LMFAO! Humor as a Response to Fear: Decomposing Fear Control within the Extended Parallel Process Model

Eulàlia P. Abril⬤, Glen Szczypka⬤, and Sherry L. Emery⬤

This study seeks to analyze fear control responses to the 2012 Tips from Former Smokers campaign using the Extended Parallel Process Model (EPPM). The goal is to examine the occurrence of ancillary fear control responses, like humor. In order to explore individuals' responses in an organic setting, we use Twitter data—tweets—collected via the Firehose. Content analysis of relevant fear control tweets (N = 14,281) validated the existence of boomerang responses within the EPPM: denial, defensive avoidance, and reactance. More importantly, results showed that humor tweets were not only a significant occurrence but constituted the majority of fear control responses.

Research supports scare tactics, or fear appeals, as a strong persuasive tool, and scholars, practitioners, and individuals alike have used them to encourage healthier behaviors. Witte's (1992) Extended Parallel Process Model (EPPM) provides a powerful framework to analyze whether and how fear appeals can yield desired effects on individuals, the elements needed for success, and common reasons for backfire and other failures (Popova, 2012). However, while a string of studies have looked at health campaign effectiveness using the EPPM (see Maloney, Lapinski, & Witte, 2011; Witte & Allen, 2000), very few studies have looked at the responses of individuals for whom fear appeals backfire. Scholars have, instead, treated fear control responses as a single construct, ignoring the differences among fear appeals outcomes that fail and their relative importance (e.g., Smalec & Klingle, 2000).

Eulàlia P. Abril (Ph.D., University of Wisconsin-Madison) is an assistant professor of Communication at the University of Illinois at Chicago. Her research areas include health and political communication, new media effects, persuasion, and public opinion.

Glen Szczypka (M.A., DePaul University) is the Deputy Director of the Health Media Collaboratory and Principal Research Scientist at NORC at the University of Chicago. He is a Senior Consultant for the CDC's Office on Smoking and Health and has over 15 years of experience working with government and nonprofits to evaluate and measure the effectiveness of public health campaigns.

Sherry L. Emery (Ph.D., University of North Carolina at Chapel Hill) is the Director, of the Health Media Collaboratory and Senior Fellow at NORC at the University of Chicago. Her research has focused on tobacco-related media campaign evaluation, social media measurement and analysis, tobacco marketing, and tobacco control policy.

Color versions of one or more of the figures in the article can be found online at www.tandfonline.com/hbem.

The U.S. Center for Disease Control and Prevention (CDC) launched the Tips from Former Smokers campaign (henceforth, "Tips") in 2012 with a budget of $54 million for its first year,[1] making it the first nationwide, anti-smoking campaign ever rolled out (Harris, 2012). This expenditure was warranted given that smoking was (and continues to be) the number one preventable killer and agent of disease in the United States (CDC, 2011). Tips used real-life stories from former smokers enduring the long-term health consequences of smoking, including stoma, amputation, tracheotomy, paralysis, and heart surgery (Flock, 2012). All Tips ads belonged to the genre of health consequences of smoking (Abril, Emery, Bucy, Alexander, & Pederson, 2012), and contained high levels of fear appeals.

This study seeks to examine the range and relative importance of fear control responses generated by the 2012 Tips campaign through social media artifacts (Zhao, Liu, Tang, & Zhu, 2013). An advantage of social media artifacts over techniques such as focus groups or surveys is that social media platforms provide an organic setting (as setting in which population responses are gathered unprompted). Despite a general sense among scholars and policy makers of the urgency of studying health campaign responses in organic settings, (Witte & Allen, 2000), few studies have followed suit (with some exceptions, like Emery, Szczypka, Abril, Kim, & Vera, 2014).

A handful of studies have used Twitter to examine public responses to issues and campaigns (Himelboim & Han, 2013; Park, Rodgers, & Stemmle, 2013). In 2012, the Tips campaign generated 193,491 unique tweets in just four months. The tweets collected for the present analysis were collected from the Twitter Firehose, which contains all tweets generated by public accounts.[2] Analyses will consist of confirming traditional fear control responses within the EPPM (denial, defensive avoidance, and reactance), and exploring additional responses. Research within the EPPM has typically been confined to testing for the presence of these traditional fear control responses.[3] However, most studies have tested whether experimental treatment could elicit a specific response (e.g., reactance), rather than testing the potential set of responses that may organically emerge from a given message or campaign. Hence, these methods fail to consider coping strategies such as humor (Martin, 2010) and provide minimal information as to the relative importance of each fear control response.

We seek to theorize about the contribution of humor as fear control response, proposing that EPPM's composition of boomerang responses should include humor. On a practical level, practitioners may benefit from knowing the relative importance of fear control responses, as it will make it easier to design messages that can buffer a greater number of such responses.

Literature Review

The Extended Parallel Process Model

Fear appeals have been used extensively as a persuasive tool to influence audiences toward desirable outcomes like smoking cessation. Scholars have historically

tried to assess the persuasiveness of fear appeals, constructing different models to explain how appeals work, fail, or boomerang (see Witte, 1998). The Extended Parallel Process Model (EPPM) is the most recent model that incorporates success (intended outcome) and failure (unintended outcome or lack of outcome) of fear appeals. The EPPM also considers both cognitive and emotional routes and decomposes the persuasive process into various elements, thus facilitating the manipulation and analysis of its components (Witte, 1992; Popova, 2012).

