

Emotional Selection in Memes: The Case of Urban Legends

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This article explores how much memes like urban legends succeed on the basis of informational selection (i.e., truth or a moral lesson) and emotional selection (i.e., the ability to evoke emotions like anger, fear, or disgust). The article focuses on disgust because its elicitors have been precisely described. In Study 1, with controls for informational factors like truth, people were more willing to pass along stories that elicited stronger disgust. Study 2 randomly sampled legends and created versions that varied in disgust; people preferred to pass along versions that produced the highest level of disgust. Study 3 coded legends for specific story motifs that produce disgust (e.g., ingestion of a contaminated substance) and found that legends that contained more disgust motifs were distributed more widely on urban legend Web sites. The conclusion discusses implications of emotional selection for the social marketplace of ideas.

What determines which ideas succeed in the social environment as people exchange information and stories with others? In a famous Supreme Court opinion, Oliver Wendell Holmes described how ideas succeed or fail using the metaphor of the economic marketplace: "The best test of truth is the power of the thought to get itself accepted in the competition of the market" (*Abrams v. United States*, 1919). Holmes's metaphor of the "marketplace of ideas" embodies two key assumptions—(a) that ideas compete, and (b) that they compete on the basis of their truthfulness. Biologist Richard Dawkins (1976) has proposed a biological metaphor that also assumes that ideas compete but that does not assume they compete solely based on truth. Dawkins pictured culture as being composed of many individual units (the cultural analogue of genes) that undergo variation, selection, and retention. As a label for this cultural gene equivalent, he proposed the term *meme*. Dawkins's memes do not compete solely on truth—consider annoying commercial jingles or a chain letter that threatens doom if it is not reproduced and spread (Dawkins, 1976). In this article we follow Dawkins in explaining how ideas propagate using a variation–selection–retention approach, so to acknowledge our theoretical approach and unit of analysis, we often use the term *meme* for ideas that propagate in the social environment.¹

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From an anecdotal perspective, the ideas that survive the competition of the marketplace often seem more like Dawkins's (1976) examples of chain letters than like the insightful political commentary envisioned by Holmes. Consider the rumor, popular in the 1970s, that McDonalds extended its hamburger meat by adding ground earthworms. Alternatively, consider the fears that surface every Halloween about the dangers of Halloween trick or treating. In a *Newsweek* article published right before Halloween in 1975, a reporter warned, "If this year's Halloween follows form, a few children will return home with something more than an upset tummy: In recent years, several children have died and hundreds have narrowly escaped injury from razor blades, sewing needles, and shards of glass purposefully put into their goodies by adults" (quoted in Best, 1990, p. 132). An ABC News poll in 1985 showed that 60% of parents were worried that their children might become victims (cited in Best, 1990). However, when Joel Best (1990) studied every reported incident since 1958, he found "a few incidents where children received minor cuts from sharp objects in their candy bags, but the vast majority of reports turned out to be old-fashioned hoaxes, sometimes enacted by young pranksters, other times by parents hoping to make money in lawsuits or insurance scams" (Glassner, 1999, p. 30; see Best, 1990). Counter to the stories about tainted candy, the only conclusion that might be drawn from social science research is not "don't take candy from strangers" but perhaps "take candy from strangers, just not from your parents."

The stories about earthworms in hamburgers and booby-trapped Halloween candy are both popular "urban" or "contemporary

¹ The General Discussion contains more detail on why we feel this term is useful.

legends"²—stories that are told as true by people in modern society. Why are these contemporary legends successful, and what do they tell us about the memes that are selected in the social environment? Researchers have frequently assumed that legends succeed because they provide insightful social commentary about the cultural or economic context (e.g., Brunvand, 1981; Fine, 1992; for an alternative, Freudian approach, see Dundes, 1971). However, we suggest that in many situations, the most important feature of the social environment is not shared culture but shared psychology. We propose that memes such as the ones above undergo a kind of *emotional selection*—they are selected and retained in the social environment in part based on their ability to tap emotions that are common across individuals. Furthermore, when memes are selected based on their ability to provoke emotion, the memes that survive emotional selection in the marketplace of ideas may not always be those that are most truthful.

How Are Ideas Selected?

In this article, we study contemporary legends as an example of the memes that succeed in the social environment. Contemporary legends are an interesting topic because they have aroused wide attention on the part of the research community (Brunvand, 1981; Dégh, 1971; Dundes, 1971; Fine, 1980, 1992; Hall, 1965) and the public (e.g., the many Internet Web sites that analyze and debunk contemporary legends). Not only are legends prominent in the social environment, they have achieved their prominence because people often regard them as true. Folklorists distinguish legends (which are told as true) from other genres of oral tradition, such as fairy tales, that are told solely for their entertainment value (Brunvand, 1981). Thus, contemporary legends provide a particularly interesting test of whether ideas win out in the marketplace because of their perceived "truth."

In this article, we also draw on the psychological literature on rumors. Like legends, rumors are memes that propagate in a social environment as true statements to be believed. In general, legends have a somewhat more complex plot structure than rumors do, but scholars who have researched rumors and legends often analyze the same kinds of stories (Allport & Postman, 1947; Brunvand, 1999; Mullen, 1972; Rosnow & Fine, 1976). Because there is a larger literature on the psychology of rumor, it seems useful to use this literature as the starting point for an analysis of related memes.

Why do people transmit memes to others? The previous literature has implicitly or explicitly evoked two kinds of explanations for legends and rumors: *informational* and *emotional*. Before we present our emotional selection hypothesis, we describe previous informational and emotional approaches.

Informational

Clearly, one reason that memes survive in the social environment is that they provide information—they are true or plausible and contain useful, practical information or a social moral. Such informational reasons are virtually always acknowledged by scholars of rumors or legends, whether they approach rumors and legends from the perspective of psychology (Allport & Postman, 1947; Rosnow, 1980), sociology (Rosnow & Fine, 1976; Shibutani, 1966), or folklore (Brunvand, 1981). For example, rumors spread because people desire "to understand and simplify compli-

cated events" (Allport & Postman, 1947, p. 5). According to sociologist Shibutani (1966), rumors develop when there is "an unsatisfied demand for news," and they disappear when "demand for news drops or supply becomes adequate" (p. 164). Even folklorists, who are clearly sensitive to the entertainment value of stories, have argued that legends provide information: "People tell legends and other folk listen to them, not only because of their inherent plot interest but because they seem to convey true, worthwhile, and relevant information" (Brunvand, 1981, p. 11).

Emotional

Although researchers have frequently acknowledged the informational value of rumors and legends, they have also acknowledged that rumors and legends have an important emotional component. However, previous researchers have primarily emphasized vague, diffuse emotions (e.g., anxiety) that arise from a clear exogenous event such as a crisis or catastrophe.

