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The current research explores the role of disgust in enhancing compliance with fear appeals. Despite its frequent use in advertising and prevalence in consumer settings, little is known about the specific role that disgust plays in persuasion. This article explores the unique characteristics of disgust and examines its distinctive effect on persuasion. The results across a series of four studies demonstrate that adding disgust to a fear appeal appreciably enhances message persuasion and compliance beyond that of appeals that elicit only fear. Importantly, the results trace the persuasive effects of disgust to its strong and immediate avoidance reaction.

Keywords: disgust, fear, persuasion, advertising, compliance

How Disgust Enhances the Effectiveness of Fear Appeals

As you stroll through New York City, someone hands you a free matchbook with the graphic image of a set of decayed and blackened teeth. The accompanying text reads “Cigarettes Are Eating You Alive” (Chan 2008). On a Sunday morning drive, you see a billboard with a picture of a young man reclining on a grimy mattress littered with trash. His arms are covered in open sores and bloody skin lesions and the headline reads “Picking for bugs under your skin isn’t normal. But on meth it is” (Montana Meth Project, circa 2008). You flip open a magazine and see a pair of human feet covered in thousands of red fire ants. The headline reads “There’s relief for pain like this” and the ad copy goes on to promote Lyrica, a pain medication (Pfizer, circa 2006). You turn on the television and a Lamisil commercial has just begun. A creepy, yellow rat-like creature with devilish ears and sharp claws is introducing himself as Digger, a dermatophyte or “nail infection.” You watch as he proceeds to attack a seemingly normal human toenail and pries it off of the owner’s toe using a crowbar (Novartis, circa 2003).

Although these examples vary widely in the products and causes they serve, each attempts to persuade by eliciting

fear. Fear appeals are persuasive messages designed to frighten people into doing what the message recommends by depicting the terrible consequences of noncompliance (Witte 1992). Thus, the matchbook and billboard appeals threaten viewers with the negative health consequences they will encounter if they do not avoid smoking or methamphetamine use, and the Lyrica and Lamisil commercials both promote their products by graphically displaying the potential consequences of not using them. Appealing to fear is a widely used persuasion technique, but individual fear appeals are not always equally effective. Indeed, both practitioners and academics have documented uneven persuasion as a result of appealing to fear, and the question of exactly how fear appeals work is still a matter of ongoing debate and investigation (e.g., National Institute on Drug Abuse 1997; Prevention First 2008; Stainback and Rogers 1983; Struckman-Johnson et al. 1990).

In this research, we propose an important and previously unexamined factor that may contribute to fear appeal effectiveness: the presence or absence of disgust. Although fear and disgust are both negative emotions, disgust has several specific characteristics that differentiate it from fear and other negative emotions. We suggest that these features of disgust, when incorporated within a fear appeal, can significantly enhance message acceptance beyond that of persuasion appeals that elicit fear but not disgust.

We explore the persuasive effects of disgust across a series of four studies. First, we demonstrate that fear appeals that also elicit disgust lead to enhanced message compliance relative to fear appeals that do not activate disgust. Then, we rule out alternative explanations for our

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results before tracing the persuasion differences between fear appeals that do and do not elicit disgust to the specific characteristics associated with disgust and fear.

FEAR APPEALS

Using fear to motivate behavior is a common persuasion technique. As such, fear appeals have been used to promote a wide variety of consumer products and services ranging from security devices to over-the-counter medications to packaged goods such as mouthwash and deodorant. Fear-based persuasion appeals have also been used to address a broad range of pressing public health issues, including AIDS prevention, smoking cessation, breast self-examination, drug use, teen pregnancy, poor eating habits, and driving under the influence of alcohol (e.g., Freimuth et al. 1990).

Despite the frequency with which fear appeals are used, practitioners remain at odds over how effective fear appeals are as a means of conveying their message (National Institute on Drug Abuse 1997; Prevention First 2008; Rhodes, Wolitski, and Arguelles 1989). Fear appeals are a standard part of the persuasion landscape, suggesting that some practitioners must believe in their effectiveness, yet other practitioners and organizations openly question the impact of fear on persuasion. To illustrate, materials from the Center for Substance Abuse Prevention's Training Library caution that "messages that may do more harm than good—e.g., 'scare tactics'—should be avoided. 'Scare tactics' are not as effective as appeals to more positive emotions" (Center for Substance Abuse Prevention 2008).

Correspondingly, more than 50 years of academic research on fear appeals yields mixed evidence regarding how effective fear appeals are (e.g., Beck 1984; Hornik et al. 2008; Rogers and Mewborn 1976). In fear appeal studies, the elicitation of fear is typically determined through the use of manipulation checks in which participants indicate how afraid they feel in response to the fear-inducing manipulation. Such studies often include high- and low-fear conditions. In the high-fear condition, fear tends to be generated by making the severe consequences of a given threat self-relevant to the participant through the use of vivid language, grisly pictures, and films (e.g., Janis and Feshbach 1953). Although the majority of studies argue for a positive monotonic relationship between fear and persuasion (e.g., Stainback and Rogers 1983), others suggest that fear actually impedes message acceptance at times (e.g., Janis and Terwilliger 1962). Providing some coherence to the fear appeals literature, the results of four independent meta-analyses demonstrate that higher levels of perceived fear lead to greater persuasion (Boster and Mongeau 1984; Mongeau 1998; Sutton 1982; Witte and Allen 2000). The most recent of these concludes that "the stronger the fear appeal, the greater the attitude, intention and behavior changes.... Overall, fear appears have a relatively weak but reliable effect on attitudes, intentions and behaviors" (Witte and Allen 2000, pp. 598, 602).

Research has identified a large number of message features as well as individual difference variables that help determine whether a given fear appeal will be effective or not (e.g., Keller and Block 1996). Such factors include the level of fear (Witte 1992), perceived vulnerability to the threat (i.e., the degree to which a person feels at risk for the threat), perceived severity of the threat (i.e., how much

harm a person expects to incur from the threat), perceived self-efficacy (i.e., a person's beliefs about his or her ability to perform the recommended response), perceived response efficacy (i.e., a person's beliefs about the response's ability to ward off the threat) (Rogers 1983), self-construal (Block 2005), and message format and prior adherence level (Keller 1999). Taken together, this work suggests that fear can be an effective means of persuasion but that the persuasiveness of a given fear appeal can vary widely depending on how the appeal is designed and who the intended audience is.

