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Coping With Fear Through Suppression and Avoidance of Threatening Information

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Fear appeal communications are widely used by social marketers in their efforts to persuade individuals to refrain from engaging in risky behaviors. The present research shows that exposure to a fear appeal can lead to the suppression of concepts semantically related to the threat and bias attentional resources away from threat-relevant information. Participants in the experimental condition viewed a fear appeal advertisement depicting the negative consequences of drinking and driving. The results of a reaction time task showed inhibited responses to words semantically related to drinking (e.g., *beer*, *party*) relative to a baseline group that controlled for priming effects (Experiment 1a) and level of fear (Experiment 1b). Furthermore, those in the experimental condition were shown to adopt an attention avoidance processing style, decreasing attention to alcohol-related advertisements appearing in a mock magazine (Experiments 2a and 2b). Because processing of alcohol-related advertising has been linked previously to an increase in drinking and driving, inhibited processing of such advertisements suggests a positive outcome of suppression effects. This contrasts with prior claims suggesting that suppression is counter to prevention-based efforts.

Keywords: fear appeal, suppression, attention avoidance

Each year, the alcohol industry spends well over $1 billion promoting the consumption of alcohol and alcohol-related products (Federal Trade Commission, 2007). The Federal Trade Commission estimates that such measured media spending accounts for only about 25%–33% of total spending on promoting alcohol. Spending levels on other categories such as sponsorships, Internet advertising, point-of-purchase, and product placements have proven difficult to assess. The magnitude of these proalcohol communications has important public health implications as exposure to alcohol advertising has been found to be positively related to both excessive alcohol consumption and increased incidences of drinking and driving (Atkin, Neuendorf, & McDermott, 1983; Snyder, Milici, Slaeter, Sun, & Strizhakova, 2006; Stacy, Zogg, Unger, & Dent, 2004). Hence, in addition to social marketers' efforts to educate consumers about the risks involved with dangerous alcohol consumption behaviors, public health efforts can be greatly aided by efforts to reduce exposure, or the salience of exposure, to communications promoting alcohol-related products. For example, on the basis of the findings of a longitudinal study, Saffer and Dave (2006) estimated that a 28% reduction in alcohol advertising would result in an average 20% reduction in binge drinking, a behavior that has been found to be highly correlated with drinking and driving (Quinlan et al., 2005).

Competing against 70 advertisements glamorizing the consumption of alcohol-related products for each prevention-based advertisement (Center on Alcohol Marketing & Youth, 2003), social marketers have sought to make an impact by relying on strategies such as education-based campaigns and fear appeal advertising. These strategies have been met with mixed results. Take fear appeals, for example. The objective of a fear appeal is to threaten message recipients so that they become so frightened of the potential negative consequences of engaging in a particular unhealthy behavior that they refrain from doing so (Rogers, 1975, 1983; Ruiter, Abraham, & Kok, 2001; Tanner, Hunt, & Eppright, 1991; Witte, 1994). An example of a fear appeal may be an advertisement suggesting that if you drink and drive, you may kill someone. Prior research has demonstrated that these efforts face an uphill battle, not only because products used in the engagement in risky behaviors are often portrayed positively in communications encountered much more frequently by consumers (e.g., alcohol-related advertising), but also because fear appeal communications have varied success in actually changing attitudes and behaviors (e.g., Witte & Allen, 2000; Witte & Morrison, 2000). The latter has led scholars in this area to caution social marketers on their use of fear appeals (e.g., Witte, 1992; Witte & Allen, 2000).

We present a new argument in favor of the use of fear appeals by examining whether fear-based communications can lead message recipients to inhibit concepts related to a threat from entering their consciousness. We further examined whether this suppression biases attentional resources away from corporate advertising that promotes products (e.g., beer) instrumental to, but not specifically implicated in, the threat (e.g., drinking and driving can kill). The ability of a fear appeal to block information that is related to but not directly indicated in the threat is important because fear ap-

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peals typically target specific behaviors (e.g., drinking alcohol to excess), whereas corporate advertising is typically product or brand specific (e.g, beer, Budweiser). Hence, if a fear appeal is to inhibit the processing of threat-relevant corporate advertising, the concepts the mind attempts to block from entering consciousness would need to extend beyond those explicitly indicated in the message itself.

The fear appeal literature provides some evidence for the suppression of thoughts explicitly implicated in a threat (e.g., Roskos-Ewoldsen, Yu, & Rhodes, 2004; Witte, 1992), but stops short of investigating downstream effects such as suppression of semantically related concepts. The negative priming literature, on the other hand, does provide evidence to suggest that suppression can spread to other semantically related concepts (e.g., Damian, 2000; Tipper, 1985), but relies on very specific experimental instructions to induce suppression, and typically measures suppression only over very short time frames (i.e., a few seconds). Instead, the present research examined whether similar effects can be induced naturally in response to a fear appeal and last more than a few minutes. Once suppression for semantic associates is established, the repression literature is discussed to provide evidence that the blocking of negative thoughts from consciousness is pervasive, biasing attention away from processing threatening information such as advertising that promotes those products that could be used to engage in the unhealthy behavior. It is important to note that this information would only be perceived as threatening within the context of the fear appeal, and in fact, outside this context, may be perceived as nonthreatening, and arguably positive, to an at-risk population (e.g., an advertisement for Budweiser beer for college students).

Fear Appeal Theory

Fear appeal theory is based on the presumption that if a communication message can create fear and anxiety in the message recipients by informing them of the severe negative consequences of engaging in a particular behavior, the recipients will desire to alleviate the anxiety caused by the fear appeal. Ideally, fear appeals accomplish this by motivating message recipients to accept the message and eliminate the threat through a change in behavior that is consistent with threat avoidance (refraining from drinking and driving to decrease the chances of getting in an alcohol-related accident or of losing one's drivers license). This response is predicated on the assumption that the message recipients believe that a viable strategy exists that would allow them to refrain from the behavior. Under these conditions, fear appeals have been successful in changing attitudes and behavioral intentions in a variety of health domains, including smoking (Keller & Block, 1996; Pechmann, Zhao, Goldberg, & Reibling, 2003), drug use (Brown, D'Emidio-Caston, & Pollard, 1997), the spread of sexually transmitted diseases (LaTour & Pitts, 1989; Tanner et al., 1991), aggressive and inattentive driving (Mowen, Harris, & Bone, 2004), and alcohol abuse (Mider, 1984; Moscato et al., 2001).

However, if message recipients do not perceive that tactics exist that are efficacious in providing a viable means of avoiding the threat specified in a fear appeal (hereafter referred to as a *low-efficacy fear appeal*), message recipients may focus on alleviating the anxiety directly by suppressing threat-related thoughts from consciousness (Gore & Bracken, 2005; Ruiter, Verplanken, De Cremer, & Kok, 2004; Witte, 1992, 1994; Witte & Allen, 2000). To date, this response has been considered maladaptive from a prevention-based perspective because it focuses only on removing the anxiety and does little to motivate the message recipient from refraining from the risky behavior. We propose that suppression of threat-related thoughts can be beneficial if it inhibits processing of threat-relevant corporate advertising. In so doing, this research addresses two questions: (a) Can the influence of suppression-induced processes extend to other concepts related to the targeted unhealthy behavior that are not explicitly implicated in the fear appeal? (b) Is this effect pervasive, influencing the allocation of processing resources away from corporate advertising that promotes those products that may be used when engaging in the unhealthy behavior? The following two sections provide evidence pertinent to answering both questions.

Suppression

Evidence from the fear appeal literature suggests that when an individual processes a low-efficacy fear appeal, cognitions directly related to the threat (e.g., possible negative consequences for engaging in a risky behavior) are suppressed in memory (Hovland, Janis, & Kelley, 1953; Janis & Mann, 1977; Witte, 1992) and attitude accessibility toward the threat is inhibited (Roskos-Ewoldsen et al., 2004). According to fear appeal theory, suppression occurs to alleviate the anxiety caused by a fear appeal when an individual perceives that the behavior itself is unavoidable (e.g., Gore & Bracken, 2005; Ray & Wilkie, 1970; Ruiter et al., 2004; Witte, 1992).

Although indirect, evidence from the negative priming literature suggests that suppressive processes may not end with the threat itself, but also extend to other threat-related concepts. Typical negative priming studies instruct study participants to ignore a distractor stimulus at Time 1 and respond to the same stimulus at Time 2, at which point it is a target. Instructions to ignore the stimulus at Time 1 are thought to lead to suppression of that stimulus in the mind. Negative priming occurs if suppression of a stimulus (as evidenced by longer response times) persists at Time 2 when this stimulus served as a distractor at Time 1. Most relevant to the current investigation, negative priming has also been found with semantic associates. For example, Tipper (1985) found that participants took longer to identify a picture (e.g., a dog) at Time 2 when the to-be-ignored picture (e.g., a cat) at Time 1 was a semantic associate. Similar effects have been found by others (e.g., Damian, 2000; Noguera, Ortells, Abad, Carmona, & Daza, 2007; Ortells, Abad, Noguera, & Lupianez, 2001), particularly when the prime–target pairs were categorically related and strongly associated with one another (Fox, 1995). These results are important because they suggest that the suppression of negative consequences for engaging in an unhealthy behavior (e.g., drinking and driving) can spread to semantically related concepts such as those related to engaging in the behavior (e.g., beer).

As stated previously, the current investigation differs from negative priming studies in two important ways: First, negative priming studies induce suppression via direct instructions to ignore the target stimulus, whereas in the current studies, fear appeals are proposed as the instigator of initial suppressive processes via the message recipient's motivation to reduce anxiety. Second, to assess the applied relevance in this context, suppression effects are

investigated after longer durations given that individuals may not be exposed to specific brand advertising within seconds of viewing a fear appeal. This is in contrast to most negative priming studies where suppression at Time 2 is typically assessed within 1 or 2 s of Time 1. Although negative priming effects have most often been found to persist for only a matter of seconds, particularly for familiar stimuli (see Noguera et al., 2007), negative priming effects have been found to last up to 3 min with more than 50 intervening trials for meaningful, novel stimuli (Grison, Tipper, & Hewitt, 2005) and as long as 30 days for meaningless, novel stimuli (DeSchepper & Treisman, 1996). Compared with effects achieved through instructions to ignore, suppression effects may be more durable when induced by the need to reduce anxiety, particularly if anxiety persists over longer time intervals. Experiments 1a and 1b were designed to examine whether exposure to a low-efficacy fear appeal can lead to the suppression of concepts related to but not explicitly mentioned in the fear appeal, and whether they can persist for several minutes. Assuming suppression is evidenced under these conditions, the next question becomes whether this can influence future processing.