For example, Rosnow (1980), after reviewing the psychological literature on rumors up to 1980, postulated an "essential" emotional aspect of rumors that arises from "wants, needs or expectations stimulated by events that are anxiety producing" (i.e., "produced by apprehension about an impending, potentially negative outcome"; p. 587). In a well-known sociological account of rumors, Shibutani (1966) devoted a chapter to a kind of emotional selection that occurs when "collective excitement is extreme," as in "aggressive mobs, suicidal infantry charges, stampedes at bargaining counters, bank runs" (p. 95). Allport and Postman (1947) assumed that rumors succeed because they allow people to project their preexisting emotional state on a plausible target in a Freudian-style process (p. 43). Others have argued that rumors reduce dissonance by justifying or rationalizing a preexisting emotional state produced by a disaster or war (Festinger, 1957; see Koenig, 1985, p. 33).

These emotional explanations share three general characteristics: (a) They involve relatively negative emotions, (b) they involve diffuse emotions (e.g., "anxiety," or "apprehension about an impending, potentially negative outcome"), and (c) they generally assume that rumors spread because they tap into a preexisting emotional state prompted by an exogenous event such as a war, riot, or natural disaster. In the next section, we argue that previous emotional explanations of rumors or legends are limited in all three ways, and we describe how the emotional selection hypothesis addresses these limitations.

Emotional Selection

In this article, we propose that memes succeed in part because of *emotional selection*. We propose that memes are shaped in a process of variation, selection, and retention and that they are frequently selected and retained because they evoke an emotional reaction that is shared across people. The emotional selection approach has three potential advantages over previous approaches that emphasize informational selection or emotional selection

² Many folklore scholars prefer the term *contemporary legend* over *urban legend* because not all contemporary legends are "urban." In this article we use the term *contemporary legend* in deference to this research literature.

based on diffuse negative emotions: (a) It allows us to explain memes that produce not only negative emotions but positive ones, (b) it allows us to explain memes that not only respond to preexisting emotions but create new ones, and (c) it allows us to explain why memes often involve not diffuse, generalized anxiety but specific, identifiable emotions.

Not All Memes Evoke Negative Emotions (or Positive)

One somewhat obvious limitation of previous theories of rumors and legends is that they typically focus on negative emotions even though many rumors and legends involve positive emotions. For example, consider the very successful chain letter that swamped the Internet in 1997–1998. According to the letter, Bill Gates was testing a new E-mail-tracing program, and if a group of people forwarded the E-mail to reach 1,000 people, each person would receive \$1,000 from Bill Gates personally (Emery, n.d.; see Brunvand, 1981, for other legends of windfall gains). Alternatively, consider the “pipe dreams” that occasionally circulate during wartime, which promise that the end of the war is just around the corner (Knapp, 1944; Nkpa, 1975).

Because some rumors and legends are positive and some are negative, it is desirable to have a theory of emotional selection that can explain the success of both positive and negative memes. However, most explanations tend to explain best either negative emotions or positive emotions. For example, most previous explanations of rumors and legends have focused only on negative emotions such as anxiety (Allport & Postman, 1947; Festinger, 1957; Koenig, 1985; Rosnow, 1980; Rosnow & Fine, 1976; Shibutani, 1966). Other potential explanations could easily handle positive emotions—for example, the Bill Gates rumor is consistent with the idea that people have positive illusions about themselves and their world and that they believe the world is a kind and generous place where good things happen to good people (Lerner, 1970; Taylor & Brown, 1988; Weinstein, 1980)—however, these explanations have difficulty explaining other rumors and legends that feed negative emotions such as anxiety.

Emotional selection is consistent with the empirical results of Heath (1996), who equated items of good and bad news for “surprisingness” and asked people which items they would pass along. In domains that were emotionally positive, people passed along information that was exaggeratedly positive, and in domains that were emotionally negative, people passed along information that was exaggeratedly negative.

By proposing the idea of emotional selection, that memes are selected and retained in the social system when they evoke an emotional reaction that is widely shared across people, we allow for both positive and negative memes, as long as the positive and negative emotions are widely shared.

Not All Memes Require Preexisting Emotions

Perhaps the key limitation of previous emotional explanations is that they assume that rumors merely feed on existing emotions. According to Shibutani’s (1966) description of emotional contagion, people respond only to rumors “that are consistent with their aroused dispositions” (p. 179). Allport and Postman (1947) claimed that “rumor activates and confirms pre-existing attitudes rather than forming new ones” (p. 182). The major problem with

this approach is that it artificially limits the emotional impact of legends or rumors to situations that themselves provoke strong emotions. Indeed, Koenig (1985) summarized the previous literature as focusing on the “Three C’s—crisis, conflict, and catastrophe” (p. 3).

The emphasis of the previous literature on the Three Cs contains an important insight—that for social selection to occur, ideas must tap into an emotional reaction that is consistent across people. Indeed, one way to create strong, consistent emotional reactions is to have people confront a common external crisis, conflict, or catastrophe. However, this is not the only way. In fact, contemporary legends are a strong counterexample to the idea that for people to respond consistently, they must be facing a common external event. Contemporary legends succeed in day-to-day social interactions that lack the heightened general emotion that is produced by crisis, conflict, or catastrophe (Brunvand, 1981, 1999). Therefore, finding emotional selection in contemporary legends might cast some doubt on the assumption that rumors need to tap into preexisting emotion to propagate.

If we consider the social function of rumors and legends, it becomes clear why they need not tap preexisting emotion. Indeed, rumors and legends that create emotion may be extremely useful as the basis for social exchange and social interaction. First, rumors and legends that create emotion may be useful if people enjoy consuming emotions. This kind of *emotional consumption* is quite plausible for some emotions, particularly positive ones. For example, the Bill Gates chain letter may have strong exchange value because the person who passes it along entitles his or her friends to share a positive mood during an otherwise boring work day. Although emotional consumption is very plausible for positive emotions, it is also plausible for some negative emotions—people, after all, choose to buy scary books and to attend scary movies. Emotional selection predicts that when memes are selected for emotional consumption, they are selected based on their ability to evoke consistent emotions across people. The Bill Gates chain letter taps into a common desire for good fortune, and a scary story must tap into a common experience of fear.

Second, rumors and legends that create emotion may be useful if people bond socially with others who are sharing the same emotion. In this *social bonding* scenario, people may choose to pass along rumors and legends that create emotion not because they enjoy consuming the emotion directly but because the shared emotion enhances their social interactions. For example, Schachter (1959) enhanced people’s interest in social affiliation by confronting them with a fear-inducing stimulus. Social bonding may also be produced by shared hostility toward an out-group member (Sherif, Harvey, White, Hood, & Sherif, 1961) or by a shared contempt for a violation of social norms (Haidt, in press; Keltner & Haidt, 1999). Like emotional consumption, however, social bonding implies that emotional selection works best when legends and rumors produce emotions that are consistent across people. A legend will not produce fear-induced affiliation if it is not scary to most people, and a rumor will not produce shared hostility toward an out-group member unless it reliably causes in-group members to become angry.

