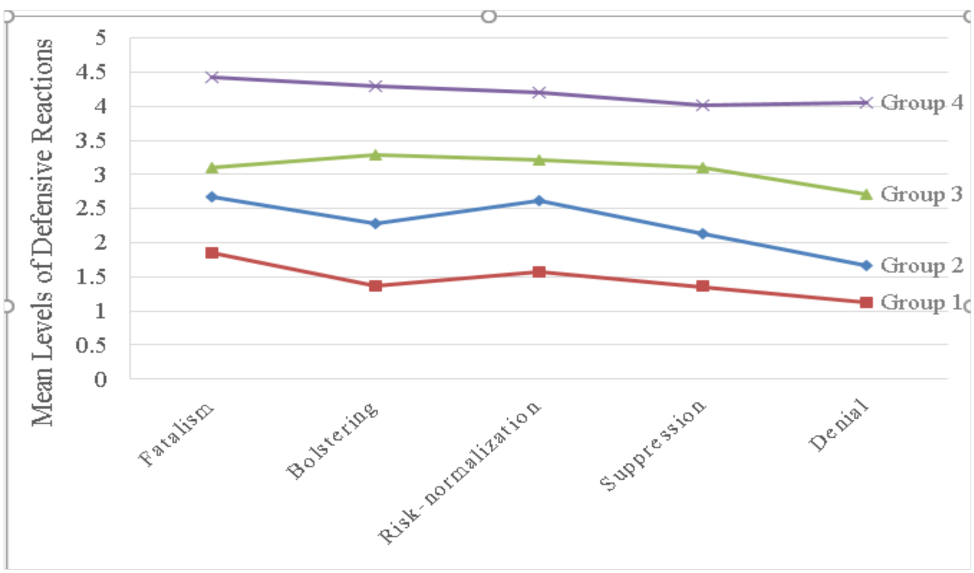


Figure 1. Group means for the four-class latent profile analysis of the Ebola (top panel) and tanning data (bottom panel).

H4: Second-Order Factor Model

H4 proposed that different types of reactions are indicative of a general propensity toward defensive reactions. If this were the case, the latent variables in the first-order models would be subsumed by a second-order factor. The results of the first-order models that tested *H1* became the starting point for assessing *H4*.

Ebola Study

Model fit statistics were $\chi^2(95) = 423.67$, $p < .001$, $\chi^2/df = 4.46$, CFI = .93, TLI = .91, RMSEA = .064, 90% CI [.058, .070], PCLOSE = .00. A chi-square difference test revealed that, in comparison to the primary factors model, the second-order model showed significantly worse fit, $\chi^2(8) = 138.30$, $p < .001$, compared with the primary factors model. The BIC difference of 84.35 also favored the first-order model. Factor loadings for the three defensive reactions were not comparable: Although suppression (.93) loaded highly onto second-order defensiveness, fatalism (.34) and derogation (.35) did not.

Tanning Study

Results for the tanning data were not as clear-cut. Despite high factor loadings (.85–.98), fit statistics were mixed, $\chi^2(313) = 721.92$, $p < .001$, $\chi^2/df = 2.31$, CFI = .93, TLI = .93, RMSEA = .065, 90% CI [.059, .071], PCLOSE = .00. Compared with the five-factor model, a chi-square difference test confirmed that the second-order factor model was worse fitting, $\chi^2(21) = 70.62$, $p < .001$. The BIC difference of 44.18 also favored the first-order model. Inspection of the correlations among factors (see Table 3) shows the strong positive associations that would be expected of a second-order model as do the parallel associations with the emotion variables. Overall, the pattern of results looked as if they should fit a second-order model, but the fit statistics mostly indicated the superiority of the first-order structure. With some uncertainty, we rejected H4.