In the current research, we suggest that an additional factor may influence the effectiveness of a fear appeal: the presence or absence of a disgust-eliciting element. Studies have suggested that fear appeals may evoke other emotions in addition to fear (e.g., Dabbs and Leventhal 1966). For example, a study of fear-based public service announcements indicates that 97% of the fear appeals surveyed elicited more than one emotion (Dillard et al., 1996). Given that specific emotions are characterized by distinct properties, it stands to reason that the other evoked emotions may play a role in persuasion as well. Indeed, research has indicated that the presence of additional emotions may strengthen the persuasiveness of fear appeals (Passyn and Sujun 2006). Specifically, Passyn and Sujun (2006) find that the addition of emotions characterized by high self-accountability, such as regret and guilt, enhanced compliance beyond that generated by straight fear appeals.

In the current research, we focus on the role of disgust in increasing the persuasiveness of fear appeals. We do so for several reasons. First, research has shown that disgust correlates highly with measures of fearfulness (Haidt, McCauley, and Rozin 1994), suggesting that unlike other emotion combinations, disgust and fear can be coactivated naturally. Second, many successful fear appeals seem to also include a disgusting element. As an example, the New York City Department of Health recently reported that consumption of sugar-rich beverages decreased by 12% following a graphic print and media ad campaign that centered on the image of soda turning into globs of fat (New York City Department of Health 2010). Similarly, each of the fear appeals we referenced in the beginning of this article—the decayed teeth, the sores and lesions, the ants, and the nail infection—could be construed as disgusting as well as frightening. The prevalence of such disgusting fear appeals suggests that the presence of a disgusting element may be linked to increased persuasiveness and compliance. Third, although feelings of disgust play a role in many typical consumer situations (Morales and Fitzsimons 2007), surprisingly little is known about the specific role disgust plays in persuasion. This article attempts to bridge that gap by examining the unique characteristics of disgust and demonstrating how those features, in the context of a fear appeal, can significantly increase message acceptance beyond appeals that elicit fear but not disgust.

DISGUST AND FEAR

Although emotions have historically been distinguished primarily on the basis of valence, recent research has argued that individual emotions—even those of the same valence—are unique and interesting in their own right (e.g., Lazarus

1991). Thus, disgust is distinct from fear, and both are unlike either anger or sadness.

Fear is the emotion of flight—that is, fear prepares and motivates a person to escape from a threat (Izard 1977). Researchers have argued that fear is described by a characteristic behavioral component (avoidance or escape), a specific physiological state (heightened autonomic nervous system activity), a distinct facial expression (eyes opened wide to show the whites of the eyes between the lid and the pupil, lifted brows, a wrinkled forehead, and a slightly open mouth), and a typical feeling state (high tension and activity) (Izard 1991). Consistent with its function as a reaction to threat, fear has been described as a state of maximal uncertainty—given the precarious nature of threatening situations, the uncertainty in fear stems from the frightened person’s insecurity over what he or she should do and whether he or she will be able to escape or avoid the fear-eliciting object (Smith and Ellsworth 1985).

Conversely, disgust has been conceptualized as “a revulsion at the prospect of (oral) incorporation of an offensive substance” (Rozin and Fallon 1987, p. 23). Although this definition links disgust firmly to food, it is not meant to imply that people experience disgust only in the face of ingestible objects. Rather, it suggests that feelings of disgust are often related to some sort of physical contact between the disgusting object and the human body. Thus, disgust has consistently been linked to the ideas of revulsion, deviation, and physical contact. Researchers have proposed that disgust has a characteristic behavioral component (an immediate distancing from some object, event, or situation), a specific physiological state (nausea, parasympathetic response, stable or decreased heart rate, increased galvanic skin response, changes in finger temperature, and right frontal area brain activation), a distinct facial expression (open mouth and closed nostrils), and a typical feeling state (revulsion) (Rozin, Haidt, and McCauley 1993). In stark contrast to fear, disgust has been associated with a strong sense of certainty—a disgusted person is certain what the problem is, knows how to deal with it, and is confident in his or her ability to do so (Smith and Ellsworth 1985).

Although both disgust and fear are linked to distancing-type tendencies, recent research has suggested that the two emotions lead to different types of avoidance behaviors. Specifically, recent models of fear suggest that fear avoidance behavior is a multistep process, in contrast to disgust, for which the impulse to distance oneself is immediate (e.g., Lang, Bradley, and Cuthbert 1997; Lazarus 1991; Rosen and Schulkin 1998). Although fear has classically been described as an emotion of flight and avoidance, it can and often does result in the opposite type of behavior: freezing or behaving like a “deer in headlights.” Consistent with this, documented markers of fear include “wary watching combined with inhibition of action” (Bowlby 1973, p. 88), the “momentary arresting or slowing of ongoing behaviors or prolonged freezing” (Charlesworth, 1974, p. 263), and a sense of uncertainty and hesitation (Smith and Ellsworth 1985).

Researchers have reconciled the disparate reactions to fear by suggesting that people respond to fear-arousing threats in multiple stages (Lang, Bradley, and Cuthbert 1997; Rosen and Schulkin 1998). First, when the threat is looming but not imminent, people display freezing-type

behaviors. As part of this freeze response, the heart rate decreases, body movements cease, and the person becomes hyper-oriented toward the environment. Then, as the danger becomes imminent, defensive responses, such as the classic fear flight response, begin to be displayed. Thus, the multi-stage model of fear suggests that fear should cause people to freeze up initially and then to take action only when the danger becomes unavoidably near. In line with this model, people have been found to “seize and freeze” in response to threatening messages about future health risks (Block and Williams 2002) and following exposure to socially threatening images but not the actual objects (Roelofs, Hage-naars, and Stins 2010).

In contrast to fear, which has been associated with multiple tendencies, disgust has been associated with only one: a very strong impulse to avoid, expel, or distance oneself immediately from the offensive object (Lazarus 1991; Smith and Ellsworth 1985). In other words, when people come into contact with a disgust-eliciting object, their first and only reaction is to move away from the object as swiftly as possible. Notably, research suggests that the disgust reaction is so strong that it can even occur in response to nondisgusting objects that have been merely associated with disgusting objects (e.g., Argo, Dahl, and Morales 2006; Rozin and Fallon 1987) and also to nondisgusting objects that a person comes across while feeling disgusted about something entirely unrelated (Lerner, Small, and Loewenstein 2004).