The EPPM (Witte, 1992, 1998) poses that when individuals are exposed to fear appeals, two appraisals typically occur. The first appraisal is threat appraisal and consists of assessing how much threat the fear appeal poses, in terms of severity and susceptibility.[4] If individuals perceive no threat, the process stalls without an outcome (in terms of attitude, intention, or behavioral change); the message is disregarded. However, if the threat is appraised as such (i.e., the threat reaches high enough levels), individuals are then motivated to begin the second appraisal. At this point, individuals are scared. The second appraisal assesses perceived efficacy (both self-efficacy and message efficacy).[5] It involves evaluating how to cope with the recommended response (in the fear appeal message) in terms of ease, feasibility, and practicality. When perceived efficacy is larger than perceived threat, individuals engage in protective motivation; they are motivated to take action (attitude, intention, or behavioral response) to lessen the threat. In this case, they accept the message and embark on danger control (e.g., "I better seek help to quit smoking").

On the other hand, when perceived efficacy is *not* larger than perceived threat, individuals bypass thoughts about threat and efficacy and take a defensive stand (in terms of attitude, intention, or behavior). In this case, they reject the message and go into fear control mode. This path is often called "boomerang" because the message response changes from a persuasive to an unsuccessful trajectory, generating a contrary effect to its original purpose in terms of attitude, intention, or behavioral outcome (Byrne & Hart, 2009; Witte, 1992).

In sum, the EPPM suggests that individuals weigh perceived threat first and perceived efficacy thereafter in a manner that generates three outcomes: disregard of the fear appeal message (little to no threat processing), fear appeal message acceptance (danger control processing), and fear appeal message rejection (fear control processing). Thus, perceived threat (directly linked to fear appeals in messages) and perceived efficacy (linked to message efficacy but also inherent in individuals) ultimately determine the three potential outcomes.

Findings from fear appeals meta-analyses suggest that *any* message with a high enough level of fear appeals—regardless of the level of efficacy—produces more message acceptance than *any* message with a low level of fear appeals (Witte & Allen, 2000). In fact, a recent study also using Twitter to assess population responses to the Tips campaign found that message acceptance was present in 87% of the tweets (Emery et al., 2014).

Fear dosage is critical. Consequently, messages frequently go awry. Boomerang responses happen and may constitute a non-trivial outcome. For instance, an analysis of Tips 2012 indicated that 7% of the messages boomeranged (Emery et al.,

2014). Analyses based on tests of the EPPM conclude that acceptance or rejection of fear-inducing messages depend upon the interplay between the level of fear elicited, levels of perceived efficacy (either response- or self-efficacy), and contextual factors (Witte & Allen, 2000; Witte, 1992, 1998). Let us examine what takes place when messages boomerang.

Fear Control Responses

A convincing body of evidence suggests that messages evoking fear may be disregarded or, worse, boomerang (Byrne & Hart, 2009; Emery et al., 2014; Henriksen, Dauphinee, Wang, & Fortmann, 2006; Witte, 1992, 1994; Wolburg, 2006). Fear control responses are boomerang effects arising from intended construct activation (i.e., advertisement constructs intentionally incorporated to attract audiences' attention toward them; Byrne & Hart, 2009). These responses are different from danger control responses in which individuals are thinking of ways to change their behavior (in this case, individuals are not avoiding the threat). Conversely, if audiences are avoiding the threat, they are not thinking about the ways in which they can protect themselves (Witte, 1992, p. 341).

In EPPM studies, only three fear control responses are often described: denial ("this cannot possibly happen"), defensive avoidance (circumventing the threat so that it is not visible), and reactance (rebelling against whoever is threatening individuals' freedom;[6] Popova, 2012; Ruiter, Verplanken, Cremer, & Kok, 2004; Stephenson & Witte, 1998; Witte & Allen, 2000; Witte, Cameron, McKeon, & Berkowitz, 1996). It is typical to bundle together these three responses under fear control because the objective of most studies about health campaign effectiveness is to assess the rate of message acceptance, the rate of message rejection, or both, but not how message rejection happened.

When scholars have tested the different fear control responses in experimental studies, participants are usually asked the extent to which they agree with statements of denial, defensive avoidance, and/or reactance after being exposed to treatments of fear appeals and/or efficacy. Results indicate that denial, defensive avoidance, and reactance are habitual outcomes (Ruiter et al., 2004; Stephenson & Witte, 1998; Witte et al., 1996). Non-experimental research employing the EPPM has also taken a look at the elicited responses of audiences to fear appeals, for instance via interviews (Wolburg, 2006), or, more recently, content analysis of Twitter data (Emery et al., 2014). In both cases, the presence of the three main fear control responses was confirmed, though not comparatively quantified.

An area in which scholars have urged researchers to focus is the assessment of campaigns' fear control responses organically emerging from individuals (Abril et al., 2015; Maloney et al., 2011; Witte & Allen, 2000); that is, unprompted. Twitter messages are a good example of unprompted responses. The platform's social media messages reflect spontaneous thoughts, potentially offering more accurate insights into users' thought processes than would be available in a traditional

focus-group setting (e.g., Wilkinson, 1998). Moreover, the ability to collect many (tweets), as opposed to fewer (interview participants) units also represents an advantage in terms of variance potential.

Both in non-experimental research using audience responses (Emery et al., 2014) and in experimental research (Witte & Allen, 2000), denial, defensive avoidance, and reactance have been confirmed. Therefore, we also expect that Twitter responses will contain messages representing instances of denial, defensive avoidance, and reactance regarding the Tips campaign. In turn, we propose the following hypotheses:

H$_1$: Among fear control tweets, there will be a significant set of responses indicating denial.

H$_2$: Among fear control tweets, there will be a significant set of responses indicating defensive avoidance.

H$_3$: Among fear control tweets, there will be a significant set of responses indicating reactance.

In addition to the maladaptive responses considered within the EPPM, this study also seeks to uncover ancillary coping responses, particularly relating to humor. The next section undertakes this venture.