Threat Avoidance

Limited evidence exists indicating that when perceived efficacy of preventive behaviors is low, a fear appeal can inhibit the processing of threatening information presented in the fear appeal. Morris and Swan (1996) demonstrated that sexually active (vs. inactive) college students had impaired memory for AIDS-relevant information presented in a fear-inducing video about AIDS prevention. In a discussion of this result, Blumberg (2000) suggested that sexually active students should have perceived lower self-efficacy in terms of their ability to engage in behaviors to prevent AIDS, relative to sexually inactive students. Blumberg further suggested that the decreased memory among the former group may have been due to a defense avoidance strategy whereby once fear was induced, subsequent information may have been processed only to the point that sexually active students could categorize it as threatening, decreasing their attention to these portions of the film. However, no direct measures of suppression were provided, nor were measures of fear or efficacy. Greater evidence that suppression-based processes can guide subsequent processing can be found in the repression literature.

Given the potential differences between suppression and repression, prior to discussing findings from the repression literature, it is first important to establish its relevancy to suppression-based responses associated with fear appeals. The repression literature characterizes repressors as individuals who are anxious by nature and are defensive in terms of admitting to themselves or others that they experience negative emotional states (e.g., Mogg et al., 2000; Newman & McKinney, 2002). By virtue of their classification based on responses to self-report measures that assess inherent trait characteristics, repressors' desire to rid their mind of unwanted thoughts is taken as a given, with a majority of the research in this area focusing on the consequence of this repressive tendency in terms of its impact on attentional mechanisms. Most relevant to the present research is prior research that examined when repressive tendencies lead to an attention avoidance coping strategy, the strategy by which the processing of threatening information is inhibited (Caldwell & Newman, 2005; Fox, 1993, 1994; Mogg et al., 2000; Myers & McKenna, 1996; Newman & McKinney, 2002).

In contrast, the fear appeal literature does not assume that suppression of threatening information is linked to an inherent trait characteristic, but rather is a natural response to a fear appeal when no viable means of avoiding the threat is perceived (Gore & Bracken, 2005; Ruiter et al., 2004; Witte, 1992, 1994; Witte & Allen, 2000). Less clear is whether the same attention avoidance coping strategy that is associated with repressors will manifest among individuals whose response to a fear appeal is to suppress threat-relevant information from entering consciousness. Recent research has found suppression and repressive coping to be highly correlated (Szentagotai & Onea, 2007), leading some to conclude that they are independent processes that belong to the same "inhibitory" cluster (Giese-Davis & Spiegel, 2001) and others to conclude that they in fact may represent the same phenomenon at different levels of automaticity (Barnier, Levin, & Maher, 2004; Szentagotai & Onea, 2007), a point discussed further in the General Discussion section. Although a more thorough discussion of the relationship between repression and suppression is beyond the scope of this article, the commonality in ridding the mind of unwanted thoughts, and the possibility that they are either in the same family of processes or in fact the same phenomenon, makes findings from the repression literature relevant to understanding when suppressive processes induced by a fear appeal may inhibit the processing of threat-relevant information, such as corporate advertising.

Repressors have been found to avoid the processing of threatening information that is located at visual fixation as well as during visual search. In terms of the former, evidence for attention avoidance is provided from a Stroop-like response task. Specifically, attention avoidance is demonstrated when participants are able to name the color of a display background faster when the target (focal) word is threatening (e.g., *pathetic*) versus nonthreatening (e.g., *toaster*). Such findings are interpreted as suggesting a bias toward allocating processing resources away from the threatening information. From a prevention-based perspective, such results may be relevant in those instances when information perceived as threatening (e.g., corporate advertising) appears during commercial breaks because individuals' attention may be fixated on the TV screen. In terms of the latter, a dot probe task has been used to show biases in visual orientation during visual search. This task involves presenting two words simultaneously, one above and one below a fixation point. After exposure to the words, a dot appears where one of the words had been. The time taken to report whether the dot probe appears in the upper or lower position is recorded. Attentional bias away from threatening information is evidenced if it takes longer to report the position of the dot probe when the probe replaced a threatening versus nonthreatening word, suggesting visual orientation was focused away from the threatening word during exposure. Biases in visual orientation may be particularly relevant if corporate advertising was perceived as threatening and placed in magazines because magazine viewing often involves visual search (Janiszewski, 1998; Pieters & Wedel, 2004).

Attention avoidance has been found using both the Stroop task (e.g., Myers & McKenna, 1996; Newman & McKinney, 2002) and dot probe task (e.g., Fox, 1993; Mogg et al., 2000) among repressors (i.e., those who are anxious and defensive) but not among low-anxiety individuals or high-anxiety individuals who are low

on defensiveness. This latter result suggests that anxiety alone is not sufficient to invoke an attention avoidance coping strategy; defensiveness, manifested as one's desire to eliminate unwanted thoughts from the mind, is also necessary. Hence, high anxiety in conjunction with suppressive tendencies lead to attention avoidance strategies in the face of threatening information.

Attention avoidance strategies have also been found to extend to information that is thematically related to repressors' specific concerns. Using a Stroop task, Newman and McKinney (2002) demonstrated that repressors were more efficient at avoiding words semantically related to a trait they had previously indicated they would least like to possess compared with words related to unfavorable traits that they were less concerned about possessing. This result suggests that attention avoidance can extend to those concepts thematically related to the particular anxiety that induces concern. The present research relied on these findings to predict that concerns about engaging in a particular unhealthy behavior may carry over to products and brands that are consumed when engaging in such behavior. Experiments 2a and 2b were designed to examine whether exposure to a fear appeal can inhibit processing of corporate advertising that promotes products and brands that may be used when engaging in the targeted unhealthy behavior.

Experiment 1a

In line with the majority of work on negative priming and related inhibitory processing effects, inhibition was established in Experiment 1a through the use of cognitive response measures. Negative priming is defined and studied as an increase in response times (i.e., slower) when responding to previously ignored stimuli (Khurana, 2000; Tipper, 2001). Thus, Experiment 1a relied on measures of response time to test the prediction that fear appeals can lead to the suppression of concepts related to one's ability to engage in the behavior specified in a fear appeal. Furthermore, Experiment 1a focused on the situation identified in prior research as most conducive to fear appeal–induced suppression effects: when the message recipient perceives little can be done to avoid the unhealthy behavior (i.e., a low-efficacy fear appeal; Gore & Bracken, 2005; Ruiter et al., 2004; Witte, 1992, 1994; Witte & Allen, 2000). If suppression is not found under this condition, then it is unlikely that these types of suppression effects can spread beyond those concepts explicitly mentioned in a fear appeal. Once suppression is established under conditions of low efficacy, the role of perceived efficacy in threat avoidance is explored in more detail in Experiment 2a.

Method

Participants

Sixty-one undergraduate students (15 women) ranging in age between 18 and 28 years old ($M = 21.28$ years, $SD = 1.98$) participated for partial course credit. Sessions lasted approximately 30 min.

Stimuli

Fear appeal. To test predictions, we needed to choose a specific unhealthy behavior as the target of a fear appeal. Given the sample population, drinking and driving was deemed to be a relevant and important topic. An estimated 7.3 million Americans ages 18–24 drove under the influence of alcohol in 2001, a number that is on the rise, as is the number of resulting deaths (Hingson, Heeren, Winter, & Wechsler, 2005). Even in this age group, college students are particularly susceptible to alcohol-related problems (e.g., impaired driving) as heavy episodic alcohol use or binge drinking is higher among this population than among same-age peers who do not attend college (Wechsler, Lee, Nelson, & Lee, 2003). In their survey of more than 10,000 college students, Wechsler et al. (2003) found that 35.5% of respondents reported driving after drinking during the school year. Thus, the specific context investigated was highly relevant for current public health concerns.

An antidrinking and driving fear appeal public service announcement (PSA) developed by the Ad Council was identified and modified to serve as the low-efficacy fear appeal (see Appendix A, Panel 1). This PSA was selected to serve as the low-efficacy fear appeal because it suggested no viable means of averting the danger specified in the fear appeal. Specifically, the fear appeal presented a scenario in which a car driven by an unknown drunken driver could kill the message recipient, suggesting few or no means for coping with the threat because the message recipient has little control over the drinking and driving behavior of others.

In addition to this fear appeal, a control PSA was required to provide baseline data for comparison purposes to assess whether exposure to the fear appeal PSA slows responses to concepts (i.e., suppresses concepts) related to drinking and driving. Two types of advertisements were available to serve as a control: an advertisement that did not use a fear appeal strategy but primed the idea that another drunken driver could injure the message recipient, or an advertisement that induced fear regarding a risky behavior unrelated to drinking and driving. Each control group has its advantages. In the former case, the context is held constant across experimental and control conditions, but level of fear varies. In the latter case, fear is held constant, but the context varies so that the concept of drinking and driving is not primed in the control condition. Experiment 1a used a low-fear, drinking and driving PSA as a comparison advertisement (see Appendix B, Panel 1). Experiment 1b used a fear appeal that does not prime the concept of drinking and driving.

Word list. A list of words was needed to assess whether exposure to the drinking and driving fear appeal suppresses semantically associated concepts. Although the primary focus of interest is inhibited processing of concepts associated with drinking, the threat of drinking and driving involves two activities. If inhibitory processes are activated on reading a drinking and driving fear appeal, the processing of associates related to drinking and to driving should be hindered. To provide a stronger test of the theory, we examined the processing of both drinking-related and driving-related associates. Thus, the word list contained four words associated with drinking (*bottle*, *beer*, *party*, and *alcohol*), four words associated with driving (*car*, *road*, *truck*, and *traffic*), four words not associated with drinking and driving (*book*, *milk*, *chair*, and *class*), and eight nonsense words (e.g., *enop*). These words were randomly placed in the list.

