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Fear and Loving in Las Vegas: Evolution, Emotion, and Persuasion

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Abstract

How do arousal-inducing contexts, such as frightening or romantic television programs, influence the effectiveness of basic persuasion heuristics? Different predictions are made by three theoretical models: A *general arousal model* predicts that arousal should increase effectiveness of heuristics; an *affective valence model* predicts that effectiveness should depend on whether the context elicits positive or negative affect; an *evolutionary model* predicts that persuasiveness should depend on both the specific emotion that is elicited and the content of the particular heuristic. Three experiments examined how fear-inducing versus romantic contexts influenced the effectiveness of two widely used heuristics—social proof (e.g., “most popular”) and scarcity (e.g., “limited edition”). Results supported predictions from an evolutionary model, showing that fear can lead scarcity appeals to be counter-persuasive, and that romantic desire can lead social proof appeals to be counter-persuasive. The findings highlight how an evolutionary theoretical approach can lead to novel theoretical and practical marketing insights.

Keywords

Evolutionary models; emotion; motivation; persuasion; advertising

Imagine you are charged with the task of creating a television advertising campaign for a new product. Knowing that people typically don't process ads very deeply, you craft the message using widely used persuasion tactics known to be particularly effective when people make quick and heuristic evaluations (Cialdini 2001). After learning that your ad tests well in a focus group, you purchase airtime during two types of perennially top-rated television programs: a police crime drama and a romantic comedy. But exactly how will these programs influence the persuasiveness of your ad? And might an ad featuring a widely used persuasive tactic actually be counter-effective when aired during one of these programs—but not the other?

Several well-established theoretical models make predictions regarding how emotionally arousing contexts such as television programs should influence the effectiveness of persuasion heuristics. Arousal-based models predict that arousal should inhibit deep processing and increase the effectiveness of diagnostic heuristics (Pham 1996; Sonbonmatsu and Kardes 1988). Affective valence-based models, however, differentiate between positive and negative feelings, predicting a different pattern for each of these two types of affect (Schwarz and Bless

1991). According to such models, programs that elicit positive feelings (such as a romantic comedy), should lead to shallower processing and increased effectiveness of heuristics. In contrast, programs eliciting negative feelings (such as the worry elicited by a police drama), should lead to more careful processing and decreased effectiveness of persuasion heuristics.

In this research we investigate another possibility grounded in an evolutionary approach (Griskevicius et al. 2006; Saad 2007; Schaller, Park, and Kenrick 2007). This theoretical approach suggests that affectively arousing stimuli can activate specific emotions. In turn, these specific states should motivate people to think and act in ways that are consistent with the underlying fitness-enhancing functions of those emotions (Keltner, Haidt, and Shiota 2006). Unlike models of general arousal or affective valence, an evolutionary approach suggests that different emotions may lead people to be persuaded by some types of heuristic cues but not by others, to interpret the same persuasive appeal in different ways, and even to lead some well-established persuasive tactics to be counter-effective. In three experiments we examine how two emotions (fear and romantic desire) influence the effectiveness of two commonly used persuasion tactics, and we identify when such tactics have a negative persuasive effect. More broadly, this research highlights a promising theoretical approach to marketing by demonstrating how an evolutionary perspective can lead to novel marketing insights.

PERSUASION HEURISTICS

Each day people are confronted with innumerable pieces of information and hundreds of decisions. Not surprisingly, people seldom deeply process each piece of information, instead often relying on quick mental shortcuts—general heuristic rules—to guide their attitudes and behaviors (Cialdini 2001; Kahneman et al. 1982). In line with such findings, it is no coincidence that advertising has come to use fewer lengthy logical arguments, and has instead infused ads with simple and time-tested persuasive appeals. Such appeals capitalize on heuristic processes because these persuasive tactics are especially effective when people are not particularly motivated or capable of thinking deeply about a message (Petty and Wegener 1998).

One such persuasive tactic is based on the general heuristic rule that if many others are doing it, it must be good—a persuasion principle known as *social proof* (Cialdini and Goldstein 2004). Appeals based on the principle of social proof tend to convey that a product is a top seller or is particularly popular. Each week, for example, there is a barrage of new ads indicating which movie is the top-grossing film because people are more likely to engage in a behavior if they are made aware that many others are already doing it (Bearden and Etzel 1982; Goldstein, Cialdini, and Griskevicius forthcoming; Nolan et al. forthcoming).

Another such persuasion tactic is based on the general heuristic rule that if a product or opportunity is rare, it must be good—an influence principle known as *scarcity* (Cialdini and Goldstein 2004). Appeals based on the principle of scarcity tend to highlight features related to the distinctiveness, rarity, or unavailability of a product or an opportunity (Dhar and Sherman 1996). For example, companies purposefully market “limited edition” products that are perceived to be more distinct and less available. Similarly, each year during the holiday shopping season there is invariably a toy (e.g., Nintendo Wii, Power Rangers, Tickle Me Elmo) that becomes a must-have item in part because it is scarce (Pratkanis and Aronson 2000).

Because heuristic cues such as social proof and scarcity are known to increase the effectiveness of ads, sales pitches, and even appeals to engage in pro-environmental behavior (e.g., Cody and Seiter 2001; Schultz et al. 2007), these strategies consistently appear on a short list of proven persuasion tactics in marketing, persuasion, and psychology (Cialdini 2001; Hoyer and MacInnis 2006; Myers 2005; Pratkanis and Aronson 2000; Solomon 2004). But ads featuring these persuasive tactics are often preceded by some content such as a television program, which may influence the effectiveness of these appeals. In fact, there are several classic theoretical

models that make predictions regarding how a television program (or any other affect-arousing context) should influence the effectiveness of persuasion heuristics. As discussed below, however, each model offers a different set of predictions regarding how arousal and affect might influence the use of mental shortcuts.

AROUSAL, AFFECT, AND PERSUASION

Arousal-based explanations focus on the effects of autonomic nervous system activation on thought and behavior. Within the realm of persuasion, higher levels of arousal generally promote processing of information in a more shallow and peripheral manner, leading people to be more likely to form evaluations based on diagnostic mental shortcuts (Petty and Wegener 1998; Pham 1996). Viewing ads in an aroused state, for example, leads people to be more persuaded by the general heuristic rule that if an endorser is likable and attractive, the product must be good (Sonbonmatsu and Kardes 1988).¹ Arousal-based explanations thus suggest that the influence of persuasive heuristics should be enhanced to the extent that various contexts, such as romantic comedies or police dramas on television, induce general arousal.