We have argued that emotional selection could operate effectively even when memes create emotions rather than simply respond to preexisting emotions. Indeed, contemporary legends seem to be a plausible candidate for such memes because they

transmit effectively in day-to-day interactions that do not involve the preexisting emotions of crisis, conflict, or catastrophe.

Not All Memes Evoke Diffuse Emotions

Previous theories have emphasized fairly vague, diffuse emotions such as anxiety. This, perhaps, is the central area in which our theory of emotional selection differs from previous approaches. Emotional selection predicts that ideas will be most likely to survive if they tap into a consistent emotional process that is shared across people. Although diffuse emotions such as anxiety may not be sufficiently consistent across people to drive emotional selection, emotional selection may occur for fear, anger, or disgust because these emotions are likely to be shared consistently across people (e.g., Ekman, 1982; Frijda, 1987; Izard, 1977).³

When memes are transmitted, consistent emotions are likely to be emphasized throughout the variation, selection, and retention process. For example, consider a situation in which a narrator is telling a story to listeners to create a social bond against an out-group. In terms of variation, narrators may consciously try to increase the emotional force of the story by choosing details that make the story more likely to provoke anger. Narrators may also vary stories without conscious calculation—when they recall a scary story or statistic, they may fill in poorly remembered details in a way that recreates the emotional reaction they had when they first heard it. In general, when rumors or legends transmit across people, the aspects of those ideas that are selected and retained are likely to be the ones that evoke consistent emotional reactions— aspects of the emotional recipe for a specific emotion such as anger or fear.

Emotional selection thus emphasizes specific, consistent emotions, and by doing so it highlights features of rumors and legends that previous accounts of general anxiety would miss. For example, emotional selection predicts that there are genres of rumors and legends that specialize in evoking specific, basic emotions. This, in fact, seems to be true. Consider fear. The Halloween trick-or-treat case was discussed in *The Culture of Fear* by sociologist Barry Glassner (1999). According to Glassner, Americans fear the wrong things (e.g., drugs, minorities, killer kids, mutant microbes, plane crashes, and road rage), and he provided numerous examples of stories and factoids that make Americans fearful of events that are relatively uncommon and unlikely. Emotional selection for fear is also illustrated by contemporary legends (e.g., Brunvand, 1981, chapters 1 and 3), wartime rumors (e.g., “bogies”; Allport & Postman, 1947; Knapp, 1944), and rumors after natural disasters (Festinger, 1957; Prasad, 1935, 1950).

Alternatively, consider another basic emotion: anger. In a classification of rumors that circulated during World War II, Knapp (1944) recognized that the single largest category consisted of “wedge drivers” that produced anger toward various groups. There were anti-Semitic, anti-Black, and anti-British rumors. One rumor held that American Catholics were trying to avoid the draft. A whole class of rumors held that public officials were using their positions for personal benefit (e.g., by acquiring extra rationed goods). Similar rumors have circulated in every war (Jacobson, 1948, chapter 8, pp. 286–454). Or consider the class of contemporary legends that make consumers angry by claiming that corporations support various fringe groups—for instance, rumors that Snapple supports the Ku Klux Klan and that Procter and Gamble

supports the Church of Satan (Eckhouse, 1993; Fine, 1992; Koenig, 1985; Stewart, 1996). Anger rumors are also pervasive in riot situations. The National Advisory Commission on Civil Disorders warned that rumors “significantly aggravated tensions and disorders in more than 65 percent of disorders studied by the Commission” (cited in Rosnow, 1980, p. 582). In 1943, during the Detroit race riots between Black and White citizens, almost identical rumors circulated within both groups: “One asserted that a black baby had been thrown from the bridge by white sailors; another that a white baby had been thrown from the bridge by blacks. A white woman had been attacked at the bridge by blacks; white sailors had insulted black girls; white girls had been accosted by blacks while swimming” (Allport & Postman, 1947, p. 196; see also Rosnow & Fine, 1976, p. 58).

The literature includes anecdotal accounts that are consistent with emotional selection. Consider how anger rumors evolved during the Detroit race riots: “Within minutes after fighting broke out, rumors were spreading like a gasoline fire through the white districts: first, it was that a white woman had been raped on the park bridge; then it was that she had also been killed. With almost each new telling the rumors took on new dimensions. Later it was said that she had also had a baby in her arms at the time, which her assailant had tossed from the bridge in the river to drown” (Jacobson, 1948, p. 57). In this situation, as the rumor evolved, it did so in a way that seemed more and more likely to provoke people to anger. A level-headed person might remain calm even when an adult is assaulted but not when a crime has been committed against a baby. Thus, emotional selection highlights features of rumors and legends that are hidden by the traditional emphasis on generalized anxiety. Instead of vague stories that provoke generalized anxiety, we find rumors and legends that seem targeted to provoke specific emotional reactions.

In short, in this section we have argued that previous theories of legends and rumors (a) emphasized negative emotions, (b) responded to preexisting exogenous events, and (c) involved diffuse emotions. We have provided examples that are inconsistent with the first point, but our studies in this article focus on challenging the latter two points. To show that legends and rumors are not limited to preexisting exogenous events such as crisis, conflict, or catastrophe, we study contemporary legends that are common in day-to-day interactions and that do not evoke strong preexisting anxieties. Furthermore, to show that emotional selection operates to shape specific emotional reactions, we focus on one specific, basic emotion and show that this specific emotion increases the transmission of legends. The next section describes why we focus on the specific emotion of disgust.

³ Emotional selection is not limited to basic emotions—for example, love is not a basic emotion with a distinctive physiological pattern or facial expression, but love stories may propagate successfully as long as they evoke consistent responses across people. However, emotional selection does require that a rumor or legend tap into an emotion that is consistent across people, and memes that evoke basic emotions such as fear or disgust may be easier to propagate than memes that evoke romantic love or spiritual rapture.

Disgust as a Case Study

Although there is ample anecdotal evidence that emotional selection may select memes that evoke basic emotions such as anger and fear, in this article we explore emotional selection using a somewhat less obvious and intuitive domain: the basic emotion of disgust. There are several reasons why disgust is a particularly interesting domain in which to test emotional selection.

First, we wanted to focus on a negative emotion. Although the previous literature on rumors and legends has found it difficult to explain positive emotions, other current literatures in social psychology can explain why people might consume memes that promote positive emotions (Taylor & Brown, 1988; Weinstein, 1980). Thus, evidence of emotional selection is likely to be less interesting for positive emotions than for negative ones.

Second, compared with other negative emotions, it is less intuitive that people would consume and transmit stories that produce disgust. Although it is obvious that some genres of stories are designed to produce sadness (e.g., tearjerkers) or fear (e.g., ghost stories, horror films), it is less obvious that the same principles operate for disgust. Rumors and legends that evoke disgust have been studied less often than have rumors and legends that evoke anger or fear (for an exception, see research on legends about contamination in consumer products; Dominowitz, 1979; Fine, 1980; Koenig, 1985).