Taken together, research suggests that whereas fear causes people to initially freeze in uncertainty before engaging in avoidance activities, disgust impels them to immediately undertake distancing behaviors. We suggest these differences in avoidance behaviors are key in the context of persuasion and compliance, and we examine this idea across a series of studies.

OVERVIEW OF STUDIES

In the current research, we are interested in exploring how the presence or absence of disgust might influence persuasion in general and, more specifically, how it might influence the effectiveness of fear appeals. As the examples we referenced previously illustrate, many fear appeals rely on revolting images and gruesome concepts to elicit fear with the goal of increasing persuasion. By incorporating such elements either visually or conceptually, these appeals elicit not only fear but disgust as well. Given that specific emotions, when triggered, have distinct effects on cognition and behavior, it stands to reason that disgust may play a unique and significant role in influencing the effectiveness of fear appeals apart from that of fear itself.

We expect appeals that coactivate disgust and fear to lead to enhanced levels of message persuasion and compliance relative to fear appeals that do not induce feelings of disgust. Although fear and disgust are both emotions of avoidance, they differ in terms of when the avoidance reaction sets in. Specifically, fear does not lead to an avoidance reaction until the threat is imminent. This timing difference becomes important in the context of fear appeals because many of them tend to warn about future (distant) threats (e.g., you will develop skin cancer in the future if you do not use sunscreen) as opposed to immediate threats (e.g., you are developing skin cancer right now). Given that fear causes

people to freeze if the danger is not looming and that disgust causes people to take immediate action, we expect that people will respond more strongly to disgusting fear appeals relative to nondisgusting fear appeals. Thus, we suggest that the unique features of disgust, when included in a fear appeal, can appreciably increase message acceptance beyond persuasion appeals that elicit fear but not disgust.

STUDY 1

The goal of Study 1 is to begin examining the role that disgust plays in the effectiveness of fear appeals. To tease out disgust's influence on fear appeals, we pit a fear appeal that does not elicit disgust (the "fear appeal"), an emotionally neutral appeal, and an appeal in which disgust and fear are coactivated (the "disgust and fear appeal") against one another and measure their respective effects on persuasion. We expect that disgust's strong and immediate impulse to expel and avoid disgust-eliciting objects will cause the coactivated disgust and fear appeal to be more effective than either the neutral or the fear (without disgust) appeal.

Participants, Stimuli, and Procedure

One hundred fifty-five undergraduate students participated in Study 1, a one-factor (emotion of image: disgust and fear, fear only, or control) between-subjects design. Notably, the disgust and fear appeal condition in this study used an actual advertisement from the Montana Meth Project, a nationally recognized, award-winning program that uses high-impact advertising to reduce methamphetamine use. Because the Meth Project advertisements use only disgusting images, the advertisements for the fear-only and control image conditions employed the same copy as the actual meth advertisement ("Actually, doing meth won't make it easier to hook up") but used different images to evoke either fear only or neutral emotions. The disgusting image showed a teenager with open sores on his face, the scary image was a coffin, and the neutral image was two teenagers sitting side by side.

Across all conditions, participants were asked to review the target advertisement for a few minutes and then to return the advertisement to the research assistant before answering a questionnaire about the advertisement. We assessed overall attitude toward the ad with five seven-point scales ("bad/good," "negative/positive," "undesirable/desirable," "unfavorable/favorable," and "dislike/like"). We averaged these to form an attitude toward the ad index ($\alpha = .88$). In addition, because the goal of the advertisement was to persuade young people to avoid using drugs, participants indicated their likelihood of methamphetamine use in particular and illegal drugs in general over the next two months on a scale from 1 ("not at all likely") to 7 ("extremely likely").

Results

Pilot. To ensure that our fear-only appeal indeed elicited fear and that our disgust and fear appeal elicited both disgust and fear, we asked 15 undergraduate students to evaluate all three advertisements used in this study for scariness and disgustingness. We assessed scariness and disgustingness with seven-point scales ("not at all scary/very scary," "not at all disgusting/very disgusting"). The results of the pretest revealed that participants rated both the disgust and fear appeal and the fear-only appeal ($M_{\text{disgust}} = 4.53, M_{\text{fear}} =$

4.60) as being more frightening than the control image advertisement ($M_{\text{control}} = 1.60; F(1, 28) = 43.76, p < .0001, \omega_p^2 = .810$, and $F(1, 28) = 45.78, p < .0001, \omega_p^2 = .817$, respectively). Participants also rated the disgust and fear appeal ($M_{\text{disgust}} = 6.00$) as being more disgusting than either the control or the fear-only advertisement ($M_{\text{control}} = 1.60, M_{\text{fear}} = 1.53; F(1, 28) = 132.19, p < .0001, \omega_p^2 = .929$, and $F(1, 28) = 136.23, p < .0001, \omega_p^2 = .931$, respectively). Thus, fear but not disgust was activated in the fear appeal, while the disgust and fear appeal successfully coactivated both disgust and fear. The neutral appeal elicited insignificant levels of both emotions.

Main study. The results of Study 1 indicated a main effect of image on attitudes toward the ad ($F(2, 152) = 8.12, p = .0004, \omega^2 = .0841$). In both the disgust and fear and fear-only conditions, participants indicated lower attitudes toward the ad ($M_{\text{disgust}} = 2.92, M_{\text{fear}} = 3.16$) than in the control condition ($M_{\text{control}} = 3.87$). Planned contrasts revealed that the difference between the disgust and fear and the control conditions was significant ($F(1, 152) = 14.9, p = .0002, \omega_p^2 = .119$), as was the difference between the fear-only and control conditions ($F(1, 152) = 7.54, p = .007, \omega_p^2 = .060$). There was, however, no difference between the disgust and fear and fear-only conditions with regard to attitudes toward the ad ($F < 1$).