Humor as a Fear Control Response

Among psychological coping strategies—beyond denial, defensive avoidance, and reactance—humor holds a promise. Research has validated the use of humor to cope with stress, anxiety, and fear (Martin, 2010), which are all potential responses to fear appeals (Witte, 1992). However, the conceptualization of humor as a response to fear, and the integration of this hypothesis to the EPPM have yet to emerge in the literature.

Emery and colleagues' (2014) study examining Twitter population responses to the Tips campaign revealed that there might be responses beyond denial, defensive avoidance, and reactance. For instance, tweets that poked fun at the ads were increasingly noted (e.g., "Smoking commercial on makes me laugh @XXX[7] everytime").[8] The tone of Tips ads was not humorous; they contained graphic descriptions of health effects in which actual smokers suffered serious health consequences at a relatively early age (see the Appendix).

This is not the first time researchers have noted humorous responses to fear appeals ads. Wolburg (2006) found that teens reacted by mocking anti-smoking campaigns when asked about these campaigns. To code these responses, she classified them (implicitly) as denial,[9] but did not engage in discussion as to whether humor responses were a separate fear control category. Similarly, Stuteville (1970) mentioned (in passing) that individuals may react jokingly when in danger (p. 44), and Helme et al. (2011) stated that humor can be used to defuse fear appeals. However, both the Stuteville and Helme studies failed to clarify whether humor responses occurred as a response to fear (Helme et al., 2011, pp. 376–377), so further research is warranted.

A humorous reaction to the Tips ads cannot be categorized as a "disregard" or "no threat perceived" category because the disregard category refers to reactions that avoid fear (Witte, 1992). Yet, tweets with humor do not disregard fear appeals but engage with them. Similarly, humor tweets cannot be considered a message acceptance strategy either because there is no evidence of Twitter users working toward eliminating the danger (being fearful of smoking and thinking about quitting or never smoking, for instance). However, humor tweets are a form of rejecting the message (boomerang).

If humor emerges from the processing moving toward fear control, the next question is whether humor is a separate response from denial, defensive avoidance, and reactance. While it may be legitimate to discuss whether humorous responses can be viewed as denial (like Wolburg, 2006, did), it is noteworthy to observe that denial explicitly mentions that the message is not credible—not possible. However, when individuals post humorous tweets, such mentions do not occur. The content often refers to elements of the message that are funny (e.g., the voice "Every Tim's the smoking commercial comes on when the talk with the thing on there neck I L O L ??") or the general fun of the ad (e.g., "That smoker commercial funny AF").

Similarly, considering humor as defensive avoidance would mean that explicit language about circumventing the threat (to avoid seeing it or hearing it) is present; there is a need for distance. Yet, humor messages engage with the fear appeal elements such as the hole in the neck or the boxy voice. There is no language about the need to disengage with the ads; viewers are not motivated to take action to distance themselves from the threat; they actually laugh *at* it.

Finally, humor does not fit in the reactance category. Reactance refers to rebelling against a threat that is hostile to freedom (i.e., explicit language about threatening elements) and/or restoring freedom (i.e., smoking). Again, there is no mention of these in the humor messages. How can we conceptualize humor, then?

The psychology of humor (for a review, see Martin, 2010) does include the function of coping before the presence of fear. According to the original formulation of the EPPM, "[f]ear control processes are defined as primarily emotional processes where people respond to and *cope with* their fear, not to the danger." [Italics are added]. As such, humor may be considered a legitimate coping response, and thus a fear control response.

Humor as Fear Defusing

Freud[10] already viewed humor as an anxiety response (as cited in Martin, 2010). When excess built-up energy in the nervous system (such as from fear) is no longer needed, it must somehow be released. Laughter and humor are ways for this to occur. The psychological explanation revolves around the idea that individuals may respond to fear by defusing it. Poking fun and mocking the ads (e.g., the stoma, the boxy voice) acts as fear defusing; steaming off; shedding anxiety. Under this scenario, the fear is not denied or avoided, but defused and depressurized. Indeed, scholars agree that humor can lessen the perception of fear in individuals (Helme et al., 2011; Steele, 2012).

The Tips ads could also heighten the awareness of mortality by invoking proximal death due to smoking and thus stimulating individuals' unconscious existential concerns (such as those treated in Terror Management Theory; Rosenblatt, Greenberg, Solomon, Pyszczynski, & Lyon, 1989). In turn, existential concerns may cause psychological discomfort. In this case, humor could serve as a coping strategy against heightened awareness of death (Elgee, 2003; Roberts, Eakin, & Motyl, 2009). Finally, in certain strands of the psychotherapy literature, laughter has been shown to help dissipate fear (Mora-Ripoll, 2010). In fact, humor relieves fear and anxiety during psychotherapy, though its use remains controversial (Ortiz, 2000).

Besides coping, humor can also serve a malign purpose wherein individuals expose their darker side when provoked. This equally plausible explanation for humor involves the benign-violation hypothesis (McGraw & Warren, 2010).

Humor within the Benign-Violation Hypothesis

In the benign-violation hypothesis (McGraw & Warren, 2010), three conditions are jointly necessary and sufficient in order to elicit humor: (a) A situation must be appraised as a violation of what is "normal" (e.g., a physical deformity like a stoma or an unusual accent like the boxy voice), (b) a situation must be appraised as benign (e.g., seeing the characters in the ads as an oddity, not as a product of smoking), and (c) (a) and (b) ought to occur simultaneously (p. 1142). Basically, anything that is threatening to individuals' sense of how the world "ought to be" is bound to be humorous, so long as the threatening situation also is benign.

What constitutes a benign violation is one of three scenarios: (1) A salient norm suggests that something is wrong (like laughing at someone who is ill), but another salient norm suggests that it is acceptable (if that person smoked so much, then you may become ill) (2) Individuals are only weakly committed to the violated norm (individuals have a more lenient moral compass). Or (3) the violation is psychologically distant (when something like a stoma seems hypothetical, and thus psychologically distant).