Unlike general arousal models, affective valence-based explanations draw a sharp distinction between the effects of positive versus negative feelings (Schwarz 2002). According to these models, positive affect leads people to rely more on simplistic thinking and mental shortcuts (Batra and Stayman 1990; Schwarz and Bless 1991), whereas most negative states (e.g., fear, sadness) lead to the opposite effect, causing people to think in a more complex manner and rely less on mental shortcuts (Murry and Dacin 1996). Accordingly, people in a positive affective state are more persuaded by a heuristic cue such as source expertise, whereas people in a negative state are less likely to use this mental shortcut (Tiedens and Linton 2001). Thus, according to affective valence-based explanations, to the extent that a context elicits positive affect, ads featuring heuristic cues should be more effective. In contrast, to the extent that a context elicits negative affect, such heuristic cues will not necessarily enhance persuasion.

A MODERN EVOLUTIONARY APPROACH

Recent research suggests that a distinction based solely on arousal or affective valence may be insufficiently textured to capture the rich influence of affect-arousing contexts (Lerner and Keltner 2001; Pham 2004). For example, fear, embarrassment, sadness, anger, and disgust are all negative affective states, but they do not have equivalent effects on cognition and behavior (Dahl, Manchanda, and Argo 2001; Lerner, Small, and Loewenstein 2004; Raghunathan and Pham 1999). Given that individuals across cultures experience similar affective responses to universal classes of stimuli, it is useful to examine the influence of affect on cognition and behavior from an evolutionary perspective (Cosmides and Tooby 2000; Keltner, Haidt, and Shiota 2006).

Two key features of modern evolutionary approaches are functionality and domain-specificity (Kenrick and Shiota forthcoming; see Saad 2007 for a more detailed discussion).

Functionality refers to the explicit consideration of how a recurrent pattern of behavior, affect, or cognition might have served to solve recurrent adaptive problems confronted by all ancestral humans; such fundamental adaptive problems include protecting ourselves from predators, finding and attracting mates, making friends, gaining status, and avoiding disease (see Kenrick et al. 2003). When adopting an evolutionary approach to examine emotion and cognition, a researcher might start by asking the following question: Given that cues of physical danger lead people across cultures to experience similar affective reactions (fear), what might be the

¹It is important to note that not all arousal models are identical. For example, Pham (1996) argues that arousal increases the selective reliance on any type of diagnostic information (i.e., heuristic or otherwise), whereas Sanbonmatsu and Kardes (1988) argue that arousal leads to an increased reliance specifically on heuristic cues.

adaptive function of this affective reaction? In other words, the key questions from an evolutionary perspective are: what adaptive problem(s) might fear (or any other emotion) have helped solve for our ancestors, and how might that emotion have promoted solutions to these problems.

But merely to argue that an emotion or a behavior is adaptively functional does not necessarily lead to novel hypotheses. The key second insight that has made modern evolutionary approaches useful in generating novel hypotheses is the consideration of domain-specificity. The concept of *domain-specificity* follows from numerous cross-disciplinary findings indicating that mental mechanisms well-suited to solving one adaptive problem are often ill-suited to solving another (Barrett and Kurzban 2006). Thus, rather than viewing the brain as one, big domain-general processor, an evolutionary approach views the brain as comprising multiple domain-specific mechanisms, each tasked with solving a different adaptive problem. For example, although a seemingly simple process such as classical conditioning was historically regarded as domain-general, more recent research shows that classical conditioning works very differently for learning aversions to poisonous foods versus learning aversion to physical threats—two *qualitatively* different adaptive problems (Domjan 2005; Kenrick and Luce 2004). Furthermore, organisms are predisposed to more readily condition responses to specific types of stimuli that would have promoted ancestral success. Fear responses in human and non-human animals, for example, are much more easily conditioned to snakes or spiders than to electrical outlets or automobiles—even though electrocution and automobile accidents cause many more deaths to people living in current-day environments (Öhman and Mineka 2001).

From an evolutionary perspective, emotions are conceived as activators of executive motivational sub-systems that direct energy in ways designed to deal with particular kinds of adaptive problems (Cosmides and Tooby 2000; Keltner et al. 2006). Once such a system is activated, it promotes a cascade of perceptions, cognitions, and behaviors conducive to the successful solution of the adaptive problem (Griskevicius et al. 2006, 2007; Maner et al. 2005). In addition, the activation of one such system can inhibit or even suppress the activation of other potentially competing systems (Brendl et al. 2003; Tipper 1992). Engaging the self-protection system, for example, can suppress attention to attractive opposite-sex individuals (Neuberg et al. 2005). An evolutionary perspective thus generates a novel set of empirical predictions involving emotion and persuasion heuristics. It suggests that the effects of different affect-arousing contexts should not only depend on the particular type of affective state in question, but also on how the particular heuristic cue facilitates or inhibits solving recurring adaptive problems.

Fear, Self-Protection, and Persuasion

Ancestral humans frequently confronted physical threats, and we are here today in part because our ancestors were successful at solving the problem of self-protection (Daly and Wilson 1988). The self-protection system is activated by fear-eliciting cues suggesting physical threat, including photos, messages, or movies depicting dangerous others (Maner et al. 2005). Once activated, a self-protective state should promote basic strategies that helped avoid harm in ancestral environments (Öhman and Mineka 2001). A core strategy evolutionarily associated with successful self-protection is increased safety in numbers. When a social animal is threatened by a predator, for example, that animal herds closer to its group; this strategy increases survival because the animal becomes less individually salient to the predator (Alcock 2005). Consistent with such animal behavior, fear in humans also appears to produce group-cohesive processes. When people in a chat room are made to feel afraid, for example, they are more likely to conform to the opinions of others in the chat room (Griskevicius et al. 2006).