Consistent with our hypothesis, the disgust and fear appeal was the most persuasive in terms of participants' likelihood to use illegal drugs in the future. While there was no difference in participants' likelihood of methamphetamine use in the next two months (all 155 participants responded with a 1, being "not at all likely" to use meth), as we predicted, the ad image had a significant effect on participants' likelihood to use illegal drugs in general ($F(2, 152) = 2.90, p = .058, \omega^2 = .024$). Participants were less likely to use illegal drugs in the disgust and fear appeal condition ($M_{\text{disgust}} = 1.57$) than they were in either the fear-only ($M_{\text{fear}} = 2.30$) or control ($M_{\text{control}} = 2.33$) conditions. Planned contrasts showed that the difference between the disgust and fear and fear-only conditions was significant ($F(1, 152) = 3.77, p = .054, \omega_p^2 = .026$), as was the difference between the disgust and fear and control conditions ($F(1, 152) = 4.87, p = .029, \omega_p^2 = .036$). The difference between the control and fear-only conditions with regard to future likelihood to use drugs, however, was not significant ($F < 1$).

Discussion

Consistent with our predictions, participants indicated greater levels of persuasion and compliance in response to a disgust-inducing fear appeal relative to both a nondisgusting fear appeal and a control appeal. This result is in line with the notion that the inclusion of a disgust-eliciting element can enhance the persuasiveness of fear-based appeals. Notably, the disgust and fear and the fear-only images had similar effects on attitudes toward the ad; both types of appeals resulted in lower attitudes toward the ad. Presumably, because both fear and disgust are negative in valence, the negative affect elicited by the images in the appeals influenced participants' attitudes toward the ad. Importantly, however, it was only the disgust-inducing fear appeal that significantly reduced future drug use, making it more effective in terms of persuasion and compliance.

STUDY 2

In Study 1, we elicited both fear only and disgust and fear through the use of disparate visual images (a picture of a coffin and a face with open sores, respectively), raising the possibility that our results were driven by differences in image vividness rather than by disgust. We address this concern in Study 2 and build on Study 1's results by examining whether the persuasion-enhancing effects of disgust are limited to such vivid elicitation through visual images. In other words, can disgust and fear be successfully elicited textually through varying ad copy only? If so, are fear appeals that elicit disgust textually as effective as their image-based counterparts? We predict that consistent with the results of Study 1, text-based disgust-inducing fear appeals also enjoy enhanced persuasion and compliance relative to straight fear appeals.

Participants, Stimuli, and Procedure

One hundred thirty-nine undergraduate students participated in Study 2, a one-factor (emotion of text: disgust and fear, fear only, or neutral) between-subjects design. All participants saw a sun safety advertisement that featured an image of two people sitting on a bench outdoors. In the fear-only condition, the accompanying ad copy read "Don't be dumb in the sun. An afternoon out in the sun can mean a severe sunburn. A possibility of serious heat stroke. An increased chance of developing fatal skin cancer. Cover up. Wear sunscreen." In contrast, in the disgust and fear condition, the ad copy read "Don't be dumb in the sun. An afternoon out in the sun can mean open sores that crust and do not heal for weeks. Scaly red patches that suddenly appear on your skin. Wart-like growths that ooze and bleed. Cover up. Wear sunscreen." In the neutral condition, the text read "Don't be dumb in the sun. An afternoon out in the sun can mean joyful laughter and high spirits. Playing with water balloons and licking ice cream cones. Memories of good times to remember for always. Cover up. Wear sunscreen."

Participants reviewed the target advertisement for a few minutes before handing it back to the research assistant and responding to a questionnaire about the advertisement. We measured attitudes toward the ad as before. Because the goal of the advertisement was to persuade people to use sunscreen, participants indicated their future likelihood of using sunscreen when out in the sun on a 1 ("not at all likely") to 7 ("very likely") scale. Participants also reported their overall attitudes toward using sunscreen and how concerned they were about getting skin cancer, both on scales from 1 ("very unfavorable/not at all concerned") to 7 ("very favorable/extremely concerned"). These served as noninter-active covariates in the subsequent study analyses.

Results

Pilot. To ensure that our ad copy manipulation was successful, we asked 18 undergraduate students to evaluate all three advertisements used in this study for how scary and disgusting they were. We assessed scariness and disgustingness with seven-point scales ("not at all scary/very scary," "not at all disgusting/very disgusting"). Participants rated the fear-only advertisement ($M_{\text{fear}} = 5.17$) as being more frightening than either the disgust and fear advertisement ($M_{\text{disgust}} = 3.78$) or the control advertisement ($M_{\text{control}} =$

1.50). Planned contrasts showed that the differences between each of the three advertisements were significant ($ps < .0037$, $\omega_{\phi}^2 > .421$). In addition, participants rated the disgust and fear advertisement ($M_{\text{disgust}} = 5.5$) as being more disgusting than either the control or the fear-only advertisements ($M_{\text{control}} = 1.44$, $M_{\text{fear}} = 2.28$). Planned contrasts revealed that the difference between the control and the disgust and fear advertisements was significant ($F(1, 34) = 71.03$, $p < .0001$, $\omega_{\phi}^2 = .854$), as was the difference between the fear-only and the disgust and fear advertisements ($F(1, 34) = 44.84$, $p < .0001$, $\omega_{\phi}^2 = .790$). The difference between the control and the fear-only advertisements in terms of perceived disgust was marginal ($F(1, 34) = 3$, $p = .0924$, $\omega_{\phi}^2 = .143$). Thus, the fear appeal elicited fear but not disgust, and the disgust and fear appeal elicited both fear and disgust. The neutral appeal elicited very low levels of the two emotions.

Main study. The results of Study 2 indicated a main effect of text on attitudes toward the ad ($F(2, 134) = 8.42$, $p = .0004$, $\omega^2 = .096$) in which both covariates were insignificant ($ps > .15$). Consistent with our previous findings, participants in the disgust and fear condition ($M_{\text{disgust}} = 3.07$) indicated lower ad attitudes than participants in either the neutral ($M_{\text{neutral}} = 4.02$) or the fear-only ($M_{\text{fear}} = 4.14$) conditions. Planned contrasts revealed that the difference between the disgust and fear and the neutral text conditions was significant ($F(1, 134) = 10.23$, $p = .0017$, $\omega_{\phi}^2 = .091$), as was the difference between the disgust and fear and the fear-only text conditions ($F(1, 134) = 14.78$, $p = .0002$, $\omega_{\phi}^2 = .129$). The neutral and the fear conditions did not differ with regard to attitudes toward the ad ($F < 1$).