Under these scenarios, humor, although containing some elements of denial, visibly has some elements that do not belong to any of the three typical fear control responses, such as seeing the consequences of smoking on the human body (the violation). Freud already mentioned this type of humor (which he denoted as "wit"), and considered it to be unhealthy (as cited in Martin, 2010, p. 35). Similarly, the notion of "schadenfreude" or laughing at other people's expense (Martin, 2010) also could be contemplated under this umbrella of malign humor.

Taking into consideration both hypotheses of humor (coping and benign violation hypothesis), humor is classified as message rejection. However, humor ought to be a separate category of fear control because there is no explicit denial, avoidance of, or reactance to the fear. In light of this new response category of fear control, the intriguing question is whether the tweets poking fun actually constitute a significant set of the fear control responses. Therefore, we pose the following research question:

RQ$_1$: Among fear control tweets, is there a significant set of humor responses?

There is the possibility that other categories of maladaptive responses to fear exist. To leave this possibility open, the following research question is proposed:

RQ$_2$: Among fear control tweets, is there another category of responses beyond denial, defensive avoidance, reactance, and humor?

Lastly, to examine the relative amount of fear control strategies (denial, defensive avoidance, reactance, humor, and possible others), we propose to test their relative importance. The answer to this inquiry may guide scholars and practitioners to a more complete depiction of the boomerang response repertoire within the EPPM. Further, it may help determine which response practitioners should pay attention to—and try to diminish the most—when designing similar anti-smoking campaigns. We offer the following research question:

RQ$_3$: Which fear control response is the most common?

Methods

The Tips Campaign

The Tips campaign (see www.cdc.gov/tobacco/campaign/tips and the Appendix) was the first time the federal government used paid advertising to prevent smoking and encourage quitting (Harris, 2012). In 2012, the 12-week campaign reached every media market in the United States, with advertising on billboards, television, radio, print, and the Internet, targeting adults 18–54 years old (Flock, 2012). In total, twelve former smokers participated in the 2012 campaign.

Evidence suggests that Tips achieved its goal of reducing smoking in the United States. Data from the CDC suggested a 132% increase in call volume to its national quit line, compared to the same 12-week period in 2011, and unique visits to the national quit Web site increased by 428% compared to 2011. Overall, 718,090 additional calls and unique Web site visits were recorded during the Tips campaign (Augustson et al., 2012). Data from population surveys will ultimately provide further evidence about longer-term outcomes such as the level of successful quitting. Still, social networking data may offer valuable insights into how viewers reacted to the ads. In particular, Twitter reveals the specific responses of viewers who experienced a boomerang effect to the Tips campaign.

Sample and Data

This study uses data drawn from a larger study (Emery et al., 2014) examining Twitter data related to the Tips campaign collected during the course of the campaign, 15 March through 9 June, 2012. Data were obtained from the Twitter "Firehose" using Gnip, Inc. (www.gnip.com) as a vendor. Unlike accessing the

publicly available data via the Twitter streaming API (Twitter's Application Program Interface), the Firehose provides real-time access to 100% of all public tweets and metadata.[11] Potentially relevant tweets were filtered using a broad set of content-specific keywords, following methods proposed by Stryker, Wray, Hornik, and Yanovitzky (2006).

In order to assess the quality of the data collected, two measures were employed: precision and recall (Mitchell, 1997). A trained naïve Bayes classifier determined that 193,491 (79%) of tweets pulled from the Firehose using our keyword filters were identified as Tips-relevant (precision). Among the random sample of approximately 13,000 unretrieved tweets, human coders found 16 tweets to be relevant to Tips. Adjusting for the sampling fraction (0.14%) of non-retrieved tweets, recall was calculated at 94% (see Emery et al., 2014 for further details).

Twitter Population Considerations

Even though the *quality* of the population data collected from Twitter is remarkable, there are some considerations to ponder with regard to the data's *representativeness*. Even with access to Twitter metadata, assessment of public Twitter account demographics is not feasible. The available information about the characteristics of Twitter users exists at the population level via survey research. The Pew Internet & American Life Project describes internet users who use Twitter as predominantly young (with 30% aged 18–29) and racially diverse (with 27% African American and 28% Latino); they also tend to be urban dwellers and middle- to higher-income (Brenner & Smith, 2013).

The Twitter population thus disproportionally mimics the population of smokers in the United States. For instance, young adults have higher smoking prevalence than the general population, and African Americans suffer disproportionately from tobacco-related diseases (Dietz, Sly, Lee, Arheart, & McClure, 2013; Peters et al., 2012; Stingone, Funkhouser, Weissler, Bell, & Olshan, 2013). Neither of these subpopulations is well-represented in mainstream research settings. Therefore, Twitter may provide insight into opinions not traditionally captured in research.

Coding Procedure and Intercoder Reliability

Human coding was used to assess relevance and code message content. The coders received training that consisted of viewing all ads that were part of the Tips campaign, then meeting as a group to review, discuss, and refine coding criteria. At the onset of this study, the body of Tips-relevant tweets was already coded for fear appeals (message acceptance, message rejection, or disregard) according to the EPPM (Witte & Allen, 2000; Witte, 1992, 1994, 1998).[12]

Of importance here, message rejection was defined as content reflecting doubt about the threat message, the viewer's inability to deal with the fear, or the viewer

being overwhelmed by fear. In such cases, the individual could use denial (e.g., "That smokefree commercial is bullsh*% ! My grandma has been smoking since she was ten and she doesn't have a hole in her da@# neck"); defensive avoidance (e.g., "Ughhhhhh that smoking commercial is on! Turn immediately"); or reactance (e.g., "I cant help but light a cigarette afta i see tha smokers commercial") to cope with fear, and such tweets would be coded as message rejection. Moreover, a humor category was also added (e.g., "*in smokers voice* My name is suzie and i used to be a smoker .. lmao .. i really try not to laugh at that commercial"). In total, 14,281 (7% of the relevant)[13] tweets were coded as fear control responses.