Building on this previous work, the current investigation examined how fear might influence the effectiveness—and perhaps even the counter-effectiveness—of widely used advertising persuasion heuristics. Traditional persuasion research (e.g., see Petty and Wegener 1998) often does not consider potential differences among various heuristic cues. For instance, general arousal and affective valance models do not make different predictions depending on whether the heuristic cue is focused on a spokesperson's expertise, the product's scarcity, or on social proof (e.g., "best-selling brand"). But an evolutionary approach suggests that the specific content of a heuristic cue may be especially relevant, particularly when a person is in a state of fear. Considering that fear should promote the adaptive strategy to join together with others, ads featuring social proof appeals (e.g., "the choice of millions") are likely to be particularly effective when people are in a fear state. In contrast, fear may actually lead ads featuring traditional scarcity appeals (e.g., "limited edition") to backfire. That is, it may be especially unappealing (and non-adaptive) to stand out from the crowd when a predator might be lurking nearby. Because being distinct increases one's conspicuousness, ads with scarcity appeals may therefore be less persuasive in fear-inducing contexts. In sum:

H1: Fear should lead *social proof* appeals to be *more* persuasive compared to when such appeals are not used.

H2: Fear should lead *scarcity* appeals to be *less* persuasive compared to when such appeals are not used.

Romantic Desire, Mate-Attraction, and Persuasion

Besides surviving, our ancestors were successful at solving the adaptive problem of attracting and reproducing with mates (or we would not be here to talk about it). The mate-attraction system is activated by cues that elicit romantic desire, including photos, stories, or movies that depict attractive opposite-sex individuals, which suggest potential for reproductive success. Once activated, this state should promote basic strategies associated with greater mating success in ancestral environments (Griskevicius, Cialdini, and Kenrick 2006; Van den Bergh, Dewitte, and Warlop forthcoming). A core strategy evolutionarily associated with successful mate-attraction is salient positive differentiation. For example, when various species of animals are approached by the opposite sex, they often engage in conspicuous displays that function both to attract the attention of the opposite sex and positively differentiate the individual from same-sex rivals (Miller 2000). Consistent with such animal behavior, romantic desire in humans also appears to lead people to engage in salient public displays such as conspicuous consumption and public charity (Griskevicius et al. 2007).

Building on this recent work, an evolutionary approach suggests that romantic desire might influence persuasion, especially when it comes to the effectiveness of basic persuasion heuristics. Considering that romantic desire should lead people to want to positively differentiate themselves, this state should lead scarcity appeals (e.g., "stand out from the crowd") to be more persuasive. In contrast, romantic desire might lead social proof appeals (e.g., "over a million sold") to actually backfire. That is, because doing what many others are doing is not an adaptive positive differentiation strategy, social proof appeals may actually become counter-persuasive when individuals are motivated to attract a romantic partner. In sum:

H3: Romantic desire should lead *scarcity* appeals to be *more* persuasive compared to when such appeals are not used.

H4: Romantic desire should lead *social proof* appeals to be *less* persuasive compared to when such appeals are not used.

EXPERIMENT 1A & 1B

The first two experiments tested how eliciting fear and romantic desire influenced the effectiveness of two basic persuasion heuristics (social proof or scarcity) compared to a control condition in which neither heuristic was used. The two experiments were conceptually identical in design, but differed in (a) the product that was rated, (b) the method of emotion elicitation, and (c) the wording of the persuasion heuristics. Specifically, in Experiment 1A emotion was elicited via movie clips, and participants rated an ad for a museum that contained a social proof, a scarcity, or neither appeal; in Experiment 1B emotion was elicited via reading short stories, and participants rated a product review for a restaurant that contained different persuasion appeals.

Method

Participants—One hundred and fifty-four people (74 men and 80 women) participated in Experiment 1A (hereafter E-1A); one hundred and fifty-seven people (63 men and 94 women) participated in Experiment 1B (hereafter E-1B). Participants were students at a large university and participated in the study in return for course credit. Participants came to the studies in small groups and were seated at computers that were partitioned from each other.

Design and Procedure—Both experiments used a between-participants 2 (emotion: fear, romantic desire) $\times$ 3 (persuasion heuristic: social proof, scarcity, control) design. Emotion was induced by viewing either a short video clip (E-1A) or reading a short story (E-1B). Participants then viewed either an ad (E-1A) or a product review (E-1B) that contained either a social proof appeal, a scarcity appeal, or did not contain either appeal (control).

To minimize potential demand characteristics, cover stories were used in both studies. In E-1A participants were told that we wanted to add realism to a “marketing and personality” study by having everyone watch a video clip before viewing an ad. Importantly, participants were told that everyone would see the same clip and the same ad because we were interested in the effects of personality. In E-1B participants were told that we were interested in “reading and memory”; the short story (i.e., the emotion manipulation) was presented as a memory task, and participants were told that they had to wait five minutes after reading the story to let their memory decay before testing. In the meantime, participants provided ratings for a product review that was ostensibly part of a different study.

Emotion manipulation—To elicit fear and romantic desire, in E-1A participants viewed a film clip edited to be 7 min in length. In the fear condition they saw scenes from *The Shining*, which depicts a madman chasing people with an ax. In the romantic desire condition they saw scenes from *Before Sunrise*, which depicts an attractive man and woman falling in love as they travel in Europe. In E-1B emotions were elicited by having participants read a short 600-word story. To elicit fear, participants read about being alone in bed late at night and hearing scary noises; after hearing someone enter the house, the story ends as someone is about to enter the bedroom. To elicit romantic desire, participants read about meeting a highly desirable person of the opposite sex and spending an enjoyable afternoon with that person.

To assess whether the manipulations were effective at eliciting the intended emotions, a separate group of 96 people underwent the manipulations used in each study. Afterward, they indicated the extent to which they felt (a1) fear, (a2) motivation to protect themselves, (b1) romantic desire, (b2) motivation to attract a romantic partner, and (c) general arousal. Responses were measured on nine-point scales with endpoints 1 (not at all) and 9 (very much).