Measures

Suppression. Suppression was assessed by measuring the time taken to respond to whether a word was a real word or nonsense word. Slower response times would indicate suppression. Re-

sponse times were measured in milliseconds. Participants were asked to respond as quickly as possible but not so quickly that it jeopardized accuracy.

Perceived fear. To ensure that the fear appeal PSA did indeed evoke higher levels of fear relative to the low-fear control PSA, we assessed feelings elicited by the PSAs via three 9-point scale items: The advertisement is not at all fear evoking or the advertisement is extremely fear evoking; the advertisement makes me feel not at all uneasy or the advertisement makes me feel extremely uneasy; and the advertisement makes me feel not at all anxious or the advertisement makes me feel extremely anxious. The three items were reliable (coefficient $\alpha = .86$); therefore, the averaged responses from the three items were used as the measure of fear.

Design

A mixed factorial design was used with group (experimental vs. control) as a between-subjects factor and type of word (related to the threat vs. unrelated to the threat) as a within-subject factor. Words associated with both drinking and driving represented concepts related to the threat.

Procedure

Participants were informed that they were going to be completing two independent studies in one session. They were then told that the purpose of the first study was to gauge their reactions to a PSA that was to be used for a different experiment later in the semester. Thirty-five participants were randomly assigned to the experimental group and received the fear appeal PSA about drinking and driving (hereafter referred to as *high-fear condition*); the remaining 26 participants served as the control group and received the low fear appeal drinking and driving PSA (hereafter referred to as *low-fear condition*). Participants were asked to evaluate the PSA carefully by spending 3 min writing whatever thoughts came to mind when reviewing the PSA.

After completing the PSA evaluation task, participants completed a second, seemingly unrelated study. Participants were told that the purpose of the study was to assess how quickly and accurately they could differentiate real words from nonsense words. Participants were seated in front of a computer screen and instructed that a series of letter strings would appear in the middle of the screen one at a time. Their task was to press the *F* key if they thought the letter string made up an actual word or the *J* key if they thought the string did not make up a real word. To familiarize themselves with the procedure, participants first completed a practice task with 10 items that were unrelated to both drinking and driving. Four of the practice words were repeated in a second practice task, which was immediately followed by the actual task. Approximately 5 min elapsed between the time participants completed the PSA reading task and when the first target word appeared in the response time task. Participants were then thanked, debriefed, and excused from the study.

Results

An alpha level of .05 was used in all analyses to determine statistical significance. All ω^2 values reported are partial ω^2, excluding variance due to analysis of variance (ANOVA) terms unrelated to the tested effect (partial $\omega^2 = \sigma^2_{effect}/[\sigma^2_{effect} + \sigma^2_{effect}]$), adopted from Zauberman and Lynch (2005).

Perceived Fear

A planned comparison on the measure of fear revealed a higher perceived level of fear among participants who received the high-fear appeal PSA ($M = 4.2$, $SD = 0.29$) than among those who received the low-fear control PSA ($M = 2.75$, $SD = 0.35$), $t(56) = 3.23$, $p = .002$, $\omega^2 = .14$, suggesting that the fear manipulation was successful.

Suppression

Mean response times and standard deviations for all conditions are shown in Table 1. To examine suppression effects, we conducted a mixed ANOVA on the average response time with word type (real threat-relevant words, real non–threat-relevant words) as the within-subject factor, fear level (high vs. low) as the between-subjects factor, and a self-report on whether the person focused more on accuracy or speed during the response time task as a covariate. Results support the predicted effects. Specifically, the two-way interaction between word type and fear level was significant, $F(1, 57) = 4.18$, $p < .05$, $\omega^2 = .05$. Planned comparisons revealed that, consistent with expectations, response times were slower (i.e., it took longer to respond) for the threat-relevant words among participants in the high-fear condition than among those in the low-fear condition, $t(57) = 2.78$, $p < .01$, $\omega^2 = .1$. There were no significant differences in response times between these two groups for the non–threat-relevant words, $t(57) < 1$, $\omega^2 < .01$. Planned comparisons indicate that this pattern of results holds for both drinking-related words, $t(57) = 2.42$, $p < .02$, $\omega^2 = .08$, and driving-related words, $t(57) = 2.31$, $p < .03$, $\omega^2 = .07$.

Furthermore, a 2 (PSA type: between-subjects) $\times$ 4 (word: within-subject) mixed ANOVA for each word category (drinking related, driving related, nonthreat relevant) showed no Word $\times$ PSA Type interactions in either of the three word groups, Fs(1, 171) ≤ 1.60, ps $> .10$, indicating that the four words in each of the categories used in the response time task did not differ across conditions. Hence, the Word $\times$ PSA Type effects were not caused by one or two dominant words. Finally, error rates when completing the response time task were extremely low across conditions;

Table 1
Mean Reaction Time (ms) and Standard Deviations Across Levels of Fear and Threat Relevance of Word: Experiment 1a

	Level of fear			
	Low		High	
Type of word	*M*	*SD*	*M*	*SD*
Threat relevant				
Drinking	423	34	532	29
Driving	477	32	573	27
Total	450	28	553	24
Nonthreat relevant				
Total	536	29	567	25

fewer than 2% of the responses incorrectly indicated that a real word was in fact a nonsense word.

Discussion

The goal of Experiment 1a was to show that threatening, low-efficacy PSAs can lead to the suppression of concepts not explicitly implicated in, but semantically related to, the threat. In support of this, response times to words that were related to engaging in drinking and driving were slower among those participants who viewed the antidrinking and driving fear appeal versus those who viewed the low-fear antidrinking and driving PSA. This result is consistent with prior research, in which negative priming shows slower response times for inhibited stimuli (e.g., Tipper, 2001).

In contrast to the threat-relevant words, no difference in response time was found between the high- and low-fear conditions for those words unrelated to the threat, suggesting that fear did not inhibit the processing of all subsequently viewed information, rather only that information that was threat-relevant. This indicates that heightened arousal did not inhibit processing in general. Experiment 1b provides greater evidence that fear-based suppression effects are fear-specific.

Although the low-fear antidrinking and driving PSA used in the control group was most appropriate for isolating the role of fear, this comparison assumes that exposure to a low-fear control PSA had no effect on the processing of threat-relevant words and thus could be used to represent a baseline for comparing performance. Yet, it is possible that priming the concept of drinking and driving in the absence of fear (i.e., in the low-fear control condition) facilitated response times to drinking- and driving-related words in the response time task. If this were the case, it would be unclear whether differences across the low- and high-fear conditions were due to heightened processing in the former condition, suppression in the latter condition, or both. Thus, replicating the suppression results with a control group that does not prime the concept of drinking and driving would greatly strengthen the findings of Experiment 1a.

Experiment 1b

The goal of Experiment 1b was to replicate the results of Experiment 1a while (a) maintaining equivalent levels of fear across experimental and control conditions so as to further rule out general arousal as potentially accounting for the results of Experiment 1a, and (b) using a control PSA that does not prime the concept of drinking and driving so as to rule out the possibility that the results of Experiment 1a were due to a facilitation in processing target words among those in the control group versus inhibited processing of target words among those in the experimental group.

Method

Because of the similarity between Experiment 1b and Experiment 1a, only differences between the two experiments are discussed in this section.

Participants

Undergraduate students ($N = 166$; 93 women) ranging in age between 19 and 24 years old ($M = 20.73$ years, $SD = 0.89$) participated for partial course credit. None of these participants were involved in Experiment 1a. Sessions lasted approximately 30 min.

Stimuli

A new control PSA unrelated to drinking and driving was adapted from the Ad Council that used a fear appeal strategy for gun control. This PSA emphasized the adverse consequences of gun crimes for the criminal and the criminal's family. Consistent with the drinking and driving fear appeal, the gun control fear appeal addressed the prevention of the misuse of an advertised product category and featured images that were not directly related to the product category. The two PSAs were in third person and similar in style, with one dominant image and very little text.

The word list used in the response time task was the same as that used in Experiment 1a with the only exception being that the driving-related words were not included.

Results

Perceived Fear

As expected, the drinking and driving fear appeal and gun control fear appeal elicited similar levels of fear ($M_{\text{gun control}} = 4.41$, $SD = 0.16$; $M_{\text{drink and driving}} = 4.53$, $SD = 0.16$), $F(1, 163) < 1$, $\omega^2 < .01$.

Suppression

A mixed ANOVA was conducted on the average response time with word type (drinking-related words, non–drinking-related words) as the within-subject factor and PSA (drinking and driving, gun control) as the between-subjects factor. Results replicate those of Experiment 1a. Specifically, it took longer to respond to drinking-related words among those exposed to the drinking and driving fear appeal versus those exposed to the gun control fear appeal ($M_{\text{drink fear}} = 547$ ms, $SD = 20$; $M_{\text{gun fear}} = 492$ ms, $SD = 19$), $t(163) = 1.96$, $p < .05$, $\omega^2 = .02$, whereas no differences between the two fear appeal groups were found for non–drinking-related words, $t(163) < 1$. Again, the nonsignificant Word × PSA Type interactions for both alcohol and control words, Fs$(1, 489) < 1.33$, ps $> .10$, confirm that these reaction time differences are not caused by a few outlier words. Furthermore, as with Experiment 1a, error rates for the response time task were very low, with fewer than 1% of the responses incorrectly identifying a real word as a nonsense word.

Discussion

Extant literature suggests that in response to a fear appeal, individuals may attempt to rid their minds of the anxiety-inducing information if they do not believe that they can avoid the danger specified in the fear appeal (e.g., Gore & Bracken, 2005; Ray & Wilkie, 1970; Ruiter et al., 2004; Witte,1992). Experiments 1a and 1b demonstrated that this type of thought suppression can extend from the dangerous behavior itself to those items instrumental to carrying out the dangerous behavior, and that this effect can persist for at least several minutes; recall that approximately 5 min elapsed between exposure to the fear appeal and exposure to the

target words appearing in the response time task. These results were reliable across two experiments. Experiment 1a found evidence of threat-relevant suppression while holding the behavior context constant and varying levels of fear. Experiments 1b replicated these results while ruling out possible priming effects and general fear-based arousal as potential alternative explanations by holding the level of perceived fear constant and varying the behavior context.