Human coding consisted of three coding cycles to ensure quality control. The first round was exploratory. Two researchers jointly coded a random sample of all relevant Tips tweets with sufficient power to test proportions (N = 542). Results from this initial exercise yielded the following results for fear control taking the entire sample as denominator: denial (2%), defensive avoidance (3%), reactance (1%), and humor (7%)—a total of 13% of tweets were fear control responses. No other fear control responses were noted. Thus, results from this sample are slightly different from the population results, which only had 7% of tweets indicating fear control. If only accounting for fear control responses, the results were, in order of importance, humor (54%), defensive avoidance (25%), denial (14%), and reactance (7%).

The second round of coding was set up to ensure acceptable intercoder reliability when using the codebook of fear control responses. A random sample among fear control tweets was selected (N = 100). Three trained researchers coded the sample for denial, defensive avoidance, reactance, humor, and other, yielding an average Kappa of .71, which was acceptable (Landis & Koch, 1977).

Given satisfactory agreement among coders, the third round involved a new random sample—and the sample from which results in this study will be derived—drawn among fear control tweets. Five coders were selected to code a sample of fear control responses (N = 1,350), with the categories denial, defensive avoidance, reactance, humor, and other potential categories. A random sub-sample of this sample (n = 100) was coded by all coders for intercoder reliability. The average Kappa was .79, an acceptable statistic (Landis & Koch, 1977).

To be sure, coding categories (dominant fear control response) were exhaustive and mutually exclusive (Neuendorf, 2002), though we recognize that two or more fear control responses may conflate in a single tweet (e.g., "I remember when my homie said 'that smokers commercial makes me want a cigarette' … lol" the response in this tweet contains reactance and humor). In this case, coding consisted of the *dominant* category (reactance).

To ensure that the incidence of conflating fear control responses was not high, we further coded a random sample of tweets (N = 100). Two coders coded another 100 random fear control tweets to detect conflating categories. Each tweet was coded for all the possible fear control responses, which each response (denial, defensive avoidance, reactance, and humor) coded as 1 (present) or 0 (not present). The incidence of conflating categories was 2% (average K = .92). A conflated category was defined as the presence of two fear response categories in one tweet. Results

showed that the incidence of more than one fear control response was minimal (around 2%). In all cases, the dominant category was easily identified.

Content analysis will consist of non-parametric tests (H_{1-3} and RQ_{1-2}). Additionally, analysis will include non-parametric (Mann-Whitney U) tests to assess differences among different fear control responses (RQ_3), that is, whether there is a most common response.

Results

Among Twitter fear control responses to the Tips campaign, approximately 2.9% were coded as denial (n = 39, p = .00), 4.5% as defensive avoidance (n = 61, p = .00), 4.8% as reactance (n = 65, p = .00), and 86.3% as humor (n = 1,165, p = .00). Because all non-parametric tests of significance were significant, we can conclude that all categories *are* in fact represented as dominant in fear control responses to the Tips campaign, thus confirming H_{1-3} and answering RQ_1. A list of examples of tweets representing each of the four fear control responses is shown in Table 1.

Results indicated that no other maladaptive response category was present in the data, so no more categories were added to the analysis (RQ_2).

Regarding the relative importance of each fear control response, results indicated a significant presence of humor (86.3%) over reactance (4.8%), Z = -31.37, p = .00, r = .85,[14] but not for reactance (4.8%) over defensive avoidance (4.5%), Z = -.36, p = .72, r = .01. Finally, analysis also showed a significant presence of defensive avoidance (4.5%) over denial (2.9%), Z = -2.2, p = .03, r = .06. Thus, the most likely fear control response was humor, followed by reactance or defensive avoidance, and denial, respectively (RQ_3). It is worth noting that humor represented the response with the most dominant category at 86.3%, an indeed very large effect.

Discussion

The 2012 Tips campaign was a remarkable success (Augustson et al., 2012). Among people using Twitter responding to the campaign ads, the vast majority reacted by accepting the threatening messages, that is, with attitudes or intentions to take action against smoking (Emery et al., 2014). Yet, a non-trivial set of responses backfired. Although this set of boomerang tweets was definitely small (7% of all Tips tweets), scholars and practitioners should examine these responses and learn how they can be minimized (Byrne & Lee, 2011).

Within the EPPM, denial, defensive avoidance, and reactance are boomerang responses to fear appeals confirmed in experimental research. However, few studies have substantiated that these are indeed organic responses (data collected under a natural setting) to fear-appeal campaigns. Therefore, our first contribution is corroborating that denial, defensive avoidance, and reactance are actual boomerang responses to a large, national, anti-smoking campaign among the Twitter population.

Table 1
Examples of Tweets under each Fear Control Response

Denial

I don't know what them people in those creepy commercials been smoking but it was more than cigarettes

What the fuck has to happen so you wind up like the lady in the smoking commercial with the hole in her neck … just smoking can't do that

john wayne did chesterfield cigarette ads: #sixwords.

I don't see how those cigarette commercial doesn't make cigarette smokers want to stop smoking.

That smoke commercial just came on.. I'm sure that only happen to people who smoke meth or sumn..

Defensive Avoidance

@XXX: I really been tryna hide from those tobacco stoma commercials..

Thought I had avoided those "smoking destroys your body!" commercials. Nope.

RT @XXX: I wish they stop showing this smoker commercial with this old white lady sounding like Daffy Duck

I hate all these anti smoking commercials. I get it I'm gonna die if I don't quit. #leavemealone

I swear they need to take the smoking commercial off the tv ..