A two-way ANOVA with emotion and method of elicitation (movie clip vs. short story) did not reveal an interaction, $F(1, 94) = .24, p = .91$, meaning that there was no difference regarding

the type of method used to elicit the states. Although means for every condition are reported in Table 1, the movie clip and short story conditions were combined for the analyses to avoid repetition. As expected, compared to the romantic desire manipulations, the fear manipulations elicited more fear ($M_s = 6.51$ vs. 1.61 ; $F(1, 94) = 130.18$, $p < .001$) and a stronger motivation to protect oneself ($M_s = 6.50$ vs. 2.48 ; $F(1, 94) = 45.37$, $p < .001$). Conversely, compared to the fear manipulations, the romantic desire manipulations elicited more romantic desire ($M_s = 6.80$ vs. 1.28 ; $F(1, 94) = 170.79$, $p < .001$) and a stronger motivation to attract a romantic partner ($M_s = 7.28$ vs. 1.56 ; $F(1, 94) = 198.65$, $p < .001$). Although the romantic desire manipulations elicited more general arousal than the fear manipulations ($M_s = 7.14$ vs. 5.68 ; $F(1, 94) = 12.57$, $p < .01$), both the fear and romantic desire manipulations were above the midpoint, suggesting that both manipulations elicited some level of arousal. Importantly, the predicted pattern of results (i.e., the interaction of emotion and persuasion heuristic) could not be explained by the slightly higher level of general arousal in the romantic desire condition.

Persuasion Heuristics—For E-1A, a magazine-like ad was created for a museum. Because we did not want participants to be highly motivated to scrutinize the ad (see Peracchio and Myers-Levy 1997), participants were told that they were among a large number of people at many universities who were participating in the study (meaning that their individual responses were merely one of a large number of responses); participants were also not given additional incentive to pay careful attention to the ad. The ad contained a photo of the museum, the museum's logo, and the line "San Francisco Museum of Art" (see Appendix A). In the social proof condition, a heuristic piece of information based on common social proof appeals was added to the no-heuristic control ad: "Visited By Over a Million People Each Year." In the scarcity condition, a heuristic piece of information based on common scarcity appeals was added: "Stand Out From the Crowd." The ad was presented to participants for 15 seconds.

For E-1B, we created a product review for a restaurant (see Appendix B). In the social proof condition, three heuristic pieces of information were added to the control review: The title included the phrase "the most popular restaurant," the review mentioned that "many people gathered there," and that "if you want to know why everyone gathers here for a great dining experience, come join them at the Bergamot Café." The scarcity condition included the phrase "a unique place off the beaten path" in the title, the review mentioned that the restaurant was a "one-of-a-kind place that is yet to be discovered by others," and that "if you're looking for a great dining experience different from any other, look no further than the Bergamot Café."²

Dependent Measures—After viewing the ad/product review, participants responded to six questions indicating their attitudes toward the museum/restaurant and their intentions of going there, both of which were expected to produce a similar pattern of results. Specifically, they answered three nine-point questions regarding their attitudes toward the museum/restaurant (bad-good, unfavorable-favorable, negative-positive). They then answered three nine-point behavioral intentions questions with endpoints *not at all* and *very much* regarding (a) the extent to which they were interested in finding out more about the museum/restaurant, (b) how likely they were to consider going to there, and (c) how likely they were to actually go there.

Results

As expected, the six attitude and behavioral intentions measures showed a similar pattern (E-1A $\alpha = .91$; E-1B $\alpha = .93$) and were combined for the analyses. Considering that both experiments had conceptually identical designs, we first wanted to make sure that the two experiments did

²Consistent with previous findings, testing indicated that inserting a social proof appeal into the ad/product review ($M = 5.59/7.30$) or inserting a scarcity appeal into the ad/product review ($M = 5.54/7.22$) indeed led the ad/product review to be more persuasive than the no-heuristic control ad/product review ($M = 4.98/6.45$).

not differ in their patterns of results. An omnibus three-way analysis of variance (ANOVA) with emotion, persuasion heuristic, and experiment did not produce an interaction, $F(2, 299) = .22, p = .80$. The experiment factor also did not interact with emotion, $F(1, 299) = .33, p = .57$, or with persuasion heuristic, $F(2, 299) = .47, p = .63$, indicating that emotion and persuasion heuristic had similar effects in both experiments. We thus combined the results from both experiments for the analyses.

Starting at a broad level of analysis, an ANOVA indicated the predicted significant interaction between emotion and persuasion heuristic, $F(2, 305) = 20.81, p < .001, d = .73$ (see Figure 1). Although the specific pattern of results was consistent with predictions, to examine our specific hypotheses we next performed a series of planned comparisons.

We first examined the predictions for fear. In line with H1, fear led social proof appeals to be more persuasive compared to the control, $F(1, 305) = 3.84, p = .051, d = .22$ ($M_{\text{social proof}} = 6.50, M_{\text{control}} = 5.88$). In contrast, fear led scarcity appeals to be less persuasive compared to the control, $F(1, 305) = 6.97, p = .009, d = .30$ ($M_{\text{scarcity}} = 4.96, M_{\text{control}} = 5.88$). Thus, supporting H2, fear not only had different effects on the persuasiveness of social proof and scarcity appeals, but it led scarcity appeals to be counter-persuasive (see Figure 1).

We next examined the specific predictions for romantic desire. In line with H3, romantic desire led scarcity appeals to be more persuasive compared to the control, $F(1, 305) = 5.34, p = .021, d = .25$ ($M_{\text{scarcity}} = 6.53, M_{\text{control}} = 5.79$). In contrast, romantic desire led social proof appeals to be less persuasive compared to the control, $F(1, 305) = 4.97, p = .033, d = .24$ ($M_{\text{social proof}} = 5.04, M_{\text{control}} = 5.79$).³ Thus, supporting H4, romantic desire not only had different effect on the persuasiveness of social proof and scarcity appeals, but it led social proof appeals to be counter-persuasive.

Discussion

Contrary to predictions made by general arousal and affective valence models, fear and romantic desire influenced the effectiveness of social proof and scarcity heuristics in a way consistent with specific predictions from an evolutionary model. In particular, although appeals based on the principle of social proof proved to be effective when people were in a fear state, ads and messages featuring scarcity appeals actually backfired when people were in a fear state. Romantic desire, however, produced the exact opposite pattern, leading scarcity appeals to be more persuasive, while leading social proof appeals to be less persuasive.