Although research investigating negative priming in the psychology literature has demonstrated that suppression can spread to semantic associates, this literature relies on experimental instructions to initiate the suppression process. Experiments 1a and 1b add to our understanding of suppression effects by demonstrating that a similar process can occur in response to an external stimulus, specifically, in this case, a fear appeal. It is important to note that the suppressed information that was semantically linked to the threat was only threatening when viewed in the context of the PSA; outside this context, the information would likely be perceived as positive by those in the sample college population (e.g., the words *beer* and *party*). Typically, negative priming studies have shown suppression of neutral words (e.g., *dog*, *cup*). Thus, finding similar suppression results with what could be perceived as positive words outside the context of the fear appeal speaks to the power of a fear appeal's ability to inhibit threat-relevant information.

The results of these two experiments make it clear that anxiety induced by the fear appeal did not lead to a global suppression of all information, but rather only information that was relevant to the cause of the anxiety. Those in the high-fear drinking and driving condition in Experiment 1a had inhibited responses to threat-relevant words related to drinking and driving but not to words unrelated to drinking and driving. Furthermore, in Experiment 1b, responses to drinking-related words were inhibited only after exposure to the drinking and driving fear appeal and not after exposure to the gun control fear appeal.

Results from Experiments 1a and 1b demonstrate that exposure to a low-efficacy fear appeal can create a situation whereby message recipients appear much like repressors in that they feel anxious and suppress threat-relevant thoughts. The repression literature shows that the trait characteristics of heightened anxiety and defensiveness (i.e., the desire to block threatening information from entering consciousness) predispose individuals to use an attention avoidance strategy when exposed to threatening information (Newman & McKinney, 2002). Hence, the next logical question is whether exposure to a low-efficacy fear appeal can also lead to an attention avoidance processing style when exposed to information relevant to the threat. Experiments 2a and 2b were designed to examine this question.

Experiment 2a

The primary goal of Experiment 2a was to demonstrate that exposure to a low-efficacy fear appeal predisposes individuals to adopt an attention avoidance processing style that inhibits subsequent processing of threat-relevant corporate advertising. As a secondary goal, Experiment 2a explored the role of efficacy in moderating this effect. This secondary goal needs further explanation.

As discussed previously, fear appeals are assumed to increase anxiety in a message recipient. How this anxiety is dealt with depends on whether strategies exist that are perceived to be efficacious in terms of averting the dangerous situation specified in a fear appeal. When efficacy is perceived to be low, the anxiety is dealt with by suppressing negative thoughts associated with the danger (as shown in Experiments 1a and 1b). In contrast, when strategies exist that are perceived to be efficacious in terms of averting the danger, the anxiety is not dealt with by suppressing negative thoughts, but rather by employing a danger averting strategy, such as not engaging in the unhealthy behavior to begin with (Gore & Bracken, 2005; Ruiter et al., 2004; Witte, 1992, 1994; Witte & Allen, 2000). Hence, perceived efficacy moderates how one deals with the anxiety induced by a fear appeal.

Parallel mechanisms have been found among individuals who are anxious by nature (Witte & Morrison, 2000). In this case, anxiety leads to one of two different processing styles in the face of threatening information. Anxious individuals who loath to admit that they experience negative affect (i.e., repressors) are said to be high on defensiveness and are predisposed to use an attention avoidance processing style when faced with threatening information (e.g., Caldwell & Newman, 2005; Fox, 1993, 1994; Mogg et al., 2000). In contrast, anxious individuals who are low in defensiveness, and thus have little need to block negative thoughts from consciousness, actually express attention vigilance, that is, their attention is drawn toward threatening information (Bradley, Mogg, Falla, & Hamilton, 1998; Mogg et al., 2000; Williams, Mathews, & MacLeod, 1996). For example, using a modified dot probe task, Bradley et al. (1998) found evidence of an attentional bias for threatening facial expressions, but not for emotional expressions in general (e.g., happy, sad), among clinically anxious individuals. The authors suggest that anxiety biases early preattentive processes that are involved in initial orienting of attention toward threatening information.

Whereas the primary goal of Experiment 2a was to show that individuals exposed to a low-efficacy fear appeal respond much like anxious, high-defensiveness individuals (i.e., like repressors) in terms their propensity to use an attention avoiding processing style, the secondary goal was to show that individuals exposed to a high-efficacy fear appeal respond much like high-anxious, low-defensiveness individuals in terms of their propensity to use an attention vigilance processing style. Although indirect, evidence has shown that when a fear appeal provides efficacious strategies to avoid the threat, individuals are likely to seek out additional threat-relevant information in an attempt to find other danger-averting strategies that they can add to their arsenal (Baron, Logan, Lilly, Inman, & Brennan, 1994; Gleicher & Petty, 1992; Tanner et al., 1991). Hence, much as defensiveness moderates processing styles among highly anxious individuals, efficacy is proposed as moderating whether a fear appeal promotes attention avoidance or attention vigilance toward threat-relevant corporate advertising.

Method

Participants

One hundred sixty-eight undergraduate students (96 women) ranging in age between 17 and 24 years old ($M = 20.81$ years, $SD = 0.95$) who had not participated in any of the prior experi-

ments completed Experiment 2a in exchange for partial course credit.

Stimuli

Fear appeal. To determine whether efficacy moderates the processing of threat-relevant information, we needed two fear appeals that varied to the extent in which message recipients perceived there to be a viable way of avoiding the danger specified in the fear appeal. Both fear appeals depicted a pair of shoes with ad copy stating that the shoes were found 30 yd from the crash site where a person by the name of Carissa was hit and killed by a drunken driver. Efficacy was manipulated by altering the tag line. In the relatively low-efficacy condition, the tag line stated, "That could have been you instead of Carissa." Hence, this was the same fear appeal as that used in Experiments 1a and 1b. In the higher efficacy condition, the tag line stated, "That drunk driver could have been you." Both fear appeals appear in Appendix A. By varying the tag line, message recipients were primed to think of drinking and driving in terms of either being the victim, for which little can be done to avoid the danger, or the assailant, which is easily avoidable by simply not drinking and driving. The former was used to represent the low-efficacy fear appeal and the latter the high-efficacy fear appeal. To match the victim or assailant focus, two low-fear control conditions were used (see Appendix B).

Prior to using these PSAs in Experiment 2a, we collected evidence to ensure that these two fear appeals did indeed vary on level of efficacy and elicited similar levels of fear. For this purpose, a separate group of 88 undergraduate students who did not participate in any of the main experiments viewed one of the following PSAs: the low-efficacy fear appeal PSA, the high-efficacy fear appeal PSA, or one of the two low-fear control PSAs. Participants then indicated the level of fear elicited by the PSA using the same three-item measure of fear used in Experiments 1a and 1b. In addition, those exposed to the fear appeals indicated perceived efficacy with four 7-point scale items of agreement (1 = *complete disagreement*, 7 = *complete agreement*) that assessed the perceived availability and feasibility of coping strategies for the dangers of drinking and driving in general: There are steps a person can take to avoid being involved in an alcohol-related accident; there are many things a person can do to decrease the chances that they are involved in an alcohol-related car accident; it would be easy for me to avoid being involved in an alcohol-related car accident; and there are a number of different things I as an individual can do to avoid being involved in an alcohol-related car accident. A single measure of efficacy was calculated by averaging responses to the four items; $\alpha = .84$). Lower numbers represented lower perceived efficacy. If the two fear appeal PSAs (one low efficacy, one high efficacy) primed message recipients to consider the dangers of drinking and driving in different contexts (i.e., as the victim or as the assailant), perceptions of participants' ability to avoid the danger should have been influenced.

Because no differences were found between the two low-fear control conditions on any measures collected, the two were collapsed for analysis purposes. An ANOVA revealed a main effect of PSA type (high fear, low efficacy; high fear, high efficacy; and low fear) on perceived fear, $F(2, 84) = 4.05$, $p = .02$, $\omega^2 = .07$. Planned contrasts further confirmed that this main effect was the result of differences between high- and low-fear PSAs. As expected, perceived fear was higher among those in the two high-fear conditions ($M = 4.9$) than among those in the low-fear control condition ($M = 3.6$, $SD = 2.1$; ts > 2.47, ps $< .02$, ω^2s $> .08$). As predicted, the analyses further confirmed that participants viewing the high-efficacy fear appeal PSA ($M = 4.9$, $SD = 1.64$) experienced levels of fear comparable with those viewing the low-efficacy fear appeal PSA ($M = 4.8$, $SD = 1.85$), $t(58) < 1$, $\omega^2 < .01$.

A second ANOVA confirmed that between the two high-fear PSAs, participants viewing the low-efficacy PSA perceived lower levels of perceived efficacy ($M = 3.4$, $SD = 1.47$) than those viewing the high-efficacy PSA ($M = 4.8$, $SD = 1.26$), $t(58) = 4.01$, $p < .01$, $\omega^2 = .21$. In summary, results showed that the fear appeal PSAs indeed elicited higher levels of fear than the low-fear control PSAs. Results also confirmed that those who viewed the high-efficacy fear appeal reported greater perceived efficacy than those who viewed the low-efficacy fear appeal. Hence, on the basis of a separate group of participants ($n = 88$) drawn from the same population that was used in the actual experiment, the selected PSAs were deemed appropriate to use in Experiment 2a. Furthermore, results regarding fear and efficacy levels were confirmed in the actual experiment using an entirely different group of participants ($n = 168$) than were used to confirm the choice of stimuli.