Reactance

If they don't stop with the hole in the throat robot voice commercials, I'm going to start smoking out of spite.

RT @XXX: Anti-smoking commercials are so annoying that I'm debating taking up smoking.

There is nothing I'd rather do than light up a cig when I watch the anti smoking commercials

RT @XXX: Every time I see an anti smoking commercial I light one up. #fuck it

puffs my black RT @XXX Dese damn smokin commercials<<<<.…….*Lights up a Newport*

Humor

I laugh so hard every time I see that smoking commercial cause I think of Kenneth ._. Hahahaha

Rofl this smoke free commercial I'm cold lol but that shit is funny 2 me

' lmmfao, det cigarette commercial kml sh.t funny af.

You know your a carmel kid when your laughing at those smoking commercials

Smh lol RT"@XXX: I hope everybody in those cigarette commercials roll over and die."

Our second contribution relates to observing and quantifying humor as an added fear control response. We argue that humor responses to fear appeals should be considered a separate boomerang strategy because they do not fit directly within traditional fear control responses (denial, defensive avoidance, and reactance). Humor has been mentioned incidentally in the literature as a fear control response (e.g., Wolburg, 2006), but its presence has never been formally tested.

The presence of humor can only be viewed as a fear control strategy. This is because Tips consisted of well-executed ads invoking fear with graphic and gory visuals (Brown, 2012; Flock, 2012). The context for humor in Tips is thus rather thin. Our study does not focus on whether humor is or is not prevalent on Twitter (some say it can be, e.g., Holton & Lewis, 2011; others, not so much, e.g., Westman & Freund, 2010). The presence of humor on Twitter seems to depend on the topic and context of the tweets. Furthermore, the tweets analyzed could be directly linked to the Tips campaign; otherwise, they were not part of our study population. The 2012 data were fetched and sifted using keywords and a machine classifier. Keywords were selected to maximize precision and recall and enhance internal and external validity (see Emery et al., 2014).

Finally, our last contribution constitutes a cautionary tale that scholars and practitioners ought to look beyond denial, defensive avoidance, and reactance since these may not be the bulk of fear control responses. In our case, the majority of boomerang messages were humor tweets.

As is the case in most studies, our research suffers from some limitations. Twitter is still not widely diffused among the U.S. adult population. Therefore, analyzing tweets provides limited generalizability to the U.S. population as a whole. A report about Twitter contemporaneous to Tips put Twitter membership at 18% (Brenner & Smith, 2013). Beyond (limited) penetration within the U.S. population, Twitter metadata do not allow full demographic characterization of the individuals generating tweets. Thus, we cannot report the demographic characteristics associated with users who had fear control responses. This feature has two implications. First, we cannot describe the similarities or differences between those who tweeted about the Tips campaign and others who also saw the ads but did not tweet about them—(who may also have a reaction to the Tips campaign). Second, and most important, there is no way to determine whether the messages were generated by smokers, former smokers, individuals who have never smoked, potential smokers, or individuals who are contemplating, thinking, or seeking help to quit.

Still, given that survey data portray Twitter users as predominantly young, African American and Latino (Brenner & Smith, 2013)—mimicking the smoker population (Dietz et al., 2013; Peters et al., 2012; Stingone et al., 2013)—results from Twitter messages may offer insight to campaign reactions not traditionally captured in mainstream media effects research such as experiments.

The EPPM is a well-constructed, comprehensive theory of fear effects (Witte, 1992) that has been validated by hundreds of studies. However, the studies to date have not ventured to confirm fear control responses beyond denial, defensive avoidance, and reactance. Our findings confirm that humor responses constitute

the largest set of fear control tweets, and thus should not be taken lightly. Although these findings are original, there are still unanswered questions that should be addressed in future research. For instance, which specific ad factors generate humor responses to ads that should evoke sadness, concern, or shock? Are there features in the ads that account for these reactions, or are these reactions due to audience characteristics that are harder to modify? Which humor responses (fear defusing or benign violation hypothesis) are linked to these ad features? Moreover, future research should sort out whether humor reactions are more likely on Twitter compared to other media or face-to-face. Although Wolburg (2006) did note humor reactions to fear-appeals tobacco campaigns beyond Twitter, she did not quantify fear control responses. So it remains an empirical question whether the prevalence of humor responses is a global phenomenon or a Twitter-related outcome.

Smoking is still common and toxic, and therefore efforts to reduce its prevalence should be taken seriously. Undertakings like the Tips campaign represent an important step toward curbing tobacco consumption, but they also show that researchers need to consider all possible audience reactions, even humorous ones. We hope that, by shedding light on humor responses, we have enriched the EPPM and opened a new avenue of research, namely humor as a fear control response. Both theoretical explanations (humor as fear defusing and humor within the benign-violation hypothesis) have the potential to aid practitioners and scholars in searching for mechanisms to revert or at least curtail boomerang effects.

Funding

Notes

1. The Tips campaign was also re-launched in 2013–2017.
2. Only tweets from account users who have a public account (support.twitter.com) can be fetched. However, about 92% of users share their tweets with everyone (Meeder, Tam, Kelley, & Cranor, 2009).
3. Byrne and Hart (2009) also note that selective exposure is a boomerang mechanism that can occur as consequence of exposure to fear, but it has not been validated in the literature (as a fear control response).
4. Severity (e.g., how harmful smoking is) and susceptibility (e.g., whether I am at risk of throat cancer) are treated in an additive manner (Witte, 1998).
5. Message efficacy (e.g., help provided in this quit line) and self-efficacy (e.g., I am able to quit smoking) are treated in an additive manner (Witte, 1998).