Third, disgust is one of the emotions that is most commonly evoked by contemporary legends. In a pilot study, we randomly selected 100 contemporary legends from the three largest Web sites that specialize in contemporary legends (which together contain over 1,000 legends). We asked five raters to identify the emotions they experienced when they read particular stories. Across raters, disgust was the most common negative emotion listed by raters, with about 25% of the stories eliciting disgust. Thus, there is reason to believe that disgust is one emotion that should be understood in emotional selection.

Finally, compared with other emotions, the theoretical structure of disgust has been described in more detail. Research on emotions has described the schemas associated with many emotions, but typically the schemas are fairly abstract because researchers have tried to choose the minimal set of dimensions (e.g., pleasantness, anticipated effort, certainty) that allow them to discriminate among various emotions (Ortony, Clore, & Collins, 1988; Smith & Ellsworth, 1985). Although disgust has been studied less often than have other emotions, it has been studied by researchers who have been interested in the evolutionary significance of disgust. As a result, researchers have described disgust based on specific actions that may have evolutionary implications (e.g., contact with bodily substances, ingestion of a contaminated substance; Haidt, McCauley, & Rozin, 1994; Rozin, Haidt, & McCauley, 1993; Rozin, Lowery, & Ebert, 1994; for a historical-literary approach to disgust, see Miller, 1997). Therefore, these researchers have described disgust at a level of detail that allows us to select and analyze contemporary legends that are based on fairly specific story motifs.

In sum, in this article we attempt to show that ideas in the marketplace undergo not only informational selection but also emotional selection. We study contemporary legends because they represent memes that have achieved success in the social environment as true information. In addition, they have succeeded in

social environments that are not characterized by high levels of preexisting emotion. Counter to previous emotional explanations, we assume that emotional selection operates to select memes that strongly trigger specific emotions rather than generalized anxiety. We have chosen to test emotional selection using the basic emotion of disgust because it is a common negative emotion in contemporary legends and because the emotions literature is highly specific about its elicitors.

Study 1

In this study, we collected a sample of potentially emotional stories and investigated whether people would indicate that they would be more willing to pass along stories that evoke stronger levels of disgust.

We prepared to test emotional selection by collecting a large sample of contemporary legends that contain one or more disgusting *motifs*. Folklorists have traditionally been quite interested in analyzing the motifs that arise in oral traditions. A motif is "the smallest element in a tale having the power to persist in tradition" (Thompson, 1946, p. 415). In fairy tales, motifs might include a dragon, a magic potion, or the number three. In this study, we selected legends that contained one or more of the specific motifs that have been found to reliably elicit disgust (e.g., contact with bodily substances, cutting or piercing of the skin; Haidt et al., 1994; Rozin et al., 1993; Rozin et al., 1994). We examined the emotional selection hypothesis by testing whether people say they would be willing to pass along legends that elicit greater levels of disgust.

We compare the emotional selection hypothesis with an *informational selection hypothesis* that predicts that people will be more likely to pass along information that is plausible and that contains some useful, practical information or a moral lesson. We also compare emotional selection with another hypothesis that we might label an *entertainment hypothesis*. This hypothesis predicts that people will value stories that produce favorable emotional reactions (especially positive and neutral emotions, e.g., interest, joy, or surprise). According to the entertainment hypothesis, stories succeed when they are able to evoke strong emotion, but only because these stories are better crafted and more entertaining—the plot is more interesting, the characters more believable, or the ending more novel. In this study, we also included various measures of story characteristics so that we could control for these factors and determine whether emotional reactions are just a proxy for a well-told, entertaining story.

Method

In this study, we assess whether people say they would be more likely to pass along stories that evoke more disgust. We compiled a database of potentially disgusting stories by searching books and the Internet for stories that contain particular disgusting motifs that have been identified by emotions researchers. In our analyses, the unit of analysis is the *story* (not the individual participant). We are not concerned with whether an individual participant would pass along a story that involves strong emotions. Rather, we are interested in whether stories that evoke strong emotions are more likely to be passed along and, thus, propagate in the social environment.

Procedure. Participants ($N = 63$) rated the emotional content of stories and their willingness to pass them along. They also rated a variety of

characteristics of the story (plot, characters, surprise ending) and the informational value of the story (whether it was true, whether it was plausible, and whether it provided a moral lesson or practical information). Each story was rated by 8 or more participants. The analyses below consider the average ratings across participants on each dimension.

Participants. Participants were Duke University undergraduate students who were recruited individually to rate various aspects of stories in exchange for a cash payment of \$10.

Materials. We compiled a large database of disgusting legends by searching the top 10 Internet sites for contemporary legends as well as several compilations of contemporary legends by Jan Brunvand (see the Appendix for a complete list of sources). We selected major Web sites by searching using the key words *urban legends*. To choose the Web sites we sampled, we considered the number of legends that were listed by each site we located, and we considered the prominence of the Web sites on the basis of whether they were cited by other Web sites that focused on contemporary legends.

To select legends that might produce disgust, we included all legends that incorporated one or more of seven motifs that have been found to produce disgust (Haidt et al., 1994): for example, unusual sexual activity such as incest or bestiality; contact with bodily substances such as feces, urine, or ejaculate; ingestion of an inappropriate substance such as rats or bodily substances. This procedure produced a database of 76 contemporary legends. The legends themselves were presented exactly as they appeared on the Web sites, but we eliminated any commentary that accompanied the legend on the Web site (e.g., comments about whether the legend was true or false). In the materials we gave to participants, we never used the terminology *legend* or *contemporary legends*. Instead, we used the more generic label *stories*.

Although our primary interest was disgust, we wanted our raters to think carefully about the emotions elicited by each story, so we added some stories to our experiment that we expected would produce other kinds of emotions. To the database of 76 disgusting legends that we compiled using the procedure described above, we added another 36 legends from the random sample we mention in the introduction, to produce a total of 112 legends. We randomly divided these 112 legends into seven different groups of 16, with the constraint that each rater saw 10–11 disgusting legends and an additional 5–6 legends from the random sample. Each rater was assigned to one of the groups of 16 legends. In total, each legend in our sample was rated by at least 8 independent raters. In our analyses, we treat the legend as the unit of analysis and average the ratings of all raters who read a particular legend.

Emotions. After they read each legend, raters indicated, using a 7-point scale, how much the story made them feel each of eight basic emotions: interest, joy, anger, surprise, sadness, contempt, fear, and disgust (1 = *very little*; 7 = *a lot*). Combined, these emotions represent the most common basic emotions that are generally listed by emotions theorists (cf. Ortony et al., 1988, Table 2.1).⁴ Because our main focus is disgust, we also added two additional emotion terms that we expected to tap lower and higher levels of disgust: *distaste* and *revolted*. We averaged the three disgust items into a single disgust scale ($\alpha = .97$).