Magazine and target advertisements. To assess the effect of reading the antidrinking and driving PSAs on subsequent processing of threat-relevant brand advertising, we constructed a mock magazine using articles and graphics from *Time Out New York*, a current events publication available in New York City. The magazine was printed in 11-in. × 17-in. format and contained seven pages that were similar in layout, with article text and images taking up three quarters of the page space and a left-hand column featuring four advertisements (see Appendix C for a sample page from the magazine). Two to three paragraphs of text were highlighted in yellow on each page. The highlighted paragraphs always appeared to the right of the threat-relevant and threat-irrelevant advertisements on those pages in which the advertisements appeared.

The four threat-relevant brand advertisements that explicitly depicted brands of alcohol were for Budweiser beer, Absolut vodka, Bud Light beer, and Amstel Light beer, and appeared on pages 3, 5, 6, and 7. A majority of the ad space in each of the advertisements contained a picture of the product. In addition, there were four threat-irrelevant advertisements (cell phone, watch, fashion, and airline) that also appeared on pages 3, 5, 6, and 7 of the magazine. The magazine was printed in high-quality color and looked like a mock-up for a real magazine.

Measures

Processing style. The distinction between attention avoidance and attention vigilance reflects the extent to which processing resources are biased away from or toward threatening information (Myers & McKenna, 1996). In addition, memory has been found to be directly affected by the amount of processing resources devoted to a stimulus, with greater processing leading to better memory (Craik & Lockhart, 1972; Craik & Tulving, 1975). Hence, reduced ability to discriminate threat-relevant advertisements appearing in the magazine from advertisements that did not appear in the magazine would be an indication of the use of an attention

avoidance processing style, whereas improved ability to discriminate would be an indication of an attention vigilance processing style. To assess ability to discriminate, we used recognition data to construct a measure of sensitivity from signal detection theory.

Measures of sensitivity have been particularly helpful in accurately assessing differences in information processing (Lord, 1985), and as such have been used to indicate the nature and level of processing (Shapiro, MacInnis, & Park, 2002). Sensitivity measures were designed to account for responses biases (Singh & Churchill, 1988), particularly those biases that may be prevalent when investigating avoidance and vigilance, making a measure of sensitivity particularly appropriate for this research. Specifically, avoidance in processing negative information might result in a nay-saying bias (i.e., saying "no" to all alcohol-related stimuli whether they were in the magazine or not), and vigilance might result in a yea-saying bias (i.e., saying "yes" to all alcohol-related stimuli whether they were in the magazine or not). Because these and other biases are accounted for, measures of sensitivity are able to accurately reflect the extent to which participants can discriminate targets (advertisements appearing in the magazine) from distractors (advertisements not appearing in the magazine).

Results of a recognition measure, to be discussed subsequently, were used to calculate the A' statistic, which is a nonparametric form of d', that measures sensitivity. The A' statistic is considered a better measure of sensitivity to yes/no task responses than d' (Stanislaw & Todorov, 1999), although the results were almost identical when d' was used as the measure of sensitivity. Following Stanislaw and Todorov (1999), A' was calculated as follows: $0.5 + [(H - F)(1 + H - F)]/[4H(1 - F)]$, where H = hit rate (hits/number of signal trials) and F = false alarm rate (false alarms/number of noise trials). In addition, because of the large number of zeros in the recognition data, a log-linear transformation of the data was done prior to calculating A' (Hautus, 1995). The more positive the A' score, the greater were participants' abilities to correctly identify that advertisements presented in the magazine were indeed presented (i.e., the greater the proportion of hits) and the greater were their abilities to correctly identify that advertisements not presented in the magazine were not presented (i.e., the fewer the proportion of false alarms). This measure varies from 0.5 to 1.0, with 0.5 indicating that participants had no ability to discriminate targets from distracters and 1.0 indicating that participants had perfect ability to discriminate between the two. Sensitivity scores lower than that of a control group's suggest attention avoidance, whereas scores higher than that of a control group's suggest attention vigilance.

The recognition measure used to calculate A' required participants to reviewed a 5.5-in. × 8.5-in. booklet featuring 28 full-page advertisements, and, for each ad, they were to indicate whether it had appeared in the mock magazine. The booklet included the 4 threat-relevant and 4 threat-irrelevant advertisements from the mock magazine, 4 threat-relevant and 4 threat-irrelevant advertisements that did not appear in the mock magazine, and 12 filler advertisements (e.g., Cirque du Soleil).

Perceived fear. Perceived fear was measured using the same three-item scale used in Experiments 1a and 1b.

Perceived efficacy. To assess the extent to which individuals perceive there to be viable strategies to avert the danger specified in the fear appeal, we asked participants to indicate their perceived likelihood of being hurt in an accident involving drinking and driving at some point in their lifetime (from 0% to100%). Higher likelihoods would suggest fewer perceived viable strategies for averting the danger. Similar measures of efficacy have been used in prior research. For example, Oyserman, Fryberg, and Yoder (2007) measured the perceived efficacy of healthy eating in terms of advancing a person's overall health by asking participants to indicate, in percentage terms (from 0 to100%), the extent to which they perceive that healthy eating would affect a person's health.

Design

Participants were randomly assigned to view one of four anti-drinking and driving PSAs: a fear appeal with low perceived efficacy, a fear appeal with high perceived efficacy, and a low-fear control PSA with either a victim or assailant focus.

Procedure

Sessions ranged between 5 and 15 participants. To avoid accidental exposure to another participant's magazine, participants were placed one per table. Participants were first given the same cover story and set of instructions regarding evaluating the PSA as were given to those in Experiment 1a and 1b. Immediately following the PSA rating task and completion of the measure of fear, the experimenter began what participants believed was a second study. Participants were told that the study's purpose was to explore how a new type of magazine, which was currently available in some major U.S. markets, would fare in the town in which the university was located. Participants were also told that because of time constraints, the experimenter had highlighted key parts of representative articles and that participants were to focus on reading only the highlighted parts. This provided a believable reason for the highlighting used to help control exploratory search and browsing behavior.

After reading the magazine, participants completed a recognition memory test for the advertisements that appeared in the mock magazine and then completed the measure of perceived efficacy by estimating their perceived likelihood of getting in an alcohol-related driving accident in their lifetime. Finally, participants completed demographic information, were debriefed, and excused from the study.

Results

Perceived Fear

An ANOVA was conducted with fear as the dependent variable and the three PSA types (low-efficacy fear appeal, high-efficacy fear appeal, and low-fear control) as the between-subjects factor. As expected, the results revealed a significant main effect of PSA type, $F(2, 162) = 7.41$, $p < .01$, $\omega^2 = .07$; participants viewing the low-efficacy ($M = 4.49$, $SD = 0.35$) and high-efficacy ($M = 4.42$, $SD = 0.33$) fear appeal PSAs experienced a statistically equivalent level of fear, $t(83) = 0.14$, $p = .89$, $\omega^2 < .01$, which was higher than the fear experienced by those viewing the low-fear appeal control PSA for both efficacy conditions ($M = 3.14$, $SD = 0.25$; ts > 3, ps $< .01$, ω^2s $> .07$).

Perceived Efficacy

As expected, planned comparisons conducted on the measure of efficacy revealed higher levels of perceived efficacy (less likeli-

hood of being involved in an alcohol-related accident) in the high-efficacy fear appeal condition ($M = 23.2\%$, $SD = 4.38$) than in the low-efficacy fear appeal condition ($M = 38.5\%$, $SD = 4.46$), $t(55) = 2.35$, $p < .05$, $\omega^2 = .07$. For comparison purposes, the mean for participants exposed to the low-fear control PSA was 29.34%, suggesting relatively moderate levels of perceived efficacy in this group ($ps > .1$, when comparisons were conducted between the low-fear control group and high- and low-efficacy fear appeal groups).

Sensitivity

A mixed ANOVA was conducted on A' with PSA type as the between-subjects factor and type of advertisement (alcohol-related, non–alcohol-related) as the within-subject factor. Results reveal the predicted interaction between PSA type and ad type, $F(2, 165) = 3.763$, $p < .03$, $\omega^2 = .0$. As shown in the Figure 1 (recall that A' varies between 0.5 and 1.0), the interaction between PSA type and ad type was due to a poorer ability to discriminate alcohol-related advertisements from alcohol-related distractors (i.e., alcohol advertisements not in the magazine) for participants in the low-efficacy fear appeal condition ($M = 0.59$, $SD = 0.03$) than those in either the high-efficacy fear appeal condition ($M = 0.73$, $SD = 0.02$), $t(85) = 3.9$, $p < .01$, $\omega^2 = .14$, or the low-fear control group ($M = 0.66$, $SD = 0.02$), $t(119) = 2.03$, $p < .04$, $\omega^2 = .03$. Furthermore, ability to discriminate signals (alcohol advertisements in the magazine) from noise (alcohol advertisements not in the magazine) was better among participants in the high-efficacy fear appeal condition than among those in the low-fear control condition, $t(126) = 2.4$, $p < .04$, $\omega^2 = .04$. In addition, as Figure 1 indicates, no differences were found in discrimination ability across PSA types with respect to non–alcohol-related advertisements ($ps > .40$).

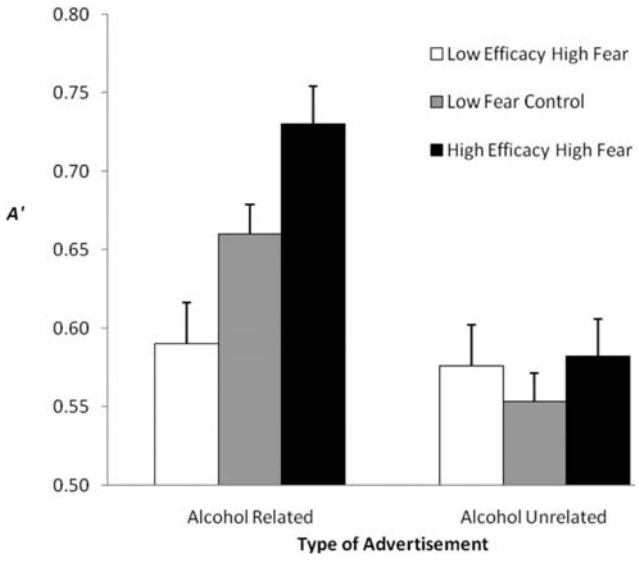

Figure 1. Attention paid toward alcohol-related and alcohol-unrelated advertising as measured by A' as a function of efficacy and fear in Experiment 2a.