6. Fear control responses are sometimes named differently. For instance, reactance is also named perceived manipulation; denial is also named issue derogation (Witte, Berkowitz, Cameron, & McKeon, 1998).
7. Twitter user names have all been redacted.
8. Tweets have not been edited and are hence shown verbatim throughout.
9. Many of the quotes in her study refer to laughter by those watching the ads (Wolburg, 2006, pp. 306, 308, 314).
10. Freud borrowed the idea that the purpose of laughter is to release excess nervous energy from Herbert Spencer (1860).
11. Twitter's API samples from the Firehose. API sampling varies anywhere from 1–60% of Twitter content (https://dev.twitter.com/docs/streaming-apis).
12. A standardized code set was constructed and eight human coders were paired into four coding teams to classify a random sample ($N = 1,400$; 350 tweets per dyad) of the Tips-relevant tweets ($N = 193,491$) for message acceptance, rejection, or disregard. Intercoder reliability for content coding was acceptable ($K = .75$). This code set was then used to train the naïve Bayes classifier to machine classify the corpus of Tips-relevant tweets.
13. The relevant Tips tweets are the population of 193,491 tweets.
14. r is the effect size (Rosnow & Rosenthal, 1996). Small ≤ .1, medium > .1 ≤ .5, large > .5.

ORCID

Eulàlia P. Abril ⓘ http://orcid.org/0000-0002-8843-3163

Glen Szczypka ⓘ http://orcid.org/0000-0001-5024-8395

Sherry L. Emery ⓘ http://orcid.org/0000-0001-9278-9990

References

Abril, E. P., Emery, S. L., Bucy, E. P., Alexander, R., & Pederson, L. (2012). Not all anti-smoking ads are created equal. Evaluation of ad genre on attitudinal outcomes and quitting intentions. In *International Communication Association Annual Conference. Health Communication Division*. Phoenix, Arizona.

Abril, E. P., Kupczyk, M., Zwicke, G. L., Mastarone, G. L., Irwin, T., & Dykens, A. (2015). Health communication practices in rural Senegal. An assessment to support cervical cancer screening. *Journal of Applied Communication Research*, *43*, 242–262.

Augustson, E., Bright, M. A., Babb, S., Malarcher, A., Rodes, R., Beistle, D., . . . Mowery, P. (2012). Increases in quitline calls and smoking cessation website visitors during a national tobacco education campaign: March 19–June 10, 2012. *Morbidity and Mortality Weekly Report*, *61*, 667–670.

Brenner, J., & Smith, A. (2013). *72% of online adults are social networking site users*. Washington, D.C. Retrieved from http://pewinternet.org

Brown, D. (2012, 14 March). New anti-smoking ad campaign features personal profiles of tobacco victims. *The Washington Post*. Washington, D.C. Retrieved from http://www.washingtonpost.com/national/health-science/new-anti-smoking-ad-campaign-features-personal-profiles-of-tobacco-victims/2012/03/14/gIQAPxjvCS_story.html?tid=wp_ipad

Byrne, S., & Hart, P. S. (2009). The boomerang effect. A synthesis of findings and a preliminary theoretical framework. In C. Beck (Ed.), *Communication yearbook 33* (pp. 3–37). Mahwah, NJ: Lawrence Erlbaum.

Byrne, S., & Lee, T. (2011). Toward predicting youth resistance to internet risk prevention strategies. *Journal of Broadcasting & Electronic Media*, *55*, 90–113.

Centers for Disease Control and Prevention (CDC). (2011). *Adult smoking in the U.S*. Retrieved from http://www.cdc.gov/vitalsigns/AdultSmoking/

Dietz, N. A., Sly, D. F., Lee, D. J., Arheart, K. L., & McClure, L. A. (2013). Correlates of smoking among young adults: The role of lifestyle, attitudes/beliefs, demographics, and exposure to anti-tobacco media messaging. *Drug and Alcohol Dependence*, *130*, 115–121.

Elgee, N. J. (2003). Laughing at death. *Psychoanalytic Review*, *90*, 475–497.

Emery, S. L., Szczypka, G., Abril, E. P., Kim, Y., & Vera, L. (2014). Are you scared yet? Evaluating fear appeal messages in tweets about the Tips campaign. *Journal of Communication*, *64*, 278–295.

Flock, E. (2012). March Watch CDC's graphic Tips from Former Smokers ads. *The Washington Post—Blogs*. Retrieved from http://www.washingtonpost.com/blogs/blogpost/post/cdc-unveils-graphic-tips-from-former-smokers-ad-campaign/2012/03/15/gIQA9VpVES_blog.html

Harris, G. (2012). CDC finances nationwide antismoking ad campaign, a first. *The New York Times*. Retrieved from http://www.nytimes.com/2012/03/15/health/policy/cdc-finances-nationwide-antismoking-ad-campaign-a-first.html

Helme, D. W., Noar, S. M., Allard, S., Zimmerman, R. S., Palmgreen, P., & McClanahan, K. J. (2011). In-depth investigation of interpersonal discussions in response to a safer sex mass media campaign. *Health Communication*, *26*, 366–78.

Henriksen, L., Dauphinee, A. L., Wang, Y., & Fortmann, S. P. (2006). Industry sponsored anti-smoking ads and adolescent reactance: Test of a boomerang effect. *Tobacco Control*, *15*, 13–8.

Himelboim, I., & Han, J. Y. (2013). Cancer talk on Twitter: Community structure and information sources in breast and prostate cancer social networks. *Journal of Health Communication*, 1–16.

Holton, A., & Lewis, S. C. (2011). Journalists, social media, and the use of humor on Twitter. *Electronic Journal of Communication*, 21.

Landis, J. R., & Koch, G. G. (1977). The measurement of observer agreement for categorical data. *Biometrics*, *33*, 159–174.

Maloney, E. K., Lapinski, M. K., & Witte, K. (2011). Fear appeals and persuasion: A review and update of the Extended Parallel Process Model. *Social and Personality Psychology Compass*, *5*, 206–219.