Discussion

The Structure of Defensive Reactions

We tested four hypotheses regarding the structure of defensive reactions. The one-and-done model assumed that defensive reactions are substitutable, thereby requiring only one for any given person. This position was rejected. Another possibility, labeled styles, implied that groups of individuals can be defined in terms of their characteristic use of a subset of defensive reactions. This alternative was rejected. Yet another option was a second-order factor model. This clearly did not fit the Ebola data, but visual inspection of the patterns in the tanning data suggested that it might be viable. Previous work also shows strong interfactor correlations (McQueen et al., 2013) and parallel associations with external variables (McQueen et al., 2014). However, the more stringent fit indices were incompatible with a second-order model. This model too was rejected, though not with the same degree of confidence as one–and-done or styles.

In both of our studies, the primary-factors model offered the most serviceable account of the data. Not every fit coefficient exceeded Hu and Bentler's (1998, 1999) criteria, but even the lowest values were very close to standards of fit that are guidelines, not laws. And other statistics suggested good to excellent fit. We concluded that, from an empirical standpoint, defensive reactions should not be viewed as a single phenomenon. Rather, they are best conceptualized as several related concepts that are positively correlated but still retain their individual identities. Such was the answer to the question that motivated this project.

That answer is not, however, without qualifications. We did not study every possible defensive reaction. And we conducted only two studies, each involving only one topic and fewer than 1,000 participants. Still, both data sets gave similar conclusions, and the investigations were nicely complementary. The Ebola data examined reactions to a real-world event for which no practical self-protective action was available. Most of those participants were exposed to many media and interpersonal messages in the weeks prior to the survey. In contrast, the tanning study considered a practiced behavior for which cessation was required to reduce risk. Participants were exposed to a single but, we believe, powerful message. It is a strength of this project that, despite notable differences in research design, the results of the two studies point to the same conclusions.

Implications for Practice

The ramifications of our results for research are straightforward. The assumption that the set of defensive reactions are homogeneous (e.g., Witte & Allen, 2000) is incorrect and should not be replicated. Rather, researchers should report results for defensive reactions individually. This does not preclude also reporting an index of overall defensive reactions if such a model fits the data in any given instance. However, to permit accumulation of evidence across studies, second-order results should be presented only in addition to the first-order results.

Implications for Taxonomies of Defensive Reactions

Although our primary motivation for this project was to assess the question of structure broadly, it is also valuable to consider the findings specifically, especially as they relate to previous efforts to organize defensive reactions in terms of content.

Suppression: Cognitive and Emotional

There were several reasons to believe that cognitive and emotional suppression are separate phenomena. For example, cognitive appraisal theories depend heavily on the idea that cognitions cause but are distinct from emotions. However, our data produced a single suppression factor that did not differentiate between the subtypes. This might be because individuals genuinely do not discriminate between the two, or it might follow from the fact that after message exposure, emotions and cognitions activate one another quickly and reciprocally. Whatever the explanation, suppression appears to constitute a single-category phenomenon, a finding foreseen by van’t Riet and Ruiter (2013).

Contesting: Denial, Derogation, and Counterarguing

The tanning data gave empirical reason to collapse this trio of reactions. The common thread is their focus on rejecting the issue or advocacy (Blumberg, 2000). Together, the three closely resemble the superordinate category of resistance that Fransen et al. (2015) labeled *contesting*, a term that we adopted in this article. These results are similarly compatible with van't Riet and Ruiter's (2013) treatment of denial, which they use as an umbrella for several specific processes.

Bolstering

This reaction is the obvious counterpoint to contesting. Rather than trying to reject the change, bolstering represents an active effort to maintain one's existing position (Jacks & Cameron, 2003). As with McQueen et al. (2013), our work confirmed that bolstering was distinct from other strategies. However, Fransen et al.'s (2015) second-order category titled empowerment strategies suggests that future research would do well to ascertain whether other first-order strategies, including social validation and self-assertions, might form an empirically coherent cluster with bolstering.