Informational characteristics. Raters indicated whether they thought the story was true (i.e., actually occurred) and plausible (i.e., could occur), whether the story contained practical information or a moral lesson, and whether it would make them change their behavior. These ratings and the other ratings for story characteristics were made on a 7-point scale (1 = *strong no*; 7 = *strong yes*).

Story characteristics. Raters also rated whether the story had a rich plot, whether the characters seemed real, and whether the actions of the characters were believable. These are the major factors that story writers discuss as the foundation for good stories. Also, because surprise endings have been identified as a key feature of contemporary legends (Brunvand, 1981), we asked participants whether they expected the story's ending.

Pass along. Participants also answered four questions to indicate whether they would pass along a story, each on a 7-point scale (1 = *strong no*; 7 = *strong yes*). They first indicated whether they would pass along the story to others, then they also indicated whether they would pass it along as true, as an interesting story, and if someone else told a similar story. The four measures were highly related, and below we average them into a single measure ($\alpha = .91$).

Results

Table 1 summarizes the mean ratings of the 112 legends on emotional, informational, and story characteristics. Overall, the stories received moderate ratings on emotion—interest, surprise, and disgust were all around the midpoint of the scale; anger, sadness, and contempt were listed less often; and joy and fear were listed most rarely. In terms of informational characteristics, the ratings of whether a story actually occurred and could occur were highly correlated ($r = .89$), so we averaged these into a measure of plausibility ($M = 3.6$). Raters were more likely to think that a story was plausible than to say that it provided practical information ($M = 2.8$) or a moral ($M = 2.6$; $ps < .001$ by paired t test).

The last four columns of Table 1 present ordinary least squares (OLS) regressions that predict the score of each story on the pass-along measure based on informational and emotional factors and story characteristics. The first three regressions suggest that both informational and emotional selection are important. In Regression 1, which considers only emotional factors, the emotion of interest is important but disgust is not. Regression 3 suggests that when informational factors are controlled, more disgusting stories are more likely to be passed along.

The most complete regression, Regression 4, indicates that stories were more likely to be passed along if they evoked reactions of interest ($\beta = .49, p < .01$), surprise ($\beta = .24, p < .05$), and disgust ($\beta = .27, p < .05$). In terms of informational characteristics, stories were more likely to be passed along if they were plausible ($\beta = .34, p < .05$). In terms of story characteristics, stories were more likely to be passed along if their characters seemed real ($\beta = .30, p < .05$) but less likely to be passed along if they had rich, perhaps complex, plots ($\beta = -.24, p < .05$).

Discussion

In this study we explore emotional selection by comparing it with informational selection and with an entertainment hypothesis (i.e., story characteristics). Informational selection is clearly important. Stories were more likely to be passed along when people said they were plausible (i.e., when raters said they were true or that they could occur). Stories were not more likely to be passed along when they contained practical information or a moral lesson.

Consistent with emotional selection, stories were more likely to be passed along if they evoked more interest or surprise. However, these observations are somewhat banal because they are also consistent with the broader entertainment hypothesis that people like stories that are entertaining. Thus, the most novel evidence for

⁴ We omitted two other emotions that we normally would have included (i.e., shame and guilt) because in the pilot study that we describe in the introduction, our raters never reported experiencing these two emotions on any of the random sample of legends.

Table 1
Study 1: Means and Standard Deviations of Ratings of Contemporary Legends (Emotional, Informational, and Story Characteristics) and OLS Regressions to Predict Pass Along

Measures	<i>M</i>	<i>SD</i>	OLS Regressions			
			1	2	3	4
Pass along	3.4	0.8				
Emotional reaction						
Disgust	4.0	1.5	.11		.26**	.27**
Interest	3.8	0.8	.67***		.46**	.49**
Surprise	4.0	1.0	-.04		.16†	.24*
Joy	1.7	0.7	.00		.00	.04
Anger	2.4	1.0	.13		-.09	-.13
Sadness	2.5	1.0	-.04		.02	.07
Contempt	2.4	0.9	-.13		-.09	-.09
Fear	1.9	0.7	-.10		-.17†	-.13
Informational factor						
Plausibility	3.6	1.1		.51***	.46***	.34*
Story contains practical/useful information	2.8	0.9		-.04	.02	.03
Story contains a moral	2.6	0.9		.14	.00	.02
Story would make me change my behavior	1.9	0.6		.13	.18†	.14
Story characteristic						
Plot of the story was rich	3.1	0.8				-.24*
Characters seemed real	3.8	0.9				.30*
Ending was expected	3.3	1.0				.09
Characters' actions were believable	3.8	1.0				-.08
Adjusted <i>R</i> ²			.37	.37	.58	.60

Note. The unit of analysis is the contemporary legend ($N = 112$). Ordinary least squares (OLS) regressions predict the pass-along variable on the basis of the other variables in the table; the entries in these columns are standardized betas from the regression.

† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

emotional selection is that stories were more likely to be passed along if they evoked greater disgust. This finding is hard to reconcile with entertainment or informational theories of selection.

Although we did not specifically test for the preexisting anxiety hypothesis, our results provide some reason to doubt that emotional selection requires preexisting anxiety. Some of the legends in our sample might tap preexisting anxieties—for example, stories of contaminated foods in fast-food restaurants—but others focus on events that seem unlikely to do so. For example, the most popular legend in the sample involved toad licking. According to this legend, some people like to lick a particular kind of North American toad because its skin secretes a chemical that produces a psychoactive high.⁵ Another popular legend holds that Ozzy Osbourne, the heavy metal rock star, once bit the head off of a live bat during a concert. Both legends were rated as highly disgusting and were quite likely to be passed along. However, neither seems likely to tap broad, preexisting anxieties. The disgusting activities in both stories require voluntary effort and special supplies; thus, they seem unlikely to feed anxieties about accidental toad licking or bat chewing.

Study 2

Study 1 provides some evidence that emotional selection may be at work in the propagation of contemporary legends. However, because Study 1 uses a naturally occurring set of legends, it is possible that some other factor was spuriously correlated with disgust and that our analysis omitted this important factor.

In this study, we try to control for this possibility by selecting a sample of legends and manipulating their capacity to evoke the emotion of disgust. Emotional selection predicts that if we vary the level of disgust evoked by a legend, people should be more willing to pass along variants that are more disgusting.

In this study we also wanted to control for several alternative interpretations of our main results on emotional selection. Study 1 shows that people were more likely to pass along legends that aroused greater emotion, including more disgust. Is this truly evidence that people pass along stories that evoke negative emotions? Were people perhaps implicitly gloating over the misfortune or humiliation of the characters in the story, or were they using the story to feel better, by comparison, about their own circumstances? By controlling for such factors, we improve our ability to interpret any potential effects of emotional selection.