Discussion

Experiment 2a builds on results of Experiments 1a and 1b by demonstrating that exposure to a fear appeal can guide subsequent processing of threat-relevant information. Processing resources were either biased away from or biased toward threat-related corporate advertising depending on the extent to which the danger specified in the fear appeal was perceived to be avoidable. Specifically, when participants perceived little could be done to avert the dangers of drinking and driving that were specified in the fear appeal, processing resources were biased away from advertisements that promoted Budweiser beer, Absolut vodka, Bud Light beer, and Amstel Light beer. In contrast, when participants had more faith that the dangers of drinking and driving that were specified in the fear appeal could be averted, processing resources were biased toward the alcohol-related advertisements.

These results mimic those found among repressors and highly anxious, low-defensive individuals, providing further insight into the influence that efficacy exerts in fear-based responses. Among highly anxious individuals, levels of defensiveness (the extent to which an individual desires to block negative thoughts) dictate whether individuals are predisposed to use an attention avoidance or attention vigilance processing style when exposed to threatening information (Mogg et al., 2000). Level of efficacy played the same role in response to viewing a fear appeal, thus providing greater confidence that perceived efficacy moderates the extent to which individuals attempt to block or seek out threat-relevant information. In addition, and consistent with the results of Experiments 1a and 1b, fear appeals had no effect on the level of processing devoted to non–alcohol-related advertisements, suggesting that both attention avoidance and attention vigilance are threat specific, and that results cannot be attributable to differences in visual search behavior across conditions while completing the magazine reading task.

As was done in Experiment 1b, to augment the results of the low-efficacy fear appeal condition in Experiment 2a, we conducted a second experiment that used a no-prime control group. Furthermore, Experiment 2b was designed to equate level of fear across the experimental and control conditions so as to provide greater evidence that it is not fear per se that accounts for the results, but rather how an individual deals with the fear (e.g., by engaging in attention avoidance).

Experiment 2b

Because the primary goal of Experiment 2a was to provide evidence that fear appeals can lead to the use of an attention avoidance processing style, only the low-efficacy drinking and driving fear appeal was used in Experiment 2b. The same no-prime, gun control fear appeal that was used in Experiment 1b was used in this experiment as a comparison group. Furthermore, the same measures and methods in Experiment 2a were used in this experiment.

After exposure to either the gun control or the drinking and driving fear appeal, 87 undergraduate students (44 women) ages 18–24 years old ($M = 20.57$ years, $SD = 0.97$) who had not participated in any of the prior research completed the magazine reading task that contained the same non–alcohol-related advertisements and three of the same alcohol-related advertisements

used in Experiment 2a, plus one advertisement depicting a party scene. The party scene was used to demonstrate a different type of related stimulus and, as predicted, behaved similarly to the alcohol ads. Analyses on A' revealed a similar pattern of effects as that in Experiment 2a; planned comparisons showed the predicted lower A' scores for alcohol-related advertisements in the related fear condition (drinking and driving: $M = 0.59$, $SD = 0.03$) than in the unrelated fear condition (gun control: $M = 0.66$, $SD = 0.03$), $t(85) = -1.98$, $p < .05$, $\omega^2 = .03$, and no difference in A' scores for non–alcohol-related advertisements, $t(85) = -0.54$, $p > .10$, $\omega^2 < .01$.

By comparing the low-efficacy fear appeal against two types of control groups in Experiment 2a and 2b, differences in levels of fear and in PSA design can be ruled out as alternative explanations, allowing conclusions about the directionality of the effects to be made. In other words, when combined, Experiments 2a and 2b provide evidence that it is not the fear itself, but rather the interpretation of the fear that guides the findings.

General Discussion

Practical Implications

Fear appeals have been used across a variety of domains in an attempt to persuade individuals to refrain from engaging in unhealthy or risky behaviors. In judging the effectiveness of a fear appeal, the predominant belief is that a fear appeal is only successful if it encourages cognitive, affective, or behavioral responses that are directed toward preventing the dangerous situation from occurring (Rogers, 1975, 1983; Ruiter et al., 2001; Tanner et al., 1991; Witte, 1994). A fear appeal has been presumed to be unsuccessful, and perhaps even detrimental, if it leads to message rejection, such as suppressing from consciousness the negative consequences of engaging in an unhealthy behavior. It was not thought that such an outcome could be beneficial in terms of averting the behavior (Leventhal, 1971; Rippetoe & Rogers, 1987; Ruiter et al., 2004; Tanner et al., 1991; Witte & Allen, 2000). However, these definitions of success and failure have not considered the impact of fear appeals on the subsequent processing of corporate advertising. Decreasing exposure to positive portrayals of products that enable individuals to engage in risky behavior has been found to discourage such behavior (Saffer & Dave, 2006). To this end, the present research provides the first step in understanding the effects of fear appeals on the processing of threat-relevant advertising.

When participants perceived little could be done that would be efficacious in terms of avoiding the danger specified in a fear appeal, suppressive processes were found to inhibit responses to those products (e.g., beer, alcohol) that could be used to enable the risky behavior (e.g., drinking and driving; Experiments 1a and 1b), and encouraged use of an attention avoidance processing strategy that biased processing resources away from alcohol-related advertising (Experiments 2a and 2b). In contrast, when danger-averting behavior was perceived to be efficacious, participants were predisposed to use an attention vigilance processing style, biasing processing resources toward alcohol-related advertising (Experiment 2a). These results are in direct opposition to predominant thought regarding the importance of providing efficacious strategies for averting the danger specified in a fear appeal. Specifically, prior research has demonstrated high-efficacy fear appeals to be beneficial to prevention-based campaigns and low-efficacy fear appeals to be ineffective (see Witte & Allen, 2000). In contrast, it was the low-efficacy condition that proved most beneficial in diverting attention away from alcohol-related advertising. In fact, the high-efficacy fear appeal proved counterproductive to prevention-based efforts in that it caused processing resources to be drawn toward alcohol-related advertising.

Although this research demonstrated a positive outcome using a low-efficacy fear appeal, more research is needed to determine the viability of using this type of fear appeal for prevention-based campaigns. Specifically, some low-efficacy fear appeals have been shown to lead to reactance, increasing the likelihood that message recipients would engage in the risky behavior that the fear appeal was attempting to prevent (Witte & Allen, 2000). This possibility may outweigh the advantages found by decreasing attention to threat-relevant advertising. However, the atypical nature of the low-efficacy fear appeal used in the current research suggests that reactance would be unlikely. Even fear appeals used in prior research that were perceived as being nonefficacious were explicitly designed to encourage a modification in behavior to promote engagement in a healthy activity (e.g., applying sunscreen) or halt engagement in a risky behavior (e.g., drinking and driving). It is the lack of effectiveness or willingness to engage in the strategies that made individuals perceive that their ability to avoid the danger was nonefficacious. In contrast, the low-efficacy fear appeal used in the present research did not focus on a behavior the message recipient could engage in or refrain from, nor did it offer any means of behavior modification to avoid the negative consequence. Specifically, the fear appeal induced anxiety by making it salient that the message recipient could be the innocent victim of others' dangerous behavior. Hence, reactance is unlikely because the fear appeal did not focus on the behavior of the message recipient, but rather the behavior of others. This is an interesting approach in the design of fear appeals that has not been studied before.

Theoretical Implications

The level at which negative priming operates has been a central issue in the negative priming literature. The main focus of the issue revolves around the extent to which suppression effects can operate on a more abstract, categorical level, as opposed to being constrained to an identical priming paradigm (where the prime and target words are the same) that operates on a relatively low perceptual level. Because semantic negative priming would require suppression to operate on a relatively abstract level, some researchers have questioned whether negative priming can extend to semantic associates (e.g., Macleod, Chiappe, & Fox, 2002). However, the results of Experiments 1a and 1b provide evidence that suppression does extend to semantic associates; exposure to a low-efficacy fear appeal about the dangers of drinking and driving suppressed semantically related words such as *beer* and *party*. Although methodological differences exist between those used in negative priming studies and those used in this research, the results of Experiments 1a and 1b provide support for the existence for spreading inhibition to semantically related associates, a core requirement for semantic negative priming. Given the importance of this issue to the negative priming literature, despite method-

ological differences, this is an important result, adding to the growing evidence for semantic negative priming.

The current research also adds to a growing body of evidence that individuals have the ability to selectively avoid processing threatening information (e.g., Caldwell & Newman, 2005; Fox, 1993, 1994; Mogg et al., 2000). Many conceptualizations of coping assume that attention to threatening information is an automatic default response, leading researchers to determine how and why individuals might override this natural tendency and employ an attention avoidance strategy (Bradley et al., 1998; Newman & McKinney, 2002). In fact, one of the main reasons repressors have been studied is that they have been shown to have a predisposition for using this strategy in the face of threatening information, and thus are very appropriate for this purpose (Newman & McKinney, 2002). However, even within the repression literature, evidence for an attention avoidance strategy is mixed. One of the possible contributing factors for the mixed results is the inconsistency in methods used to classify experimental participants as repressors versus nonrepressors (Myers & McKenna, 1996). For example, Dawkins and Furnham (1989) used normative means from self-report measures to classify participants as repressors, and found evidence suggesting attention vigilance, whereas Myers and McKenna (1996) relied on splitting the data to yield extreme values on self-report measures to classify participants as repressors versus nonrepressors, and found evidence for attention avoidance. Furthermore, repressors have been found to purposefully underreport anxiety levels because of their unwillingness to convey negative affect (Mogg et al., 2000; Weinberger, Schwartz, & Davidson, 1979). Rather than relying on measured responses to provide evidence of attention avoidance, the present research relied on a manipulation to induce this processing style, thus eliminating the classification problem and providing additional support for attention avoidance.