Reappraisal: Fatalism and Risk Normalization

Individuals who acknowledge a risk and believe that there is no action that can ameliorate the risk are called fatalistic. A similar idea—risk normalization—expresses the belief that risks are merely part of life and therefore should be accepted. Although these two concepts were distinct in the data, their latent correlation was quite high (r = .87), making it likely that they were measuring the same underlying construct. Thematically, both constructs evidence passivity in the form of calm and resigned acceptance of risk (cf. Gross, 2014). It is worth noting that fatalism and risk normalization exhibited parallelism with respect to the emotion variables included in our investigation. This also implies the potential for subsuming them under a broader concept such as reappraisal. As with other clusters, a compelling case would require evidence of parallelism in the antecedents and consequents of the two reactions.[3]

An Exhaustive List of Defensive Reactions

It is generally held that taxonomies maximize their utility when they are comprehensive. Our results do not meet this standard and, indeed, we think that it may not be possible. One reason is that not every reaction is suitable for every circumstance. Bolstering offers a case in point: What would one bolster with regard to the threat of Ebola? In other words, what is comprehensive in one context may be less so in another context. Developing a better understanding of defensive reactions requires an iterative process in which careful conceptualization is informed by empirical tests and vice versa. Having completed empirical work on one aspect of defensive reactions (i.e., structure), we now turn our attention to five conceptual

---

[3] A model that collapsed the items for these two factors produced fit statistics that might be called adequate but cannot be characterized as attractive: $\chi^2(321) = 688.46$, $p < .001$, $\chi^2/df = 2.14$, CFI = .94, TLI = .93, RMSEA = .061, 90% CI [.055, .067], PCLOSE = .003. The BIC difference of 37.16 between this model and the five-factor model (see Table 2) favored the latter. This argues against the idea that fatalism and risk normalization can be reconceived as reappraisal.

issues that will help to guide construct explication. We hope that consideration of these matters can move research toward the next iteration of the theory-data cycle.

Criteria to Inform Conceptual Analysis of Defensive Reactions

Are Message Consumers Active or Reactive?

Persuasion research often draws on a military metaphor in which would-be persuaders attack individuals who must defend their positions (e.g., McGuire, 1964). Because persuaders are active and defenders are reactive, we have the phrase *defensive reactions*. Interestingly, the emotion regulation literature takes the opposite view: "Emotion regulation begins with the *activation of a goal* to modify the emotion-generative process" (Gross, 2014, p. 6). Goals are responsive to situations, but they are not merely reflexive. Instead of reactions, goals evoke strategies. We believe that conceptualizing message consumers as variably (re)active is the most realistic path for future inquiry. Although others may disagree with our variably-(re)active position, any effort at explication will need some statement regarding the degree to which defensive reactions are automatic and defensive, or controlled, strategic processes.

Are Defensive Reactions Adaptive or Maladaptive?

To the best of our knowledge, Leventhal (1970) was the first writer in the threat appeals tradition to introduce the language of adaptive and maladaptive coping (although these ideas are hinted at in Hovland et al., 1953). The overarching conception of coping, which has carried through to the present, is at least a little paternalistic. Adaptive coping means agreeing to do as instructed by the researcher or health professional, whereas virtually everything else is deemed maladaptive. Here again, the contrast with the emotion regulation literature is instructive. Regulation strategies may be judged to be effective or ineffective with regard to the individual's goals. As emotions are generally but not universally functional, it seems safe to assume the same about emotional regulation strategies. If we avoid defining defensive reactions as maladaptive, many of the strategies examined in this article can be viewed as primarily adaptive. For instance, reappraisal is simply accepting that which cannot be changed. That is a useful tool for emotion management as long as the estimate of changeability is not at far remove from reality (see van't Riet & Ruiter, 2013, for a similar point). Almost certainly, what are called defensive reactions are really general purpose mechanisms that, from the perspective of the researcher, are misapplied or overused. Decoupling defensive reactions from paternalistic evaluations of their utility may provide a clearer scientific picture of their true nature.

When Do Defensive Reactions Occur?