It is important to note that our findings are not mere demonstrations of simple persuasion-matching effects. For example, matching models might suggest that putting people in a particular affective state (e.g., positive or negative) might lead them to be more responsive to appeals that are congruent with that affective state. Persuasion-matching models might also suggest that romantic feelings would enhance responses to appeals that explicitly suggest that a particular product will make a person more desirable to the opposite sex; and that fear might enhance responses to messages explicitly suggesting that a particular product will prevent physical danger. Going beyond such matching hypotheses, our model made predictions that involve a non-obvious and subtle interplay between emotion and the effectiveness of basic and widely used persuasion principles—an interplay that flows naturally from our evolutionary model.

³We should note that researchers' critical alpha level (e.g., .05) for two-tail t-tests for specific predictions depends on the importance researchers place on Type I errors. For example, a more conservative test in this case would use a Dunn-Sidak correction (see Kirk 1995) to adjust for using the same control condition for two different tests, which would place the critical alpha level at .03.

EXPERIMENT 2

Considering that specific emotions can cause widely used persuasion appeals to be counter-persuasive, Experiment 2 examined theoretically derived contexts in which such potentially detrimental persuasion effects might be avoided. By doing so, the experiment also aimed to illuminate the process by which fear and romantic desire can lead specific persuasive heuristics to be counter-persuasive. To explore these issues, we again drew on an evolutionary approach, which led us to naturally parse the persuasion heuristics of social proof and scarcity into two separate and rarely distinguished components.

Two Types of Social Proof Heuristics

Our functional perspective posits that romantic desire should cause social proof appeals to backfire because this state motivates people to positively differentiate themselves by explicitly not doing what many others are doing. A closer look at the wide uses of social proof appeals, however, reveals a subtle but potentially important distinction. Social proof appeals sometimes focus on what many others are doing, but at other times they focus on what many others desire or what many others are talking about (e.g., “the movie that everyone is talking about”). The key difference is that the first type of appeal conveys mass behavior (many people are going to that movie), whereas the second type conveys a positive attitude toward that behavior (many people want to go to that movie) without explicitly conveying that many people are already doing it.

Social proof appeals often unwittingly conflate “behavioral” information (many others are doing it) and “attitudinal” information (many others are talking about it). For example, stating that a hotel is the “#1 hotel” in towns can imply different information: Perhaps the hotel books the most rooms (*behavioral* social proof), such as a large discount hotel. Or perhaps the hotel is the “in place” to be (*attitudinal* social proof), such as a small boutique hotel frequented by Hollywood’s elite. According to our functional perspective, romantic desire should decrease the persuasiveness of only the behavioral social proof appeal. That is, whereas behavioral social proof appeals imply that one would be following the herd by purchasing a product, attitudinal social proof appeals do not explicitly convey mass consumption, just that people are talking excitedly about a product. Thus, romantic desire should produce a backfire effect for behavioral social proof appeals (as in study 1A and 1B). But romantic desire should not produce a backfire effect for attitudinal social proof appeals because such appeals do not convey information about ubiquitous consumption. In sum:

H5: Although *behavioral* social proof appeals (“everybody’s doing it”) should be more persuasive under fear (H1) and less persuasive in a state of romantic desire (H4) relative to a neutral emotion control, the persuasiveness of *attitudinal* social proof appeals (“everybody’s talking about it”) should not differ as a function of emotion.

Two Types of Scarcity Heuristics

Our functional approach makes a similarly textured prediction regarding how emotion-arousing contexts will influence scarcity appeals. Our model posits that fear leads scarcity appeals to backfire because fear motivates individuals to stay with the crowd (and not be distinctive). A closer look at the wide uses of scarcity appeals, however, reveals that scarcity appeals do not always focus explicitly on the distinctiveness of a product. Instead, scarcity appeals can note that an opportunity to purchase a product is limited (e.g., “only three days left”).

Scarcity appeals often unwittingly conflate both *distinctiveness* and *limited opportunity* simultaneously (e.g., “limited edition product”). That is, the reason why limited edition products are desirable is both because such products perceived to be less available (limited-

opportunity scarcity) and because owning such a product increases the odds that other people don't have the same product (distinctiveness scarcity). Our model predicts that fear and romantic desire should have a markedly different effect on these two types of scarcity appeals. Specifically, whereas distinctiveness-based scarcity appeals convey that purchasing that product will lead one to be unique, limited-opportunity scarcity appeals do not convey consumer uniqueness. Thus, whereas fear should lead distinctiveness-based scarcity appeals to backfire (as in study 1A and 1B), limited-opportunity scarcity appeals, which are not informative about consumer uniqueness, should be effective even in threatening contexts. In sum:

H6: Although *distinctiveness-based* scarcity appeals (“stand out from the crowd”) should be more persuasive in a state of romantic desire (H3) and less persuasive under fear (H2) relative to a neutral emotion control, the persuasiveness of *limited-opportunity* scarcity appeals (“limited time offer”) should not differ as a function of emotion.

Method

Participants—Four hundred and sixty-eight students from a large university (239 men and 229 women) participated in the study in return for course credit. To minimize potential demand characteristics, a slightly modified version of the cover story from the first two studies was used. Fourteen participants indicated that they were not fluent in English, leaving a total of 454 participants for the analyses.

Design and Procedure—The experiment used a 3 (emotion: fear, romantic desire, neutral) $\times$ 4 (persuasion heuristic: behavioral social proof, attitudinal social proof, distinctiveness scarcity, limited-opportunity scarcity) $\times$ 2 (product: museum, Las Vegas) mixed-factorial design. Emotion and product were between-participants factors, meaning that a participant saw an ad for the museum or an ad for Las Vegas. Persuasion heuristic was a within-participants factor, meaning that each participant saw ads with all four types of persuasion heuristics.

All participants initially rated a no-heuristic version of the museum or Las Vegas ad. These pre-emotion manipulation ratings of the no-heuristic ad provided a measure of participant-specific biases toward the product and ad layout. As would be expected, there were no differences in the initial ratings of the ad across the three emotion conditions ($M_{\text{neutral}} = 5.75$, $M_{\text{fear}} = 5.73$, $M_{\text{romantic desire}} = 5.64$; $F(2, 451) = .23$, $p = .80$). These pre-emotion ratings served as a covariate in the analyses to reduce within-participant noise in the study.