It is interesting that research in the repression literature typically finds support for attention avoidance using words that are socially threatening (e.g., *ridicule*, *fail*) but not when using words that are physically threatening (e.g., *stab*, *attack*; Caldwell & Newman, 2005; Fox, 1993; Myers & McKenna, 1996). Researchers have argued that physically threatening information is biologically relevant to survival and thus, based on its evolutionary significance, is unlikely to be selectively avoided (Bradley et al., 1998; Newman & McKinney, 2002). In fact, physically threatening information tends to lead to attention vigilance, automatically capturing attentional resources (Bradley et al., 1998). Arguably, in this research, those items suppressed and avoided when viewed in the context of the low-efficacy fear appeal would likely be considered physically threatening in that they could be involved in one's death due to a drinking and driving accident (e.g., beer, vodka). However, it is unlikely that this information is perceived to be physically threatening outside the context of using these products in unhealthy ways. Perhaps attention avoidance is still possible for physically threatening information that does not have evolutionary roots. If so, this suggests boundary conditions for using a low-efficacy fear appeal for inhibiting processing of threat-relevant advertising; it could not be used to inhibit those behaviors that use items that are by nature physically threatening. For example, it would have been interesting to see whether those exposed to the gun control fear appeal would have inhibited the processing of gun-related information (e.g., bullets). An alternative would be to simply rely on socially threatening aspects of risky behavior such as the negative stigma associated with drinking and driving because socially threatening stimuli have reliably led to attention avoidance among repressors (Caldwell & Newman, 2005; Fox, 1993; Myers & McKenna, 1996).

Limitations and Directions for Future Research

Although the results of this research suggest the importance of considering the effects of prevention-based messages on the processing of corporate advertising, the ultimate goal of a prevention message is to alter behavior. A robust finding in the marketing (e.g., Berger & Mitchell, 1989; Haugtvedt, Schumann, Schneier, & Warren, 1994) and psychology (e.g., Berlyne, 1970; McCullough & Ostrom, 1974) literature indicates that attitudes and behaviors are greatly influenced by message repetition, typically with greater message repetition leading to greater preferences. Hence, although the long-term effects of the suppression mechanism require further study, the results of Experiments 2a and 2b indicate that the processing of industry advertisements promoting unhealthy behavior can be reduced by using a low-efficacy fear appeal. Despite this, more proximal determinants of behavior, such as attitudes and behavioral intentions, should be studied using this type of fear appeal. For example, given that exposure to this type of low-efficacy fear appeal led to suppression and inhibited processing of information related to specific types of alcoholic beverages, it may also decrease preference and intentions to drink these beverages even when a person is not intending to drive.

An issue not directly investigated in this research is whether the processing of threat-relevant information is an effortful process. If avoidance of threat-relevant information requires cognitive effort, then its effects are dependent on the availability of cognitive resources. Current thinking does seem to suggest that the results of these experiments rely on an effortful process. For example, whereas repressors use of inhibitory strategies may be an automatic, effortless process developed over time by repeated practice (Wegner & Zanakos, 1994), suppression of negative thoughts has been conceptualized as being effortful because it has not been routinized over time (Szentagotai & Onea, 2007). Because the suppression-based effects in the present research are based on a single episode, they do not seem to readily meet the criterion of an effortless process developed over time by repeated practice. For this reason, it is likely that the inhibitory effects found in this research would decrease as the availability of cognitive resources decreased. In support of this view, Wenzlaff, Rude, Taylor, Stultz, and Sweatt (2001) found that an attentional bias to avoid negative words among those at risk for depression disappeared under conditions of cognitive load. However, considering the findings of Experiments 2a and 2b, where reading magazine articles put participants under moderate levels of cognitive load, questions about the effects of cognitive load on inhibitory effects remain. Despite being under at least moderate load, those in the low-efficacy condition were expressing suppressive tendencies in that they were biased away from processing threat-relevant advertisements.

Another potential factor limiting the usefulness of the results has to do with the duration for which suppressive effects may be operable. Although suppression effects due to negative priming typically have been found to persist for only a matter of seconds (see Noguera et al., 2007), the results of Experiments 1a and 1b

suggest that suppression effects can last a minimum of 5 min. Methodological differences between negative priming studies and Experiments 1a and 1b may account for this seeming inconsistency with findings from the negative priming literature. Negative priming studies rely on instructions to ignore to induce suppression. Furthermore, instructions to ignore are only relevant for a short period of time, as negative priming studies involve multiple trials, with each trial lasting for only a brief duration. In contrast, the suppression-based effects found in Experiments 1a and 1b were due to participants' desire to reduce anxiety caused by the low-efficacy fear appeal. Perhaps mood-based suppression is more durable, lasting at least as long as anxiety is present. However, even if this were the case, it suggests a limitation in terms of social marketers' ability to capitalize on the types of effects found in this research. Specifically, care would have to be taken to place low-efficacy fear appeals in those communication vehicles where threat-relevant advertising is most prevalent. Doing so would help ensure that suppression-based effects would be operational during the time individuals come in contact with threat-relevant advertising.

Conclusion

Social marketers face an uphill battle in their attempt to discourage individuals from engaging in unhealthy behaviors such as abusing alcohol. Hindering this battle are the multibillion dollar industries that promote the very products that are instrumental for engaging in these unhealthy behaviors. The use of fear appeals has been one strategy social marketers have relied on in this battle. The current series of experiments furthers our understanding of fear appeals by showing how they can inhibit the processing of threat-related product advertising. In so doing, the research provides evidence that attention avoidance processing strategies can be evoked naturally in response to a fear appeal.

References

Atkin, C. K., Neuendorf, K., & McDermott, S. (1983). The role of alcohol advertising in excessive and hazardous drinking. *Journal of Drug Education, 13,* 313–324.

Barnier, A. J., Levin, K., & Maher, A. (2004). Suppressing thoughts of past events: Are repressive copers good suppressors? *Cognition & Emotion, 4,* 513–531.

Baron, R., Logan, H., Lilly, J., Inman, M., & Brennan, M. (1994). Negative emotion and message processing. *Journal of Experimental Social Psychology, 30,* 181–201.

Berger, I. E., & Mitchell, A. A. (1989). The effect of advertising on attitude accessibility, attitude confidence, and the attitude behavior relationship. *Journal of Consumer Research, 16,* 269–279.

Berlyne, D. E. (1970). Novelty, complexity, and hedonic value. *Perception & Psychophysics, 8,* 279–286.

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

Bradley, B. P., Mogg, K., Falla, S. J., & Hamilton, L. R. (1998). Attentional bias for threatening facial expressions in anxiety: Manipulation of stimulus duration. *Cognition & Emotion, 12,* 737–753.

Brown, J. H., D'Emidio-Caston, M., & Pollard, J. A. (1997). Students and substances: Social power in drug education. *Educational Evaluation and Policy Analysis, 19,* 65–82.

Caldwell, T. L., & Newman, L. S. (2005). The timeline of threat processing in repressors: More evidence for early vigilance and late avoidance. *Personality and Individual Differences, 38,* 1957–1967.

Center on Alcohol Marketing and Youth. (2003). *Fewer drops in the basket: Alcohol industry "responsibility" advertising declined on television 2002.* Washington, DC: National Research Council/Institute of Medicine.

Craik, F., & Lockhart, R. S. (1972). Levels of processing: A framework for memory research. *Journal of Verbal Learning and Verbal Behavior, 11,* 671–684.

Craik, F., & Tulving, E. (1975). *Journal of Experimental Psychology: General, 104,* 268–294.

Damian, M. F. (2000). Semantic negative priming in picture categorization and naming. *Cognition, 76,* B45–B55.

Dawkins, K., & Furnham, A. (1989). The colour naming of emotional words. *British Journal of Psychology, 80,* 383–389.

DeSchepper, B. G., & Treisman, A. M. (1996). Visual memory for novel shapes: Implicit coding without attention. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 22,* 27–47.

Federal Trade Commission. (2007). Alcohol advertising expenditures. Retrieved January 14, 2009, from http://www.ftc.gov/reports/alcohol/appendixb.shtm

Fox, E. (1993). Allocation of visual attention and anxiety. *Cognition & Emotion, 7,* 207–215.

Fox, E. (1994). Attentional bias in anxiety: A defective inhibition hypothesis. *Cognition & Emotion, 8,* 165–195.

Fox, E. (1995). Negative priming from ignored distractors in visual selection: A review. *Psychonomic Bulletin & Review, 2,* 145–173.

Giese-Davis, J., & Spiegel, D. (2001). Suppression, repressive-defensiveness, restraint and distress in metastatic breast cancer: Separable or inseparable constructs. *Journal of Personality, 3,* 418–449.

Gleicher, F., & Petty, R. E. (1992). Expectations of reassurance influence the nature of fear-stimulated attitude change. *Journal of Experimental Social Psychology, 28,* 86–100.

Gore, T. D., & Bracken, C. C. (2005). Testing the theoretical design of a health risk message: Reexamining the major tenets of the extended parallel process model. *Health Education & Behavior, 32,* 27–41.

Grison, S., Tipper, S. P., & Hewitt, O. (2005). Long-term negative priming: Support for retrieval of prior attentional processes. *Quarterly Journal of Experimental Psychology, 58*(A), 1199–1224.

Haugtvedt, C. P., Schumann, D. W., Schneier, W. L., & Warren, W. L. (1994). Advertising repetition and variation strategies: Implications for understanding attitude strength. *Journal of Consumer Research, 21,* 176–189.

Hautus, M. J. (1995). Corrections for extreme proportions and their biasing effects on estimated values of *d′*. *Behavior Research Methods, Instruments, & Computers, 27,* 46–51.

Hingson, R., Heeren, T., Winter, M., & Wechsler, H. (2005). Magnitude of alcohol-related mortality and morbidity among U.S. college students ages 18–24: Changes from 1998 to 2001. *Annual Review of Public Health, 26,* 259–279.

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

Janis, I. L., & Mann, L. (1977). *Decision-making: A psychological analysis of conflict, choice, and commitment.* New York: Free Press.

Janiszewski, C. (1998). The influence of display characteristics on visual exploratory search behavior. *Journal of Consumer Research, 25,* 290–301.