Gross's (2014) analysis of emotional regulation is built upon a model of emotional response. Consistent with many theories, the emotional response model posits a sequence in which a change in situation demands attention, which is followed by appraisal and, finally, by an emotion. Emotion regulation occurs along this same time line either by preventing one of the four antecedents to emotion or via efforts to modulate the emotion itself. Strategies for emotion regulation correspond with categorically distinct points along the emotional response continuum. This framework for understanding affect management lends a valuable temporal dimension to our consideration of defensive reactions. Perhaps, not coincidentally, it also predicts a primary factors model, something that we observed in our data. The specifics of Gross's model may or may not be useful, but the broader point is essential: A precise explication of defensive reactions will benefit from temporal analysis of the phenomena.

Is There a Hierarchy of Defensive Reactions?

Greenwald and Leavitt (1984) observe that messages may be processed at different levels of abstraction. Preattentive processing is the mainly subconscious evaluation of stimuli in terms of relevance, interest, and novelty. It may prompt focal attention, a process that involves channel selection and semantic analysis. Comprehension occurs when individuals construct propositional representations of the message, which may be followed by elaboration. Each of these stages is thought to provide input to the next, higher level of processing. If we accept the Greenwald–Leavitt model or something like it, then defensive reactions can occur at each level of abstraction (Blumberg, 2000; McQueen et al., 2013). Theorizing a hierarchy may be helpful to understanding defensive reactions. One clear implication of the hierarchy is that no single methodological approach can provide a complete picture of the focal concept. Our self-report data speak only to the later stages of the model in which defensive processes are accessible to awareness (cf. Brown & Richardson, 2012).

Are Defensive Reactions Only Psychological?

The study of defensive reactions is closely associated with psychological models of message processing. As a result, it is not surprising that defensive reactions are cast in the same mold. Could there be other means by which individuals manage their emotions and keep dissonance at bay? There are at least two categories of reactions that are not treated in a comprehensive fashion by contemporary theories of persuasion. One is behavioral. Individuals regulate their feelings using various behaviors, including exercise and recreational chemicals (Heiy & Cheavens, 2014; Parkinson & Totterdell, 1999) and performing the forbidden behavior (Brehm, 1966). A second category is social (Zaki & Williams, 2013). When distressed, individuals seek out the advice and comfort of others, who may assist them via distraction, bolstering, or reappraisal (Burleson & Goldsmith, 1998). Acknowledging variation in reactions does not demand that every theoretical framework incorporate them all, but wise choices about conceptual boundaries are possible only when the terrain is clearly marked.

Reactance and Defensive Reactions

Psychological reactance is a motivational state often credited with creating resistance to persuasion (Brehm, 1966; Rains, 2013). Because reactance shows a similarity of outcome with defensive reactions, it is fair to ask why it was not included in this project. One reason is that reactance is thought to have a different cause than defensive reactions: Perceived freedom plus threat to freedom versus emotion regulation and/or dissonance reduction. Another justification concerns method of assessment. The most valid approach to measurement of reactance requires coding of open-ended data (Quick, 2012), a procedure that extends beyond the pure survey-item approach that we employed. Overall, then, our judgment regarding the scope of the current study was influenced by both theoretical and practical concerns. Readers should not infer from this that we think reactance is unimportant. Indeed, our contesting factor seems quite similar to the negative/critical cognitions that partially defines reactance (Rains, 2013) and might offer a close-ended measure of that construct.

Mitigating Defensive Reactions

One motive for better understanding defensive reactions is that we might devise methods for minimizing their occurrence. Self-affirmation, that is, the practice of reinforcing a message recipient's self-concept (Steele, 1988), offers a case in point. Studies report that affirmation is often sufficient to reduce defensive processing of persuasive health messages (e.g., Zhao, Peterson, Kim, & Rolfe-Redding, 2014). Tracing the effects of self-affirmation through the defensive mechanisms identified in our study might shed light on the means by which this and other mitigation techniques operate. Knowledge of the pathways via which different mitigation techniques produce their effect would enable novel questions, such as whether combinations of techniques cumulate, plateau, or become counterproductive. More nuanced questions and answers are the benefit of careful construct explication.