⁵ The idea of toad licking strikes some people as humorous as well as disgusting, and when we presented these results in seminars, several people questioned whether these urban legends were really like rumors (as we assume in the introduction) or more like jokes. To test this possibility, we used a procedure similar to the one used in Study 1 to have 60 new raters rate the 112 legends on a 7-point scale (7 = *very similar*, 1 = *not similar*) based on how similar they were to rumors ($M = 4.6$), gossip ($M = 4.2$), jokes ($M = 3.7$), and news ($M = 3.0$). All differences between means are significant at $p < .01$ by paired t test. Thus, these legends are more like rumors than like other potential categories of social exchange. We thank Ralph Rosnow for suggesting this procedure.

Method

Participants. Participants were 42 Duke University undergraduates who participated for course credit.

Materials. The experiment was titled "Emotional Stories," and participants were asked to read 12 stories and fill out an associated questionnaire. In a between-subjects design, participants read 12 stories in a low-, medium-, or high-disgust condition. To manipulate disgust in a way that would allow our results to generalize, we randomly selected 12 legends from the database of 76 disgusting legends that we compiled for Study 1.

We then manipulated disgust by altering the core motif that seemed to make the story disgusting. For example, for a story in which a man ingested a contaminated substance (the liquid from a soda that contained a dead rat at the bottom), we altered the amount of ingestion that took place to be either more disgusting (the man ingested not only the liquid associated with the dead rat but pieces of the dead rat itself) or less disgusting (the man did not ingest anything because he spotted the rat after he smelled a bad odor). See Table 2 for a description of stories and manipulations.

One problem we encountered in attempting to manipulate the stories was that many of the core motifs were already about as disgusting as our limited

Table 2
Variations of Each Story for Low-, Medium-, and High-Disgust Conditions

Story	Low	Medium	High
Cat food mislabeled as tuna	A person opened a can, prepared to make tuna salad, and noticed that the tuna smelled funny.	A person opened a can, prepared to make tuna salad, took a bite, and spit the tuna out. ^a	A person opened a can, prepared to make tuna salad, ate it, and started to feel queasy.
Toothbrushes	Pictures in the roll of film feature various views of the bellboy cleaning his nails with the four family toothbrushes.	Pictures in the roll of film feature various views of the bellboy with the four family toothbrushes stuck in his armpits.	Pictures in the roll of film feature various views of the bellboy with the four family toothbrushes stuck up his bootie. ^a
Rat in soda bottle	Before he drank anything he saw that there was a dead rat inside.	About halfway through he saw that there was a dead rat inside. ^a	He swallowed something lumpy and saw that there were pieces of a dead rat inside.
Infested hairdos	There were rats crawling all over the towel.	There were rats crawling around in her hair.	She had been gnawed to death by rats. ^a
Hit and run	There was a bird imbedded in the grill of his car.	There was a dog imbedded in the grill of his car.	There was an 8-year-old girl imbedded in the grill of his car. ^a
Scrotum self-repair	The man suffered minor abrasions on his scrotum and testicles.	The man suffered a torn scrotum and lost one of his testicles.	The man suffered a torn scrotum and lost one of his testicles, but he calmly stapled his scrotum back together and resumed work before finally visiting a doctor three days later. ^a
Wedding video	He forgot to erase from the tape scenes of himself masturbating.	There were scenes of himself in sex acts with his plastic dummy.	There were scenes of himself in sex acts with a neighbor's bull terrier named Ronnie. ^a
Dog's dinner	The waiter had told the chef to prepare the dog for dinner. The couple ran into the kitchen to save poor Rosa just in time.	Eventually the waiter returned carrying a dish. When the couple removed the silver lid they found Rosa. ^a	The couple enjoyed their delicious meal. They eventually realized that the waiter had served them Rosa for dinner.
Young sister takes mother literally, castrates brother	The girl pinched it. The mother came home to find her son crying and a cut on his penis.	The girl cut it off. The mother came home to find her son crying and bleeding with no penis.	The girl cut it off. The mother came home to find her son had bled to death with no penis. ^a
Roaches in new cactus houseplant	There were ants having babies inside the plant.	There were cockroaches having babies inside the plant. ^a	The plant exploded, and hundreds of cockroaches flew out. Apparently, the motion had been caused by the cockroaches having babies inside the plant.
Decapitated motorcycle rider	His arm is neatly cut off.	He is neatly decapitated by the steel sheet. ^a	He is neatly decapitated by the steel sheet, and the head splatters on the windshield of the car behind it, causing the driver to hit a tree.
The movie star and the gerbil	[A famous movie star] had a hot dog removed from his anus.	[A famous movie star] had a gerbil removed from his anus. ^a	[A famous movie star] had a diseased rat removed from his anus.

^a The story in this condition was the original version.

imaginations would allow us to make them. Overall, for 6 of the 12 stories the original version of the story was in the high-disgust condition, and for the other 6 stories the original version was in the medium-disgust condition. Analyses for each set of stories produced similar results, so the analyses and results reported below represent the combined sets.

Emotions. After they read each legend, raters provided the same emotions ratings provided in Study 1. The alpha for the disgust scale in this study was .92.

Informational characteristics. Raters indicated whether they thought the story actually occurred and whether it could occur.⁶ In Table 3, we report separate means for these two ratings, but in the regressions in Table 4 (as in Study 1) we combine these measures into a single measure of plausibility. Raters also indicated whether the story would make them change their behavior. These ratings were made on a 7-point scale (1 = strong yes; 7 = strong no).

Severity (gloating). We were also interested in whether people experienced the negative emotions of the story as positive (e.g., by gloating). We thus asked raters to assess how much the main characters in the story suffered trauma, pain, or loss of dignity. These ratings were made on a 7-point scale (1 = very little; 7 = a lot). We expected that if raters were implicitly gloating, they would be more likely to pass along stories that involved more trauma or loss of dignity.

Social comparison. A less extreme version of the gloating hypothesis is that people simply feel more thankful about their own circumstances when they hear about the misfortunes of others. To test for this kind of social comparison, we asked people whether each story made them feel better about themselves and about their own circumstances (1 = strong yes; 7 = strong no).

Results

Manipulation checks. Table 3 separates, by condition, the mean ratings of emotion, main character suffering, informational

Table 3
Study 2: Mean Responses for Each Degree of Disgust (Low, Medium, High) and Ordinary Least Squares Regression to Predict Pass Along

Measures	Low	Medium	High
Pass along	2.6 _a	2.7 _a	3.4 _b
Emotional reaction			
Disgust	4.2 _a	4.6 _b	5.2 _c
Interest	3.6	3.6	3.7
Surprise	3.5 _a	4.1 _b	4.6 _c
Joy	1.9	2.0	1.9
Anger	2.1 _a	2.2 _a	2.7 _b
Sadness	2.5 _a	2.7 _a	3.1 _b
Fear	2.1	2.0	2.4
Contempt	2.5	2.5	2.8
Informational			
Story actually occurred	3.5 _a	3.0 _b	2.9 _b
Story could occur	4.4 _a	4.2 _{ab}	3.7 _b
Change behavior	1.6	1.5	1.8
Severity (gloating)			
Trauma	4.8 _a	5.2 _b	5.8 _c
Pain and suffering	3.9 _a	4.2 _b	5.0 _c
Loss of dignity	3.8 _a	4.2 _b	4.8 _c
Social comparison			
Feel better about self	1.8	1.9	1.8
Feel better about own circumstances	1.9	2.2	2.0

Note. Entries in a given row with different subscripts differ by a post hoc test using Bonferroni comparisons. Responses were made on a 7-point scale.