After these pre-ratings, emotion was elicited via movie clip. Fear and romantic desire were elicited via the same movie clips as in Experiment 1A. Participants in the neutral condition viewed a clip from the film *Winged Migration*, which depicted nature scenes. The addition of a neutral emotion condition enabled us to ascertain the specific direction of the persuasion effects predicted for fear and romantic desire. Participants then viewed the four versions of the Las Vegas or the museum ad, whereby each version contained one of the four heuristics. The four versions of the ad were each presented in random order for 15 seconds. The same dependent measures as in the first two studies were used.

Persuasion Heuristic—Half of the participants evaluated ads for a museum (see Experiment 1A). In addition to the three original versions of the ad (*behavioral social proof*: “Visited By Over a Million People Each Year”; *distinctiveness scarcity*: “Stand Out From the Crowd”; and *no-heuristic*), we created two additional versions for the two new persuasion heuristic conditions. For the *attitudinal social proof* ad, a line was added conveying that many people think the museum is an exciting place: “The museum that millions are talking about.”

For the *limited-opportunity scarcity* condition, a line was added conveying a dwindling opportunity to visit the museum: “Last chance to visit.”

The other half of the participants saw an ad for the city of Las Vegas. The basic no-heuristic version of the ad contained a large photo and the name of the city (see Appendix C). In the distinctiveness scarcity condition the ad contained the appeal “Do something different.” In the limited-opportunity scarcity condition the ad contained the appeal “Limited time offer ends this week.” In the behavioral social proof condition the ad contained the appeal “Visited more than any other city.” In the attitudinal social proof condition the ad contained the appeal “See what everyone is talking about.”

Ad Pre-Testing—To ascertain whether people clearly saw the intended differences between the four versions of the ads, a separate group of 23 people viewed and rated all of the ads. They indicated the extent to which each ad conveyed information that was directly related to the four persuasion heuristics in the study. Specifically, they indicated the extent to which an ad conveyed that one has a limited opportunity to visit the museum/Las Vegas, and that this opportunity is becoming scarce (limited-opportunity scarcity); that one would be doing something distinct from others, and be different from others by visiting these destinations (distinctiveness scarcity); that these destinations are commonly visited and are popular (behavioral social proof); and that there is a lot of “buzz” and a lot of excitement about these destinations (attitudinal social proof). They also indicated the extent to which the appeal was informative regarding whether many or few people actually visit the museum or Las Vegas. All responses were provided on seven-point scales with endpoints “not at all” and “very much.”

As expected, a two-way repeated-measures ANOVA with heuristic and ad did not indicate an interaction, $F(1, 21) = .22, p = .84$, so the Las Vegas and the museum ads were combined for the analyses. As seen in Table 2, pre-testing confirmed that each of the four types of heuristic appeals conveyed the intended information. Specifically, products in the distinctiveness scarcity condition were seen as more distinct and different rather than as limited and scarce ($M_s = 6.43$ vs. 1.48 ; $F(1, 22) = 517.03, p < .001$). In contrast, products in the limited-opportunity scarcity condition were seen as more limited and scarce rather than as distinct and different ($M_s = 5.72$ vs. 2.22 ; $F(1, 22) = 96.85, p < .001$). Products in the behavioral social proof condition were seen as being common, popular, and consumed by many rather than as having much buzz and excitement ($M_s = 6.86$ vs. 4.96 ; $F(1, 22) = 47.60, p < .001$). In contrast, products in the attitudinal social proof condition were seen as having more buzz and excitement rather than being seen as merely common and popular ($M_s = 6.61$ vs. 5.57 ; $F(1, 22) = 12.79, p = .002$). Importantly, products in the behavioral social proof condition were perceived as having been significantly more consumed than products in the attitudinal social proof condition ($M_s = 5.87$ vs. 3.91 ; $F(1, 22) = 18.91, p < .001$).

Results

The six dependent measures were combined into a persuasion index ($\alpha = .91$). A repeated-measures ANOVA did not indicate an interaction with type of ad (Las Vegas and Museum; $F(6, 1341) = .77, p = .60$), so the two types of ads were combined for the analyses. As predicted, a repeated-measures analysis of covariance (with the pre-emotion manipulation ratings of the no-heuristic ad as a covariate) found an interaction between emotion and persuasion heuristic, $F(6, 1350) = 10.28, p < .001, d = .44$. To test the specific hypotheses of the study, we performed a series of tests for main effects and a series of planned contrast with the with the pre-emotion manipulation ratings of the no-heuristic ad as a covariate.

Consistent with H5, the persuasiveness of the new *attitudinal social proof* appeals (e.g., “the museum that millions are talking about”) did not differ across the three emotion conditions ($M_{\text{control}} = 5.82, M_{\text{fear}} = 5.91; M_{\text{romantic desire}} = 5.77; p = .92$). However, the persuasiveness

of the behavioral social proof appeal (e.g., “visited by over a million people each year”) was significantly different across the three emotion conditions, $F(2, 450) = 7.70, p = .001, d = .37$. In line with H1, behavioral social proof appeals were *more* persuasive in the fear than in the control condition ($M_{\text{fear}} = 5.48, M_{\text{control}} = 5.09$), $F(1, 450) = 5.38, p = .021, d = .25$ (see Table 3). Also consistent with H4, behavioral social proof appeals were *less* persuasive in the romantic desire than in the control condition ($M_{\text{romantic desire}} = 4.71, M_{\text{control}} = 5.09$), $F(1, 450) = 3.92, p = .048, d = .20$ (see Table 3). Overall, H5 was clearly supported, whereby fear and romantic desire had opposite effects on behavioral versus attitudinal social proof appeals.