Conclusions

A better understanding of defensive reactions requires more precise delineation of the focal construct. This article contributes to that effort by identifying and testing four possible approaches to structuring defensive reactions. The results provide support for a taxonomy of defensive reactions in which multiple factors retain distinctive conceptual status vis-à-vis one another. The challenge of developing techniques for countering defensive reactions must account for (a) the existence of multiple reactions and (b) the likelihood that any given individual may use multiple defenses. Both points contribute to the science of resistance to persuasion.

References

Blumberg, S. J. (2000). Guarding against threatening HIV prevention messages: An information-processing model. *Health Education & Behavior, 27,* 780–795. doi:10.1177/109019810002700611

Brehm, J. W. (1966). *A theory of psychological reactance*. New York, NY: Academic Press.

Brown, S. L., & Richardson, M. (2012). The effect of distressing imagery on attention to and persuasiveness of an anti-alcohol message: A gaze-tracking approach. *Health Education & Behavior, 39,* 8–17. doi:10.1177/1090198111404411

Burleson, B. R., & Goldsmith, D. J. (1998). How the comforting process works: Alleviating emotional distress through conversationally induced reappraisals. In P. A. Andersen & L. K. Guerrero (Eds.), *Handbook of communication and emotion* (pp. 246–281). San Diego, CA: Academic Press.

Carcioppolo, N., Chudnovskaya, E. V., Gonzalez, A. M., & Stephan, T. (2014). In-group rationalization of risk and indoor tanning: A textual analysis of an online forum. *Public Understanding of Science, 25*(5), 627–636. doi:10.1177/0963662514564930

Carmines, E. G., & McIver, J. P. (1981). Analyzing models with unobserved variables. In G. W. Bohrnstedt & E. F. Borgatta (Eds.), *Social measurement: Current issues* (pp. 65–115). Beverly Hills, CA: SAGE Publications.

David Cornfield Melanoma Fund Canada. (2011, May). *Dear 16-year-old me* [Video file]. Retrieved from https://www.youtube.com/watch?v=_4jgUcxMezM

Dillard, J. P., & Shen, L. (2006). Self-reports of discrete emotions. In R. A. Reynolds, R. Woods, & J. D. Baker (Eds.). *Handbook of research on electronic surveys and measurements* (pp.330-333). Hershey, PA. Idea Group.

Fransen, M. L., Smit, E. G., & Verlegh, P. W. J. (2015). Strategies and motives for resistance to persuasion: An integrative framework. *Frontiers in Psychology, 6*, 1201–1213. doi:10.3389/fpsyg.2015.01201

Greenwald, A., & Leavitt, C. (1984). Audience involvement in advertising: Four levels. *Journal of Consumer Research, 11,* 581–592. doi:10.1086/208994

Gross, J. J. (2014). Emotion regulation: Conceptual and empirical foundations. In J. J. Gross (Ed.), *Handbook of emotion regulation* (2nd ed., pp. 3–20). New York, NY: Guilford.

Heiy, J. E., & Cheavens, J. S. (2014). Back to basics: A naturalistic assessment of the experience and regulation of emotion. *Emotion, 14,* 878–891. doi:10.1037/a0037231

Hovland, C., Janis, I., & Kelley, H. (1953). *Communication and persuasion*. New Haven, CT: Yale University Press.

Hu, L., & Bentler, P. M. (1998). Fit indices in covariance structure modeling: Sensitivity to underparameterized model misspecification. *Psychological Methods, 3*, 424–453. doi:10.1037/1082-989x.3.4.424

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*, 1–55. doi:10.1080/10705519909540118

Hunter, J. E., & Gerbing, D. W. (1982). Unidimensional measurement, second-order factor analysis, and causal models. In B. M. Staw & L. L. Cummings (Eds.), *Research in organizational behavior* (Vol. 4, pp. 267–299). Greenwich, CT: JAI.