More important, in terms of participants' likelihood of using sunscreen in the future, the results revealed a main effect of text ($F(2, 134) = 2.96$, $p = .0554$, $\omega^2 = .027$); the overall attitude toward sunscreen covariate ($F(1, 134) = 27.59$, $p < .0001$) and the concern about getting skin cancer ($F(1, 134) = 11.96$, $p = .0007$) covariate were also significant. Consistent with our hypothesis, participants in the disgust and fear condition indicated a greater likelihood of using sunscreen ($M_{\text{disgust}} = 4.67$) than participants in either the fear-only ($M_{\text{fear}} = 4.07$) or the neutral ($M_{\text{neutral}} = 4.09$) conditions. Planned contrasts showed that participants in the disgust and fear condition were significantly more likely to use sunscreen than participants in the fear-only ($F(1, 134) = 4.94$, $p = .028$, $\omega_{\phi}^2 = .041$) or neutral ($F(1, 134) = 3.93$, $p = .049$, $\omega_{\phi}^2 = .031$) conditions. The difference between the fear and the neutral conditions was not significant ($F < 1$).

Discussion

Because we held visual image constant across all three conditions, the results of Study 2 suggest that disgust and fear can be coactivated without the use of images. This finding rules out the possibility that our results from Study 1 were driven by differences in image vividness rather than by disgust. Importantly, the textually elicited disgust and fear appeal enhanced persuasion much like its visual image-based counterpart; participants in the disgust and fear condition reported a greater likelihood of avoiding unprotected sun exposure and using sunscreen than those in either the neutral or the fear-only conditions. This suggests that the persuasive effects of disgust-inducing fear appeals are not dependent on a specific format and, more generally, that

marketers have options for eliciting specific emotions when they design persuasion appeals.

In Study 3, we build on our results in Studies 1 and 2 in several ways. First, although the results of Study 2 suggest that differences in image vividness were not responsible for our effects, this does not rule out differences in overall ad vividness as an alternative explanation, because text may also vary in degrees of vividness. We address this issue in Study 3 by holding ad image and copy constant across conditions and priming emotion separately. Second, by varying the specific emotions elicited by the advertisements in Studies 1 and 2 (whether it is through images or text), we also changed the negative consequences communicated in the appeal (i.e., having open sores vs. dying prematurely). As such, a second potential alternative explanation for our results up to this point is that our disgust appeals are confounded with the fear of appearing unattractive (i.e., highlighting a negative consequence related to appearance). Prior research has demonstrated that fear appeals that focus on appearance-based consequences are more effective than health consequence-based fear appeals (e.g., Jones and Leary 1994; Mahler et al. 1997). Given that our disgust-inducing fear appeal in Study 1 used the image of a teenager with open wounds on his face and that our disgusting text in Study 2 described warts and scaly patches, this suggests that our results might have been driven by a fear of appearing unattractive rather than the elicitation of disgust, as we argue. Thus, one of the goals in Study 3 is to rule out this alternative explanation for our findings. Finally, we suggested that disgust enhances fear appeal persuasion because it leads to more immediate action in the context of a distant threat than does fear. Our results are consistent with this idea, but they do not provide evidence to support it explicitly, making it difficult to rule out additional alternative explanations. In Study 3, we begin to examine the mechanisms behind the persuasion-enhancing effect of disgust.

STUDY 3

We designed Study 3 with several goals in mind. First, it addresses the issue of vividness as an alternative explanation and begins to disentangle the effects of disgust from those of appearance-based fear appeals. To do so, we use the same health consequence-based fear appeal in both the fear-only and the disgust and fear conditions, and we prime disgust incidentally to create the disgust and fear condition. We expect to observe continued enhanced persuasion in the disgust and fear condition compared with the fear-only condition, despite the absence of appearance-related consequences and even though ad vividness is held constant across conditions. Moreover, to provide stronger evidence of the persuasion-enhancing effect of disgust, Study 3 includes a measure of the degree of learning from the advertisement in addition to the behavioral intention measures used in previous studies. We reasoned that in the context of fear appeals (which typically warn against some threat), persuasion should be reflected by increased amounts of learning and concern about the issue following exposure to the message relative to before. In other words, a persuasive fear appeal should heighten consumers' concern about the advertised problem. Consistent with our reasoning, prior research on health risks has used level of concern about the advertised message as an indicator of attitudes and inten-

tions to comply with the message (Menon, Block, and Ramanathan 2002). We expect that higher levels of concern (i.e., learning) in the disgust and fear ad condition relative to the fear-only condition will provide additional support for disgust increasing the persuasiveness of, and compliance with, fear appeals. Second, we designed Study 3 to provide process evidence for why disgust enhances persuasion. Specifically, we ask participants to respond to measures of how quickly they would change their behavior after viewing an advertisement. Consistent with our theorizing that disgust leads to immediate action and fear leads to hesitation resulting from uncertainty, we expect participants in the disgust and fear condition to report being more likely to react quickly than participants in the fear-only condition.

Participants, Stimuli, and Procedure

Eighty-two adults recruited by a marketing research firm participated in Study 3, a three-cell (neutral prime with control ad, neutral prime with fear ad, disgust prime with fear ad) between-subjects design. The entire study was conducted online. As such, to make the task more realistic, participants were told the following cover story:

In this study, we are interested in how people look at pictures and advertisements on the Internet. In what follows, we will ask you to look at and evaluate a series of visual images and advertisements. There are no right or wrong answers—we are simply interested in what you think of the images and the advertisement.¹

Participants were either given a neutral prime or a disgust prime before looking at an advertisement online.

The disgust prime consisted of five images selected from the International Affective Picture System (IAPS; Lang, Bradley, and Cuthbert 1999). The images were selected on the basis of published emotion ratings of the images (Mikels et al. 2005), similar to Chapman et al. (2009); they were chosen because they were rated high in disgust but low in other negative emotions such as fear and sadness. The neutral prime consisted of five emotionally neutral images. After looking at the disgusting or neutral images, participants saw an advertisement for an Intak water bottle. In the fear ad conditions, the advertisement listed several negative health consequences that could result from using water bottles that contain the chemical BPA, such as an increased risk of cancer, an elevated likelihood of heart disease, and long-term neurological damage. Then, it indicated that Intak water bottles are 100% BPA-free and included the reminder “Don’t forget to avoid BPA” at the end of the advertisement. In the control ad condition, the advertisement described Intak as being one of the safest water bottles and included the reminder “Don’t forget to buy Intak” at the end, but mentioned nothing about the effects of BPA or whether Intak contained BPA.