Table 4
Study 2: Ordinary Least Squares (OLS) Regression to Predict Pass Along

Independent variables	Regression			
	1: Info	2: Emotions	3: Info and emotions	4: All variables
Emotional reaction				
Medium disgust	.05	.02	.03	.02
High disgust	.20***	.16**	.18**	.17***
Interest		.11	.11	.11*
Surprise		.03	.06	.05
Joy		.16**	.15**	.15**
Anger		-.02	-.05	-.05
Sadness		.00	.04	.01
Fear		.07	.03	.02
Contempt		.12*	.09	.09**
Informational				
Plausibility	.17***		.17***	.17***
Change behavior	.14***		.13***	.14***
Severity (gloating)				
Trauma				.09
Pain and suffering				.04
Loss of dignity				-.07
Social comparison				
Feel better about self				.05
Feel better about own circumstances				.09
Adjusted R ²	.49	.49	.53	.53

Note. The table reports standardized betas from OLS regressions. The OLS regression also contained dummy variables for each participant that are not reported in the table. Info = information.
* $p < .05$. ** $p < .01$. *** $p < .001$.

features, and generalized worldview. We analyzed the data using repeated measures analysis of variance (ANOVA), with the 12 stories as the repeated measure within subjects and three levels of disgust (low, medium, high) as the between-subjects variable. Table 3 reports individual post hoc tests that compare each condition with the others using Bonferroni fractions. Our manipulation of disgust was successful—overall, the three conditions differed significantly in disgust, $F(2, 37) = 29.67, p < .001$, and post hoc comparisons suggest that each condition differed from the others.

Evidence of emotional selection. Our key prediction in this study was that participants would be more willing to pass along

⁶ In addition to the generic measure of whether a story could occur (as in Study 1), we also asked people whether they thought the events in the story could happen to them or to someone they know. We originally added these measures because we wanted to rule out a hypothesis consistent with preexisting anxiety—people might pass along stories that could occur not because the stories are informational but because people are anxious about similar events happening to them. The preexisting anxiety hypothesis should predict that people should be most likely to transmit stories that could occur to them—not to someone they know or a generalized other. The order of means shows that people were more likely to say a story could occur ($M = 4.1$) than to say it could occur to someone they know ($M = 3.0$) or that it could occur to them ($M = 2.3$; all pairs differ at $p < .001$ by paired t test). These three measures were highly correlated and had the same effect on our regressions, so for simplicity we use the same measure we used in Study 1 (i.e., the generic “could occur” item).

stories that were more disgusting. This was the case. The repeated measures ANOVA suggests that the conditions differed significantly, $F(2, 37) = 5.40, p < .01$. Post hoc tests indicate that the high-disgust condition prompted the most transmission—participants were more willing to pass along stories in the high-disgust condition than in the low- and medium-disgust conditions ($ps < .05$), but the low- and medium-disgust conditions did not differ significantly.

The manipulation checks above confirm that we successfully manipulated disgust; however, we also altered other factors. Thus, to provide more direct evidence that disgust affects transmission, we present a number of OLS regressions in Table 4 that indicate that our manipulation of disgust increased people's willingness to pass along a story even after we simultaneously controlled for emotional, informational, and other factors (e.g., severity, social comparison). The regressions take the participant-story as the unit of analysis (resulting in 42 participants \times 12 stories = 504 degrees of freedom), but to control for the fact that each participant contributed 12 observations to the analysis, we included dummy-coded indicator variables to control for different means among participants.

In Table 4, the first two rows show the additional impact of an indicator variable that compares our medium- and high-disgust manipulations with the low-disgust manipulation. The four columns of the table show that the high-disgust version differed significantly from the low-disgust version, and this effect remained relatively consistent even as we controlled for informational factors, other emotions, and other factors. Thus, there is consistent evidence for emotional selection for disgust.

In addition to the evidence of emotional selection for disgust, the regressions in Table 4 also allow us to assess other effects. Consider Regression 4. Consistent with emotional selection, we found that participants were more willing to pass along stories that evoked more interest ($\beta = .11, p < .05$), joy ($\beta = .15, p < .01$), and contempt ($\beta = .09, p < .05$). Consistent with informational selection, participants were also likely to pass along stories that were plausible ($\beta = .17, p < .001$) and that would change their behavior ($\beta = .14, p < .001$). Notably, the regression does not indicate any evidence of gloating—participants were not more willing to pass along a story when the main character of the story suffered greater trauma or loss of dignity.

Story-level analysis. We also assessed whether the overall results were skewed by one or two of our stories. In this analysis, we treated each story as the unit of analysis and compared the mean response of all participants in the low-, medium-, and high-disgust conditions. Of the 12 stories we studied, participants said they would pass along the version in the high-disgust condition over that in the low-disgust condition in 10 stories ($p < .05$ by binomial test), and they said they would pass along the version in the high-disgust condition over that in the medium-disgust condition in 9 cases ($p = .15$). In fact, the only case for which transmission decreased as disgust increased was the wedding video story, in which people accidentally see a tape of a man participating in bestiality.

Discussion

Study 2 directly documents emotional selection when emotion is manipulated. In general, people preferred the version of the story

that produced the highest levels of disgust. It is interesting that when people indicated that they would pass along the most disgusting story, they were also passing along stories that produced higher mean levels of other negative emotions (i.e., anger and sadness) and were passing along stories that they admitted were less plausible. Recall that we randomly selected legends to be manipulated from the broader database of disgusting legends. Thus, there is no reason to believe that the results of this study are atypical—it should be possible to manipulate emotions for other stories in a way that alters emotional selection.

One possible explanation for these results is that by changing the stories, we created bad versions of the story that did not “hang together.” However, we note that people were almost as likely to prefer the highly disgusting version of a story whether it was invented by us (4 out of 6 stories) or was the original version in the environment (in 5 out of 6 stories). Some readers may wonder why—if we found it so easy to manipulate urban legends for our experiment—the process of emotional selection does not operate in the natural environment to make urban legends even more disgusting (e.g., if a legend mentions a rat, why does the process of emotional selection not eventually produce a legend with a diseased rat?). As anecdotal evidence of the power of emotional selection, we note that we found it difficult to “improve” the disgust quotient of about half our stories (brave readers might attempt this as an exercise). However, we also note that evolutionary approaches assume only that selection works in general, not that it always produces an optimum on each dimension of selection.