Jacks, J. Z., & Cameron, K. A. (2003). Strategies for resisting persuasion. *Basic and Applied Social Psychology, 25,* 145–161. doi:10.1207/S15324834BASP2502_5

Kass, R. E., & Raftery, A. E. (1995). Bayes factors. *Journal of the American Statistical Association, 90*(430), 773–795. doi:10.1080/01621459.1995.10476572

Koole, S. L. (2009). The psychology of emotion regulation: An integrative review. *Cognition and Emotion, 23*, 4–41. doi:10.1080/02699930802619031

Leventhal, H. (1970). Findings and theory in the study of fear communications. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 5, pp. 119–186). San Diego, CA: Academic Press.

McGuire, W. J. (1964). Inducing resistance to persuasion: Some contemporary approaches. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 1, pp. 191–229). New York, NY: Academic Press.

McQueen, A., Swank, P. R., & Vernon, S. W. (2014). Examining patterns of association with defensive information processing about colorectal cancer screening. *Journal of Health Psychology, 19*, 1443–1458. doi:10.1177/1359105313493649

McQueen, A., Vernon, S. W., & Swank, P. R. (2013). Construct definition and scale development for defensive information processing: An application to colorectal cancer screening. *Health Psychology, 32,* 190–202. doi:10.1037/a0027311.supp

Parkinson, B., & Totterdell, P. (1999). Classifying affect-regulation strategies. *Cognition and Emotion, 13,* 277–303. doi:10.1080/026999399379285

Quick, B. L. (2012). What is the best measure of psychological reactance? An empirical test of two measures. *Health Communication, 27*, 1–9. doi:10.1080/10410236.2011.567446

Raftery, A. E. (1995). Bayesian model selection in social research. *Sociological Methodology, 25*, 111–163. doi:10.2307/271063

Rains, S. A. (2013). The nature of psychological reactance revisited: A meta-analytic review. *Human Communication Research, 39,* 47–73. doi:10.1111/j.1468-2958.2012.01443.x

So, J. (2013). A further extension of the extended parallel process model (E-EPPM): Implications of cognitive appraisal theory of emotion and dispositional coping style. *Health Communication, 28,* 72–83. doi:10.1080/10410236.2012.708633

Steele, C. M. (1988). The psychology of self-affirmation: Sustaining the integrity of the self. *Advances in Experimental Social Psychology, 21*, 261–302. doi:10.1016/s0065-2601(08)60229-4

Tesser, A. (2000). On the confluence of self-esteem maintenance mechanisms. *Personality and Social Psychology Review, 4*, 290–299. doi:10.1207/s15327957pspr0404_1

van't Riet, J., & Ruiter, R. A. C. (2013). Defensive reactions to health-promoting information: An overview and implications for future research. *Health Psychology Review, 7*(Suppl. 1), S104–S136. doi:10.1080/17437199.2011.606782

Webb, T. L., Miles, E., & Sheeran, P. (2012). Dealing with feeling: A meta-analysis of the effectiveness of strategies derived from the process model of emotion regulation. *Psychological Bulletin, 138*, 775–808. doi:10.1037/a0027600

Witte, K., & Allen, M. (2000). A meta-analysis of fear appeals: Implications for effective public health campaigns. *Health Education & Behavior, 27*, 591–615. doi:10.1177/109019810002700506

Zaki, J., & Williams, W. C. (2013). Interpersonal emotion regulation. *Emotion, 13,* 803–810. doi:10.1037/a0033839

Zhao, X., Peterson, E. B., Kim, W., & Rolfe-Redding, J. (2014). Effects of self-affirmation on daily versus occasional smokers' responses to graphic warning labels. *Communication Research, 4,* 1137–1158. doi:10.1177/0093650212465433