After viewing the advertisement, participants answered a series of questions designed to assess the persuasiveness of the advertisement. We measured intentions to avoid products

¹We designed this experimental procedure to be similar to how people actually look at pop-up advertisements on the Internet with brief exposure to one advertisement. In contrast, in Study 4, participants viewed multiple advertisements embedded in an online magazine with longer exposure to each advertisement to ensure that the effect of disgust on persuasion is not limited to only certain types of exposure conditions.

containing BPA with three items on a scale from 1 (“not at all likely”) to 7 (“very likely”), which we averaged to form an “avoid BPA” index ($\alpha = .76$). Participants indicated their likelihood of avoiding products that contain BPA, their likelihood of recommending that their family and friends avoid products that contain BPA, and their likelihood of purchasing products from the Intak BPA-free product line. Consistent with procedures in Menon, Block, and Ramanathan (2002) that use a learning measure to assess attitudes and intentions to comply resulting from fear appeals, participants also indicated the degree to which they were familiar with the issues surrounding BPA before participating in this survey on a scale from 1 (“not at all familiar”) to 7 (“very familiar”) and the degree to which they were now concerned about the effects of using products that contain BPA after having participated in the survey on a scale from 1 (“not at all concerned”) to 7 (“very concerned”). To test the idea that disgust is associated with immediate action and that fear is first linked to freezing behavior, participants also responded to several questions designed to measure the speed at which they would change their behavior after viewing the advertisement rather than the particular actions they would take. Specifically, participants indicated whether the advertisement made them immediately think about how bad it is to use products that contain BPA, whether the advertisement made them immediately think about times in the past when they had used products that contain BPA, and how soon they thought they would need to take action to address the issues involved with using products that contain BPA. We measured the first two items on a scale from 1 (“definitely no”) to 7 (“definitely yes”) and the last item on a scale from 1 (“not soon at all”) to 7 (“very soon”). We averaged these three items to form an “act quickly” index ($\alpha = .85$).

Results

The results of Study 3 indicate a main effect of condition on avoiding BPA behaviors ($F(2, 79) = 3.79, p < .03, \omega^2 = .064$). Participants in the disgust prime/fear appeal condition had significantly greater intentions to avoid BPA ($M_{\text{disgust}} = 5.75$) than either participants in the neutral prime/fear appeal ($M_{\text{fear}} = 4.85; F(1, 79) = 6.91, p = .01, \omega_p^2 = .098$) or participants in the neutral prime/control ad condition ($M_{\text{control}} = 5.10; F(1, 79) = 3.69, p = .058, \omega_p^2 = .047$). However, there was no difference between intentions to avoid BPA for participants in the neutral prime/fear appeal and participants in the neutral prime/control ad condition ($F < 1$).

In addition, the results indicate a main effect of condition on the degree of learning from the advertisement (i.e., the change in concern about the advertised issue before and after the appeal was viewed) ($F(2, 78) = 3.84, p < .03, \omega^2 = .059$). Due to statistical limitations in using difference scores, the model run to assess learning had postappeal exposure knowledge as the dependent variable with preappeal exposure knowledge as a covariate; however, for clarity of presentation, we report mean difference scores next. Participants in the disgust prime/fear appeal condition learned significantly more about BPA from the advertisement ($M_{\text{disgust}} = 2.45$) than either participants in the neutral prime/fear appeal ($M_{\text{fear}} = 1.08; F(1, 78) = 6.31, p = .0141, \omega_p^2 = .089$) or those in the neutral prime/control ad condition ($M_{\text{control}} = 1.31; F(1, 78) = 4.76, p = .0321, \omega_p^2 = .064$). However, the

difference between learning for participants in the neutral prime/fear appeal and participants in the neutral prime/control ad condition was not significant ($F < 1$).

Providing evidence in support of the proposed timing difference between disgust and fear reactions, there was also a main effect of condition on likelihood to act quickly after seeing the advertisement ($F(2, 79) = 12.03, p < .0001, \omega^2 = .212$). Participants in the disgust prime/fear appeal condition were much more likely to act quickly in response to the advertisement ($M_{\text{disgust}} = 5.76$) than either participants in the neutral prime/fear appeal ($M_{\text{fear}} = 4.96; F(1, 79) = 4.02, p < .05, \omega_p^2 = .052$) or participants in the neutral prime/control ad condition ($M_{\text{control}} = 3.82; F(1, 79) = 24.0, p < .0001, \omega_p^2 = .296$). The difference between likelihood to act quickly for participants in the neutral prime/fear appeal and participants in the neutral prime/control ad condition was also significant ($F(1, 79) = 7.44, p < .01, \omega_p^2 = .105$), but as we anticipated, it was smaller than when disgust played its immediate distancing role.

To test for mediation, we focused on the two main conditions of interest, the disgust and fear and the fear-only conditions, and conducted a bootstrapping analysis using likelihood to act quickly after exposure to the advertisement as the mediator (Preacher and Hayes 2008; Zhao, Lynch, and Chen 2010). The results of the analysis revealed a significant indirect effect for acting quickly ($b = .3783, SE = .1957; 95\% \text{ confidence interval} = .0162 \text{ to } .8979; \text{Sobel } z = 1.91, p = .056$), suggesting that the relationship between emotion condition and persuasion was mediated by likelihood to act quickly after exposure to the advertisement. Thus, the enhanced persuasion results observed in the disgust and fear condition were due in part to the fact that relative to fear, disgust leads to a quicker readiness to act.

Discussion

Consistent with our hypotheses, participants in the disgust and fear condition continued to display increased persuasion and compliance relative to participants in either the fear-only or the neutral conditions, across both learning and behavioral intention measures. Notably, these results occurred even though the advertisement used in both the fear and the disgust and fear-only conditions was centered on health-based rather than appearance-based consequences, supporting our hypothesis that our results from Studies 1 and 2 were driven by the nature of disgust itself rather than by the appearance-based nature of our previous disgust and fear advertisements. These results also occurred with ad vividness, clarity, and quality held constant across conditions, ruling out differences in ad vividness as an explanation for our results. In line with our theorizing, participants in the disgust and fear condition reported a greater likelihood of reacting quickly to the advertisement than participants in the fear-only and the neutral conditions. Moreover, acting quickly mediated the relationship between emotion condition and persuasion. Together, these results suggest that disgust indeed enhances the effectiveness of fear appeals and that it does so through the immediacy of its avoidance reaction.