Consistent with H6, the persuasiveness of the new *limited-opportunity scarcity* appeal (e.g., “limited time offer ends soon”) did not differ across the three emotion conditions ($M_{\text{fear}} = 5.50, M_{\text{control}} = 5.28, M_{\text{romantic desire}} = 5.28; p > .32$). However, the persuasiveness of the *distinctiveness scarcity* appeal (e.g., “stand out from the crowd”) was significantly different across the three emotion conditions, $F(2, 450) = 14.56, p < .001, d = .51$. In line with H3, distinctiveness scarcity appeals were *more* persuasive in the romantic desire than in the control condition ($M_{\text{romantic desire}} = 5.68, M_{\text{control}} = 5.21$), $F(1, 450) = 11.91, p = .001, d = .26$ (see Table 3). Also consistent with H2, distinctiveness scarcity appeals were *less* persuasive in the fear than in the control condition ($M_{\text{fear}} = 4.84, M_{\text{control}} = 5.09$), $F(1, 450) = 5.89, p = .016, d = .25$ (see Table 3). Overall, H6 was clearly supported, whereby fear and romantic desire had opposite effects on distinctiveness versus limited-opportunity scarcity appeals.

Discussion

Experiment 2 examined how fear and romantic desire influenced the persuasiveness of social proof and scarcity heuristics when they varied in subtle but conceptually important ways. Consistent with predictions, romantic desire led behavioral social proof appeals (everyone is doing it) to backfire, but attitudinal social proof appeals (everyone is talking about it) did not produce a backfire effect. To our knowledge this is the first study to highlight the conceptual differences between the behavioral and attitudinal components of social proof-based appeals. This pattern of results also indicates that romantic desire undermines persuasive appeals that specifically suggest that performing a particular behavior will signal that one is acting like many other members of the crowd. For scarcity heuristics, fear led distinctiveness-based scarcity appeals (do something different) to backfire, but limited-opportunity scarcity appeals (limited time offer) did not produce a backfire effect. Thus, fear appears to undermine persuasion appeals that suggest that a behavior will make one conspicuously visible.

GENERAL DISCUSSION

This research began with a straightforward question: How might different affect-arousing contexts influence responses to time-tested and widely used persuasion appeals? We focused this question by examining how a specific positive affective state (romantic desire) and a specific negative affective state (fear) would influence the effectiveness of two well-established heuristic cues: social proof (e.g., “#1 product in the country”) and scarcity (e.g., “limited edition product”). Whereas general arousal and affective valence models made two sets of different predictions, results across three experiments were instead consistent with specific predictions derived from an evolutionary model. This model suggests that the elicitation of specific emotions should motivate individuals to think and act in ways that are consistent with the underlying fitness-enhancing function of each emotion. In line with this perspective, fear and romantic desire had vastly different effects on the persuasiveness of two persuasion appeals. In particular, fear led normally persuasive scarcity appeals to backfire—though the same scarcity appeals were more effective following romantic content. In contrast, romantic desire led normally effective social proof appeals to backfire—though the same social proof appeals were more effective following fear-inducing content.

Further consideration of these persuasion backfire effects led us to use an evolutionary model to identify key components of social proof and scarcity appeals that could eliminate such effects. In line with predictions, romantic desire specifically led *behavioral* social proof appeals (everyone is doing it) to backfire, whereas *attitudinal* social proof appeals (everyone is talking about it) were not influenced by context. Similarly, fear specifically led *distinctiveness* scarcity appeals (do something different) to backfire, whereas *limited-opportunity* scarcity appeals (limited time offer) were not influenced by context. These nuanced findings indicate the reason why social proof and scarcity appeals can backfire: Romantic desire can lead social proof appeals to backfire because people in this state are motivated to not be followers of others' behavior; fear can lead scarcity appeals to backfire because people in this state are motivated to stick together. These specific patterns of findings, derived from an evolutionary perspective, would not have been predicted a priori by any other theoretical model of which we are aware.

Evolutionary Approaches

This research is one of the first programmatic empirical papers to demonstrate the utility of an evolutionary approach in marketing by showing that adopting an evolutionary approach can produce unique and testable marketing insights. Although this theoretical approach has successfully led to large numbers of theoretical advancements in the fields of biology, anthropology, psychology, and economics, evolutionary models have thus far been almost completely absent in research on persuasion and social influence (Sundie et al. 2006), and in research on consumer behavior and marketing more generally (Briers, Pandelaere, Dewitte, and Warlop 2006; Miller forthcoming; Van den Bergh, Dewitte, and Warlop forthcoming). It is important to note that evolutionary models do not aim to replace other theoretical approaches; rather, evolutionary approaches can be fruitfully integrated into almost any area of marketing research as a means of complementing the existing theoretical models (see Saad 2007; Dewitte and Verguts 2002). Both evolutionary and proximate approaches are needed for a complete understanding of any consumer phenomena. Evolutionary models will clearly need more extensive testing by marketing researchers, including the considerations of decision neuroscience (Shiv 2007), but an evolutionary approach provides fertile ground for a wide range of insights into marketing and consumer behavior, including the posing of novel hypotheses, enabling broader theoretical integration, and connecting marketing research to a vast network of theory and research on human and non-human social behavior.

More specifically regarding emotions, a domain-specific evolutionary approach suggests that there are discrete negative and positive emotions. Indeed, some recent research has begun to examine how discrete negative emotions influence cognition (e.g., Raghunathan and Pham 1999; Lerner and Keltner 2001; Tiedens and Linton 2001). Although much of this work is implicitly evolutionary and compatible with our approach, there is a key theoretical difference. In the aforementioned work, discrete emotions are defined by particular cognitive appraisal patterns; that is, an emotion is defined by whether it relates to a high or low level of uncertainty, control, or other appraisal dimension. In contrast, our evolutionary approach defines discrete emotions in an explicitly functional manner (Keltner, Haidt, and Shiota 2006). Thus, an emotion is discrete to the extent that it has a *qualitatively* unique set of elicitors and it solves a *qualitatively* different adaptive problem relative to another proposed emotion. A given emotion from this perspective can certainly be associated with a particular cognitive appraisal pattern, but such appraisals are neither definitive of an emotion nor do they naturally flow from our evolutionary approach.