Martin, R. A. (2010). *The psychology of humor: An integrative approach*. Burlington, MA: Elsevier Academic Press.

McGraw, A. P., & Warren, C. (2010). Benign violations: Making immoral behavior funny. *Psychological Science*, *21*, 1141–1149.

Meeder, B., Tam, J., Kelley, P. G., & Cranor, L. F. (2009). RT @ IWantPrivacy: Widespread violation of privacy settings in the Twitter social network. In *Web 2.0 Privacy and Security Workshop, IEEE Symposium on Security and Privacy*.

Mitchell, T. M. (1997). *Machine learning*. Chicago, IL: McGraw-Hil.

Mora-Ripoll, R. (2010). The therapeutic value of laughter in medicine. *Alternative Therapies in Health and Medicine*, *16*, 56–64.

Neuendorf, K. A. (2002). *The content analysis guidebook*. Thousand Oaks, CA: Sage.

Ortiz, C. (2000). Learning to use humor in psychotherapy. *The Clinical Supervisor*, *19*, 191–198.

Park, H., Rodgers, S., & Stemmle, J. (2013). Analyzing health organizations' use of Twitter for promoting health literacy. *Journal of Health Communication*, *18*, 410–25.

Peters, R. J., Kelder, S. H., Johnson, R. J., Prokhorov, A. V, Meshack, A., Jefferson, T., & Essien, E. J. (2012). Cigarette smoking topography among alternative school youth: Why African American youth smoke less but are at higher long-term risk. *Journal of Psychoactive Drugs*, *44*, 252–258.

Popova, L. (2012). The extended parallel process model: Illuminating the gaps in research. *Health Education & Behavior*, *39*, 455–73.

Roberts, T.-A., Eakin, L. B., & Motyl, M. (2009). Laughing in the face of death: Laughter's palliative effect on existential death anxiety. In *Annual Meeting of the Society for Personality and Social Psychology*, Tampa, FL.

Rosenblatt, A., Greenberg, J., Solomon, S., Pyszczynski, T., & Lyon, D. (1989). Evidence for Terror Management Theory: The effects of mortality salience on reactions to those who violate or uphold cultural values. *Journal of Personality and Social Psychology*, *57*, 681–690.

Rosnow, R. L., & Rosenthal, R. (1996). Computing contrasts, effect sizes, and counternulls on other people's published data: General procedures for research consumers. *Psychological Methods*, *1*, 331–340.

Ruiter, R. A. C., Verplanken, B., Cremer, D. De, & Kok, G. (2004). Danger and fear control in response to fear appeals: The role of need for cognition. *Basic and Applied Social Psychology*, *26*, 13–24.

Smalec, J. L., & Klingle, R. S. (2000). Bulimia interventions via interpersonal influence: The role of threat and efficacy in persuading bulimics to seek help. *Journal of Behavioral Medicine*, *23*, 37–57.

Steele, K. A. (2012). *Laughter vs. fear: The role of political humor in combating fear appeals*. University of Delaware.

Stephenson, M. T., & Witte, K. (1998). Fear, threat, and perceptions of efficacy from frightening skin cancer messages. *Public Health Reviews*, *26*, 147–174.

Stingone, J. A., Funkhouser, W. K., Weissler, M. C., Bell, M. E., & Olshan, A. F. (2013). Racial differences in the relationship between tobacco, alcohol, and squamous cell carcinoma of the head and neck. *Cancer Causes & Control*, *24*, 649–664.

Stryker, J. E., Wray, R. J., Hornik, R. C., & Yanovitzky, I. (2006). Validation of database search terms for content analysis: the case of cancer news coverage. *Journalism & Mass Communication Quarterly*, *83*, 413–430.

Stuteville, J. R. (1970). Psychic defenses against high fear appeals: A key marketing variable. *Journal of Marketing*, *34*, 39–45.

Westman, S., & Freund, L. (2010). Information interaction in 140 characters or less: Genres on Twitter. In *Proceeding of the Third Symposium on Information Interaction in Context* (pp. 323–328). doi:10.1145/1840784.1840833

Wilkinson, S. (1998). Focus groups in health research. Exploring the meanings of health and illness. *Journal of Health Psychology*, *3*, 329–348.

Witte, K. (1992). Putting the fear back into fear appeals: The Extended Parallel Process Model. *Communication Monographs*, *59*, 329–349.

Witte, K. (1994). Fear control and danger control: A test of the extended parallel process model (EPPM). *Communication Monographs*, *61*, 113–134.

Witte, K. (1998). Fear as motivator, fear as inhibitor: Using the extended parallel process model to explain fear appeal successes and failures. In P. A. Andersen & L. K. Guerrero (Eds.), *Handbook of communication and emotion. Research, theory, applications and contexts* (pp. 423–450). San Diego, CA: Academic Press.

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

Witte, K., Berkowitz, J. M., Cameron, K. A., & McKeon, J. K. (1998). Preventing the spread of genital warts: Using fear appeals to promote self-protective behaviors. *Health Education & Behavior*, *25*, 571–585.

Witte, K., Cameron, K. A., McKeon, J. K., & Berkowitz, J. M. (1996). Predicting risk behaviors: Development and validation of a diagnostic scale. *Journal of Health Communication*, *1*, 317–341.

Wolburg, J. M. (2006). College students' responses to antismoking messages: Denial, defiance, and other boomerang effects. *Journal of Consumer Affairs*, *40*, 294–323.

Zhao, Y., Liu, J., Tang, J., & Zhu, Q. (2013). Conceptualizing perceived affordances in social media interaction design. *Aslib Proceedings*, *65*, 289–303.

Appendix

Collage representing a sample of images from the Tips campaign ads.