Taken as a whole, the results of the first three studies are consistent with the idea that disgust enhances fear appeal effectiveness through its tendency of immediate action. In Study 4, we build on our findings in several ways. First, we

embed our disgust-inducing fear appeal within the context of a magazine, thereby increasing the generalizability of our research and decreasing the likelihood of hypothesis guessing. Second, to definitively rule out an appearance-based explanation for our previous results, we explicitly manipulate the health and appearance focus of a fear appeal. Third, we provide further evidence that disgust encourages immediate action by augmenting our likelihood to act quickly measure with additional items. Finally, we include a choice measure to provide additional support for actual behavioral changes resulting from our theory.

STUDY 4

Participants, Stimuli, and Procedure

One hundred fifty-three adults recruited by a marketing research firm participated in Study 4, a 2 (prime: disgust vs. neutral) \times 2 (focus of ad: health vs. looks) between-subjects design. The study was conducted entirely online using a similar cover story as in the previous study, with the only difference being that instead of viewing only one advertisement, participants viewed multiple advertisements embedded within a mock-up online magazine.

The disgust and neutral primes were the same as the previous study in which participants viewed five disgusting or five neutral images on their computer screen. After looking at the disgusting or neutral images, participants were told to look through an online magazine and that one article or advertisement would be randomly selected for them to evaluate later. Participants then began looking through five pages of an online magazine called *Living Well* that we created. The pages included a title page, a two-page article describing “The 5 Places to See in 2010,” and two advertisements, including the target advertisement. As in Study 3, in all conditions, the target advertisement was for an Intak water bottle that was 100% BPA-free and included the reminder “Don’t forget to avoid BPA” at the end. However, the negative consequences that could result from using water bottles containing BPA differed across ad conditions. In the health condition, the advertisement emphasized that using water bottles that contain BPA could have “negative consequences for your health,” whereas in the appearance condition, the advertisement emphasized that using water bottles that contain BPA could have “negative consequences for your appearance.” We used this relatively subtle health versus appearance manipulation to change the focus of the advertisement but also stay true to the definition of a fear appeal as a persuasion appeal highlighting the negative consequences of engaging in a given behavior, while keeping all other features in the advertisement consistent across conditions. If our theorizing is correct, we should observe an increase in the persuasiveness of both health- and appearance-focused fear appeals when disgust is also evoked.

After viewing the magazine in its entirety, participants answered questions related to the Intak water bottle advertisement that they saw in the magazine. We measured intentions to avoid products containing BPA with the same three items as in Study 3 on a scale from 1 (“not at all likely”) to 7 (“very likely”), and we averaged them to form an “avoid BPA” index ($\alpha = .79$). Participants also responded to multiple questions designed to measure the speed at which they would change their behavior after viewing an advertise-

ment. In addition to the three measures used in Study 3, participants indicated whether the advertisement made them know what to do to avoid the effects of using products that contain BPA and whether the advertisement made them immediately think they needed to switch to using BPA-free products. We averaged these five items to form an “act quickly” index ($\alpha = .86$). Finally, we told participants that they would be entered into a lottery to win a water bottle. Participants saw four water bottles—a Nalgene, a Camelbak, a Waterbox, and an Intak bottle—and they indicated which one they would like to receive if they won the lottery.

Results

The results of Study 4 indicate a main effect of emotion prime on the avoiding BPA index ($F(1, 149) = 5.56, p = .0197, \omega^2 = .029$). Participants who saw the disgust prime before viewing either the appearance- or health-focused fear appeal had significantly greater intentions to avoid BPA ($M_{\text{disgust}} = 5.61$) than participants who saw the neutral prime ($M_{\text{fear}} = 5.12$). Neither the main effect of ad focus (health vs. appearance) nor the interaction between emotion prime and ad focus was significant ($F(1, 149) = 1.73, p = .19; F < 1$, respectively).

Consistent with the results of Study 3, there was also a main effect of emotion prime on likelihood to act quickly after seeing the advertisement ($F(1, 149) = 4.04, p < .05, \omega^2 = .020$). Participants who saw the disgust prime were much more likely to act quickly in response to the advertisement ($M_{\text{disgust}} = 5.05$) than participants who saw the neutral prime ($M_{\text{fear}} = 4.57$). Neither the main effect of ad focus (health vs. appearance) nor the interaction between emotion prime and ad focus was significant ($F(1, 149) = 1.90, p > .15; F < 1$, respectively). To test for mediation, we again focused on the disgust and fear and the fear-only conditions, and we conducted a bootstrapping analysis using likelihood to act quickly after ad exposure as the mediator (Preacher and Hayes 2008; Zhao, Lynch, and Chen 2010). The results of the analysis revealed a significant indirect effect for acting quickly ($b = .2894, SE = .1499; 95\%$ confidence interval = .0092 to .6144; Sobel $z = 1.92, p = .054$), suggesting that the relationship between emotion condition and persuasion was again mediated by likelihood to act quickly after exposure to the advertisement.

The results for bottle choice were not statistically significant but were supportive of our predictions directionally ($\chi^2 = 12.78, p = .14, \text{Cramer's } \phi = .289$). Of the participants who saw the disgust prime, 65.9% of them chose the Intak water bottle over the other three options. In contrast, only 55% of the participants who were exposed to the neutral prime chose the Intak bottle. We hypothesized that these results likely occurred because our bottle choice measure did not indicate that the Intak bottle to be given away was indeed from the Intak BPA-free line they saw advertised (i.e., the bottle was labeled “Intak” but did not indicate “BPA-free” anywhere on the bottle). To test this hypothesis, we ran a posttest in which we asked 371 online participants to read the mock-up magazine with the target advertisement embedded and then gave them their choice of the same four water bottles but with the Intak bottle clearly labeled as also being from the advertised BPA-free line. The results from the posttest revealed only a significant effect of prime ($\chi^2 = 10.02, p = .0015, \text{Cramer's } \phi = .164$) on bottle choice. Of the

participants who saw the disgust prime, 83.2% chose the Intak BPA-free water bottle over the other three options, compared with 69.4% of those who saw the neutral prime, suggesting that disgust can increase purchase intentions for the specific products advertised in fear appeals, as well as more general responses to advertisements.