Keller, P. A., & Block, L. G. (1996). Increasing the persuasiveness of fear appeals: The effect of arousal and elaboration. *Journal of Consumer Research, 22,* 448–459.

Khurana, B. (2000). Not to be and then to be: Visual representation of ignored unfamiliar faces. *Journal of Experimental Psychology: Human Perception and Performance, 26,* 246–263.

LaTour, M. S., & Pitts, R. E. (1989). Using fear appeals in advertising for AIDS prevention in the college age population. *Journal of Health Care Marketing, 9,* 5–14.

Leventhal, H. (1971). Fear appeals and persuasion: The differentiation of a motivational construct. *American Journal of Public Health, 61,* 1208–1224.

Lord, R. G. (1985). Accuracy in behavioral measurement: An alternative definition based on raters' cognitive schema and signal detection theory. *Journal of Applied Psychology, 70,* 66–71.

Macleod, C. M., Chiappe, D. L., & Fox, E. (2002). The crucial roles of stimulus matching and stimulus identity in negative priming. *Psychonomic Bulletin & Review, 9,* 521–528.

McCullough, J. L., & Ostrom, T. (1974). Repetition of highly similar messages and attitude change. *Journal of Applied Psychology, 59,* 395–397.

Mider, P. A. (1984). Failures in alcoholism and drug dependence prevention and learning from the past. *American Psychologist, 39,* 183–184.

Mogg, K., Bradley, B. P., Dixon, C., Fisher, S., Twelftree, H., & McWilliams, A. (2000). Trait anxiety, defensiveness and selective processing of threat: An investigation using two measures of attentional bias. *Personality and Individual Differences, 28,* 1063–1077.

Morris, K. A., & Swan, W. B., Jr. (1996). On wishing away the threat of AIDS. In S. Oskamp & S. C. Thompson (Eds.), *Understanding and preventing HIV risk behavior* (pp. 57–79). Thousand Oaks, CA: Sage.

Moscato, S., Black, D. R., Blue, C. L., Mattson, M., Galer-Unti, R. A., & Coster, D. C. (2001). Evaluating fear appeal messages to reduce alcohol use among "Greeks." *American Journal of Health Behavior, 25,* 481–491.

Mowen, J. C., Harris, E. G., & Bone, S. A. (2004). Personality traits and fear response to print advertisements: Theory and an empirical study. *Psychology and Marketing, 21,* 927–943.

Myers, L. B., & McKenna, F. P. (1996). The colour naming of socially threatening words. *Personality and Individual Differences, 6,* 801–803.

Newman, L. S., & McKinney, L. C. (2002). Repressive coping and threat-avoidance: An idiographic Stroop study. *Personality and Social Psychology Bulletin, 28,* 409–422.

Nielsen, J., & Shapiro, S. (2006). Spreading fear: How fear appeals inhibit the processing of threat-relevant advertising [Abstract]. *Proceedings of the Association for Consumer Research, 34,* 192–193.

Nielsen, J., & Shapiro, S. (2008). Positive fear control: How fear appeals inhibit the processing of threat-relevant advertising [Abstract]. *Proceedings of the Society for Consumer Psychology,* 119.

Noguera, C., Ortells, J. J., Abad, M. J. F., Carmona, E., & Daza, M. T. (2007). Semantic priming effects from single words in a lexical decision task, *Acta Psychologica, 125,* 175–202.

Ortells, J. J., Abad, M. J. F., Noguera, C., & Lupianez, J. (2001). Influence of prime–probe stimulus onset asynchrony and prime precueing manipulations on semantic priming effects with words in a lexical-decision task. *Journal of Experimental Psychology: Human Perception and Performance, 27,* 75–91.

Oyserman, D., Fryberg, S. A., & Yoder, N. (2007). Identity-based motivation and health. *Journal of Personality and Social Psychology, 93,* 1011–1027.

Pechmann, C., Zhao, G., Goldberg, M. E., & Reibling, E. T. (2003, April). What to convey in antismoking advertisements for adolescents: The use of protection motivation theory to identify effective message themes. *Journal of Marketing, 67,* 1–18.

Pieters, R., & Wedel, M. (2004, April). Attention capture and transfer in advertising: Brand, pictorial, and text-size effects. *Journal of Marketing, 68,* 36–50.

Quinlan, K. P., Brewer, R. D., Siegel, P., Sleet, D. A., Mokdad, A. H., Shults, R. A., & Flowers, N. (2005). Alcohol-impaired driving among U.S. adults, 1993–2002. *American Journal of Preventive Medicine, 4,* 346–350.

Ray, M. L., & Wilkie, W. L. (1970, January). Fear: The potential of an appeal neglected by marketing. *Journal of Marketing, 34,* 54–62.

Rippetoe, P. A., & Rogers, R. W. (1987). Effects of components of protection-motivation theory on adaptive and maladaptive coping with a health threat. *Journal of Personality and Social Psychology, 52,* 596–604.

Rogers, R. W. (1975). A protection motivation theory of fear appeals and attitude change. *Journal of Psychology, 91,* 93–114.

Rogers, R. W. (1983). Cognitive and psychological processes in fear appeals and attitude change: A revised theory of protection motivation. In J. Cacioppo & R. Petty (Eds.), *Social psychophysiology* (pp. 153–176). New York: Guilford Press.

Roskos-Ewoldsen, D. R., Yu, H. J., & Rhodes, N. (2004). Fear appeal messages affect accessibility of attitudes toward the threat and adaptive behaviors. *Communication Monographs, 71,* 49–69.

Ruiter, R. A. C., Abraham, C., & Kok, G. (2001). Scary warnings and rational precautions: A review of the psychology of fear appeals. *Psychology & Health, 16,* 613–630.

Ruiter, R. A. C., Verplanken, B., De Cremer, D., & 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.

Saffer, H., & Dave, D. (2006). Alcohol advertising and alcohol consumption by adolescents. *Health Economics, 15,* 617–637.

Shapiro, S., MacInnis, D. J., & Park, C. W. (2002). Understanding program-induced mood effects: Decoupling arousal from valence. *Journal of Advertising, 31*(4), 15–26.

Singh, S. N., & Churchill, G. A., Jr. (1988). Using the theory of signal detection to improve ad recognition testing. *Journal of Marketing Research, 23,* 327–336.

Snyder, L. B., Milici, F. F., Slaeter, M., Sun, H., & Strizhakova, Y. (2006). Effects of alcohol advertising exposure on drinking among youth. *Archives of Pediatrics & Adolescent Medicine, 160,* 18–24.

Stacy, A. W., Zogg, J. B., Unger, J. B., & Dent, C. W. (2004). Exposure to televised alcohol ads and subsequent adolescent alcohol use. *American Journal of Health Behavior, 28,* 498–509.

Stanislaw, H., & Todorov, N. (1999). Calculation of signal detection theory measures. *Behavior Research Methods, Instruments, & Computers, 31,* 137–149.

Szentagotai, A., & Onea, D. (2007). Is repressive coping associated with suppression? *Journal of Cognitive Behavioral Psychotherapies, 7,* 127–138.

Tanner, J. F., Hunt, J. B., & Eppright, D. R. (1991, July). The protection motivation model: A normative model of fear appeals. *Journal of Marketing, 55,* 36–45.

Tipper, S. P. (1985). The negative priming effect: Inhibitory priming by ignored objects. *Quarterly Journal of Experimental Psychology, 37*(A), 571–590.

Tipper, S. P. (2001). Does negative priming reflect inhibitory mechanisms? A review and integration of conflicting views. *Quarterly Journal of Experimental Psychology, 54*(A), 321–343.

Wechsler, H., Lee, J. E., Nelson, T. F., & Lee, H. (2003). Drinking and driving among college students. *American Journal of Preventive Medicine, 25,* 212–218.

Wegner, D. M., & Zanakos, S. (1994). Chronic thought suppression. *Journal of Personality, 62,* 615–640.

Weinberger, D. A., Schwartz, G. E., & Davidson, J. R. (1979). Low-anxious, high-anxious, and repressive coping styles: Psychometric patterns and behavioural and physiological responses to stress. *Journal of Abnormal Psychology, 88,* 369–380.

Wenzlaff, R. M., Rude, S. S., Taylor, C. J., Stultz, C. H., & Sweatt, R. A. (2001). Beneath the veil of thought suppression: Attentional bias and depression risk. *Cognition & Emotion, 15,* 435–452.

Williams, J. M. G., Mathews, A., & MacLeod, C. (1996). The emotional Stroop task and psychopathology. *Psychological Bulletin, 120,* 3–24.

Witte, K. (1992). Putting the fear back into fear appeals: The extended parallel process model. *Communications Monographs, 59,* 329–349.

Witte, K. (1994). Fear control and danger control: A test of the extended parallel process model. *Communication Monographs, 6,* 113–134.

Witte, K., & Allen, M. (2000). A meta-analysis of fear appeals: Implications for effective public health campaigns. *Health Education & Behavior, 25,* 591–615.

Witte, K., & Morrison, K. (2000). Examining the influence of trait anxiety/repression sensitization on individuals' reactions to fear appeals. *Western Journal of Communication, 64,* 1–27.

Zauberman, G., & Lynch, J. G. (2005). Resource slack and propensity to discount delayed investments of time versus money. *Journal of Experimental Psychology: General, 134,* 23–37.

Appendix A

Low- and High-Efficacy Fear Appeal Public Service Announcements

(1) Low Efficacy Fear Appeal Used Experiments la, lb, 2a, and 2b

(2) High Efficacy Fear Appeal Used in Experiment 2a

Note. The public service announcements were shown in color to participants.

Appendix B

Low-Fear Control Public Service Announcements

(1) Victim Focus, Low-Fear Control
Used in Experiments la and 2a

(2) Assailant Focus, Low-Fear Control
Used in Expeiment 2a

Note. The public service announcements were shown in color to participants.

(*Appendixes continue*)

Appendix C

Sample Magazine Page (Original 11 in. × 17 in.) Used in Experiments 2a and 2b

Note. The magazine was shown in color to participants. Superimposed boxes indicate yellow highlighting.

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