Implications and Future Research Directions

The present findings have theoretical and practical implications for advertising practice and the strategic placement of ad and products. For instance, although television advertisers have traditionally relied on viewer demographic information to determine where and when to

purchase airtime, our model suggest that they might consider the content of the specific program during which their ads will air—and to consider such issues in a more textured and less obvious way. For example, while touting the uniqueness of a product might be effective during a program that elicits romantic desire, the same ad aired during a fear-eliciting program such as the grim local news might actually make the product unappealing. A related intriguing possibility is that ads themselves might be used to elicit specific emotions (rather than general positive or negative affect) in a strategic way. For example, the first fifteen seconds of a TV spot could be strategically crafted to elicit a specific emotion; this emotion could be used to make the persuasion appeal in the ad to be more persuasive. Considering that specific emotions are hypothesized to motivate fitness-enhancing behavior, an emotion elicited by an ad might influence both the effectiveness of the persuasive appeal in the ad and the attractiveness of the product—depending on whether the appeal and product promote the solution to the underlying adaptive problem posed by the emotion.

More broadly, the evolutionary notions of functionality and domain-specificity suggest that consumption-relevant processes such as product search, product evaluation, and decision-making are likely to differ qualitatively depending on which adaptive mental system—that is, which specific evolutionary domain—is being engaged. Such considerations suggest that consumers might process information and make decisions in qualitatively different ways depending on, for example, whether they are trying to protect themselves from disease (Argo, Dahl, and Morales 2006), gain status (Sundie et al. 2006), or affiliate with others (Maner et al. 2007). Such potential marketing-relevant effects are unlikely to be limited to advertising; different mental mechanism can be engaged in a variety of contexts, such as when a person encounters a particular background on a website (Mandel and Johnson 2002; Vohs, Mead, and Goode 2006), sees a particular emotional expression (Ackerman et al. 2006), is shopping in a particular store environment (Kaltcheva and Weitz 2006), or is surrounded by particular scents or music (Bosmans 2006; Zhu and Meyers-Levy 2005). Overall, we believe that the present work—and an evolutionary theoretical approach—reflects only the tip of a data-rich iceberg that can serve as an impetus for novel research and theory-building in marketing.

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Appendix

APPENDIX A

CONTROL (NO-HEURISTIC) MUSEUM AD USED IN STUDIES 1A AND 2 (Social Proof or Scarcity persuasion appeals were added to the ad in the other conditions)

APPENDIX B

CONTROL (NO-HEURISTIC) PRODUCT REVIEW USED IN STUDY 1B (Social Proof or Scarcity information were added to the review in the other conditions)

The Bergamot Cafe: A Great Dining Experience

Fresh is the name of the game at this cafe that could easily go head-to-head with the best restaurants in any city. Served in an enchanting atmosphere, the restaurant offers a variety

of delectable dishes. The menu features the season's best and changes monthly. Think tender lamb, fresh wild salmon, appetizers that melt in your mouth, a scrumptious assortment of organic produce and salads, as well as heavenly pastries and desserts. If you're looking for a great dining experience, look no further than the Bergamot Cafe.

APPENDIX C

CONTROL (NO-HEURISTIC) LAS VEGAS AD USED IN STUDY 2 (Social Proof or Scarcity persuasion appeals were added to the ads in the other conditions)

FIGURE 1.
STUDY 1A & 1B: EFFECTIVENESS OF PERSUASION HEURISTICS AS A FUNCTION
OF ELICITED EMOTION

TABLE 1
EMOTIONS, MOTIVATIONS, AND AROUSAL ELICITED BY MANIPULATIONS ACROSS STUDIES

State elicited	Emotion Manipulation			
	Fear <i>movie clip</i> Study 1A and 2 (n = 24)	Fear <i>short story</i> Study 1B (n = 23)	Romantic Desire <i>movie clip</i> Study 1A and 2 (n = 26)	Romantic Desire <i>short story</i> Study 1B (n = 23)
Fear	6.17 (2.24)	6.87 (2.01)	1.85 (1.52)	1.44 (.81)
Motivation to protect self	6.00 (2.98)	7.02 (1.96)	2.62 (1.98)	2.32 (1.34)
Romantic desire	1.25 (.74)	1.32 (1.20)	6.46 (2.66)	7.22 (1.84)
Motivation to attract mate	1.58 (1.74)	1.54 (1.65)	7.19 (2.19)	7.39 (1.91)
General arousal	5.83 (1.95)	5.55 (1.85)	7.23 (1.80)	7.04 (1.66)

Note: Higher numbers indicate more intense state. Bold numbers denote means above the midpoint. Parentheses denote standard deviations.

TABLE 2
STUDY 2: SPECIFIC PRODUCT INFORMATION CONVEYED BY EACH PERSUASION HEURISTIC

Information conveyed about product	Type of Persuasion Heuristic			
	SCARCITY <i>distinctiveness</i>	SCARCITY <i>limited opportunity</i>	SOCIAL PROOF <i>behavioral</i>	SOCIAL PROOF <i>attitudinal</i>
Distinct and different	6.43 (.63)	2.22 (1.28)	1.52 (.74)	2.33 (1.33)
Limited and scarce	1.48 (.55)	5.72 (1.25)	1.21 (.42)	1.30 (.49)
Common and popular	2.49 (1.20)	2.34 (1.35)	6.86 (.21)	5.57 (1.46)
Buzz and excitement	3.24 (1.38)	2.60 (1.43)	4.96 (1.31)	6.61 (.52)
Consumption is high	3.35 (1.65)	2.07 (1.18)	5.87 (1.95)	3.91 (2.03)

Note: Bold numbers denotes the highest means *within a row*. Parentheses denote standard deviations.

STUDY 2: EFFECTIVENESS OF EACH PERSUASION HEURISTIC AS A FUNCTION OF EMOTION

TABLE 3

Elicited emotion	Type of Persuasion Heuristic			
	SCARCITY <i>distinctiveness</i>	SCARCITY <i>limited opportunity</i>	SOCIAL PROOF <i>behavioral</i>	SOCIAL PROOF <i>attitudinal</i>
Fear	4.84 _a (.13)	5.49 _a (.14)	5.48 _a (.14)	5.91 _a (.13)
Neutral	5.21 _b (.11)	5.28 _a (.11)	5.09 _b (.11)	5.82 _a (.11)
Romantic Desire	5.68 _c (.13)	5.29 _a (.14)	4.71 _c (.14)	5.77 _a (.14)

Note: Subscripts denote significant differences ($p < .05$) between means *within a column*. Parentheses denote standard errors.