Discussion

Consistent with our previous findings, participants who were exposed to the coactivation of disgust and fear showed higher levels of persuasion, compliance, and purchase intentions than those who were exposed to fear only, and these results were again mediated by likelihood to act quickly in response to the advertisement. Importantly, these findings occurred independently of the health versus appearance focus of the appeal. Together with the results of Study 3, these findings rule out the possibility that some of our prior results were due to the appearance-based focus (i.e., fear of appearance-related negative consequences) of our disgust and fear advertisements and not to characteristics of disgust itself. In addition, the findings of Studies 3 and 4 suggest a possible mechanism for the extant finding that appearance-based fear appeals are more effective than health-based appeals (e.g., Jones and Leary 1994). It is difficult to activate appearance-based fears without also activating disgust; indeed, prior research on appearance-based fear appeals has highlighted aspects of appearance (e.g., wrinkles, age spots) that may also be viewed as disgusting (e.g., Mahler et al. 1997). Given the likely coactivation of disgust in appearance-based fear appeals, it is possible that disgust can help explain the previously documented increased effectiveness of such appeals.

GENERAL DISCUSSION

In contrast to existing work on consumer disgust that finds largely negative effects (e.g., Morales and Fitzsimons 2007; Shimp and Stuart 2004), we demonstrated that disgust can provide a positive, persuasion-enhancing boost to appeals that are solely fear based. Across a variety of different contexts, formats, and participant populations, we found that the combination of disgust and fear appreciably enhanced message persuasion above and beyond that of appeals that elicited fear alone. Across a series of studies, we ruled out alternative explanations for our results and traced the persuasion-enhancing properties of disgust to its strong and immediate avoidance reaction. Although disgust and fear are each emotions of avoidance, recent research has suggested that fear avoidance behavior is a multistep process in contrast to disgust, for which the impulse to distance is immediate (e.g., Lang, Bradley, and Cuthbert 1997; Lazarus 1991; Rosen and Schulkin 1998). We expected that this one-step versus two-step model of avoidance would be critical in the context of persuasion, and our results across four studies confirmed this. Thus, we found that the unique features of disgust, when included in a fear appeal, can significantly increase message acceptance persuasion appeals that elicit fear but not disgust.

As additional support for our theorizing, we conducted a study that examined a potential moderator for the disgust effect: need for control.² People differ naturally in their

motivation to control the events in their lives (Burger and Cooper 1979); whereas people high in the desire for control are described as decisive and certain, those who are low in desire for control tend to be indecisive and uncertain. Consistent with our expectations, the results from this study demonstrated that people who were high in desire for control were more persuaded by a disgust and fear appeal than by a fear-only appeal, and those who were low in desire for control were equally persuaded by both. We suggest that this occurred because the link between disgust and immediate action was particularly attractive to those who are high in desire for control but not to those who are low. Thus, this study provides additional support that the immediate distancing reaction associated with disgust enhances its persuasiveness.

The finding that disgust enhanced fear appeal persuasion in our studies indicates that disgust may be a key factor in determining how effective a given fear appeal will be. In support of this, we had two independent coders evaluate the 15 most highly cited fear appeal articles for the degree of disgust present in the fear appeal. The coders found that of the 15 articles, 9 of them included stimuli that could be considered disgusting, 5 of them did not include disgusting stimuli, and 1 did not provide enough information to discern whether the appeals were disgusting. Of the 9 studies that included disgusting stimuli, 78% reported persuasive effects of fear (7 of the 9 studies). Of the 5 studies that the coders found did not contain disgusting stimuli, 60% reported that fear enhanced persuasion (3 of the 5 studies). While this is only a small sample, with many components shifting in addition to whether the fear appeal also contained a disgusting element or not, it suggests that although feelings of disgust were never explicitly measured in these studies, disgust may have played a role in enhancing fear appeal persuasion nonetheless. We hope that the current research motivates researchers conducting future meta-analyses on fear appeals to systematically code for the presence of disgust in these appeals.

An examination of real-world advertising campaigns also corroborates our suggestion that disgust enhances the effectiveness of fear appeals. In a wildly successful campaign to reduce smoking, in 2004 the British Heart Foundation together with the Department of Health, launched a “fatty cigarette” campaign that showed graphic images linking cigarettes with fat-filled arteries. The campaign was so successful that the U.K. government is now planning to print these pictorial warning images on all tobacco products sold in the United Kingdom. Use of such warnings has also proved to be successful in reducing smoking in other countries, including Australia and Canada (www.bhf.org.uk/smoking/). Similarly, the nationally recognized and award-winning Meth Project regularly leverages the power of disgust-eliciting fear appeals in its campaign to reduce first-time methamphetamine use. One of its earliest appeals featured the image of a blood-splattered sink with the tagline “No one thinks they’ll try to tear off their own skin. Meth will change that.” Likewise, a more recent appeal featured the image of a battered and bloodied woman sitting on the floor. The ad copy read “My mom knows I’d never hurt her. Then she got in the way.” The success of these and other real-world campaigns suggests that disgust can indeed be used to enhance fear appeal persuasiveness and, more important, to effectively alter behavior. Our research found the effects of

²Details of this study are available from the first author.

disgust to be particularly strong at increasing compliance for fear appeals encouraging avoidant versus approach behaviors because of the alignment between avoidant behaviors and the avoidance reaction associated with disgust.

Our research is consistent with work arguing that fear appeals frequently elicit other emotions in addition to fear (Dillard et al. 1996) and that these emotions may strengthen the persuasiveness of fear appeals (Passyn and Sujun 2006). Importantly, however, our work focuses on the specific role that disgust plays in enhancing persuasion. Although much research has been conducted on the effects of negative emotions such as fear (e.g., Witte 1992) or guilt (e.g., Block 2005) on persuasion, startlingly little is known about the specific role of disgust. Given the high prevalence of disgust in consumer settings and the frequent incidence of disgust-eliciting elements in advertising, it is important to understand how disgust affects such basic consumer processes as persuasion or memory. More generally, the current research suggests that would be worthwhile for further research to examine the role of specific emotions in advertising and persuasion appeals because the unique properties of discrete emotions may lead to some surprising and unintended effects.

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