The emotional selection hypothesis argues that stories are more likely to propagate if they evoke strong emotions, but it does not specify the precise form of this relationship. For example, people might like stories that evoke more disgust but balk at passing along stories that are too disgusting. To our surprise, Study 2 shows the opposite pattern within the limits of our sample—people were equally willing to pass along versions in the low- and medium-disgust conditions, but they were significantly more likely to pass along the version in the high-disgust condition.

This study also provides some evidence about how much memes are selected for information in the marketplace of ideas. Consistent with informational selection, we found that people were more likely to pass along stories that were plausible and that would change their own behavior. However, note that in terms of overall means, the study suggests that the highly disgusting stories that were most likely to be passed along were also the stories that were least plausible. Thus, on balance, emotion rather than truth may sometimes win out in the marketplace of ideas.

Study 3

Studies 1 and 2 support emotional selection by showing that legends were more likely to be passed along when they evoked greater disgust. Yet our measures in these studies only involved what people said they would pass along, and such self-report measures may be suspect. A better measure would assess what people actually pass along in an uncontrived social setting. In this study, we seek evidence of emotional selection in a nonlaboratory environment by surveying urban legends Web sites.

Urban legends Web sites exist to collect and comment on the most popular contemporary legends. The Web site designers seem

to take pleasure in cataloguing and debunking legends, so they are motivated to comment on the legends that are the most prominent and widely distributed in the social environment. Thus, in Study 3 we used these Web sites as a way of measuring the breadth of distribution of particular legends.

In this study we also examine a different mechanism for measuring disgust. Previously, we measured disgust through the self-reports of independent raters. In this study we measure disgust using a scale that codes the presence of individual disgust motifs identified by research on disgust—for example, whether the story involves the motif of contact with bodily fluids or the motif of ingesting a nonfood item (Haidt et al., 1994; Rozin et al., 1993; Rozin et al., 1994). If we imagine each motif as a psychological “lever” that can be pressed to create some amount of disgust, then our motif scale allows us to measure how many levers are pushed by a particular legend. For example, in one legend a couple adopts an unusual type of Chihuahua during a trip to Mexico. Later, when they take it to the vet, the vet informs them that their pet is not a dog but a Mexican sewer rat. According to research on disgust, one of the seven most common motifs that produce disgust is contact with suspect animals (e.g., insects, toads, rats). The Mexican pet legend would score at least one point on the disgust motif scale for contact with animals. In another legend, a woman is eating her Kentucky Fried chicken and discovers that her piece of chicken has teeth—she has actually been eating a Kentucky Fried rat. This story would score at least two points on the disgust motif scale for contact with animals and ingestion of an inappropriate substance. In this study we examine whether stories that contain more disgust motifs are actually more likely to succeed in the social environment, as measured by their presence on multiple Web sites for contemporary legends.

Method

Web survey. We searched each of the top 10 Web sites listed in the Appendix to locate each of the disgusting stories using key words in the story. To construct our measure of how widely each story was reported, we simply counted how many Web sites contained each story.

Disgust motif scale. Haidt et al. (1994) validated a disgust scale that contains questions from seven different domains that commonly elicit disgust. We consider these seven domains to represent separate motifs, and we coded each legend for each motif. Without knowledge of the Web survey results, the three of us independently read the 76 stories from the database we compiled in Study 1 and indicated whether each legend contained each of the seven motifs (coefficient alphas are given in parentheses): unusual sexual activity such as incest or bestiality (.96); contact with bodily substances such as feces, urine, or ejaculate (.88); violations of hygiene such as personal uncleanliness (.76); ingestion of inappropriate food substance such as rats or bodily substances (.96); death (.91); envelope violations in which the body is cut or pierced (.84); and contact with animals, primarily insects, reptiles, and rats (.93). To construct the motif scale, we assumed that a motif was present if the majority of raters agreed it was present, and then we summed across motifs.

Informational selection. We also controlled for informational selection using the ratings from our raters in Study 1 for each of the stories in the database.

Results

Table 5 presents the percentage of stories that contain the various motifs on the disgust motif scale. On average, stories

Table 5
Study 3: Frequency of Various Motifs Among 76 Legends

Variable	% stories with motif
Contact with animal	47
Violations of body envelope	44
Death	38
Ingestion of inappropriate food item	36
Sex	23
Contact with body substances	22
Violations of hygiene	7

contained multiple motifs. Recall that to enter the database, stories had to exhibit at least one of the disgust motifs; however, the average number of motifs per story was 2.63, which is significantly greater than 1, $t(76) = 10.6$, $p < .001$. The majority of the stories (78%) included more than one motif, and about a quarter (22%) contained more than four.

Table 6 presents OLS regressions that examine how the disgust motif scale predicts two aspects of selection. The regressions on the left predict the pass-along measure from Study 1. These regressions show that the disgust motif scale significantly predicted the self-reports of our earlier raters—for example, in Regression 3, stories were more likely to be passed along when they involved more of the disgust motifs ($\beta = .26$, $p < .001$). The results in these regressions, which use the disgust motif scale, are comparable in magnitude to the results of the regression in Study 1, which used as an independent variable the raters' average self-report of the disgust they experienced.

The regressions on the right in Table 6 predict Web site popularity: the actual number of Web sites that catalogue a particular legend. The disgust motif scale was a good predictor of Web site popularity. In Regression 6, which controlled for other informational and emotional factors, the effect of disgust was significant ($\beta = .37$, $p < .01$), and the other variables failed to reach significance. In this regression, for every additional motif included in a story, the chance of the story being catalogued on an additional Web site increased by about 20%.

Discussion

This study finds results that are consistent with Studies 1 and 2 using a more objective independent and dependent variable. In terms of the independent variable, we were able to reliably code our sample of legends on the various objectives motifs predicted by research on disgust (Haidt et al., 1994; Rozin et al., 1993; Rozin et al., 1994). Although the legends needed to have only one of the motifs to be included in our database, they typically featured two or three separate motifs.

Most important, this study shows that it is possible to use the emotional selection hypothesis to predict the prominence of legends in the social environment. Note that because we were interested in emotional selection for disgust, we examined a sample of legends that were likely to evoke at least some disgust (i.e., legends with at least one disgust motif). Thus, we cannot say from our analysis whether disgusting legends are more or less popular than legends with other characteristics. However, the results do indicate that within stories that evoke at least some disgust, emotional selection operates. Each additional disgust motif signifi-

Table 6
 Study 3: Ordinary Least Squares (OLS) Regressions to Predict
 Pass Along and Popularity on Web Sites Among 76 Legends

Variable	Regression					
	Pass along			Web site popularity		
	1	2	3	4	5	6
Disgust motif scale		.19†	.26***		.36**	.37**
Interest		.59**	.36**		-.13	-.14
Surprise		-.09	.24*		-.03	-.02
Joy		-.23*	-.18*		-.09	-.06
Anger		.10	-.15		-.36	-.41†
Sadness		.03	.10		.04	.03
Fear		-.11	-.08		-.01	-.05
Contempt		.02	-.01		.26	.31
Plausibility	.53***		.57***	-.21*		-.08
Change behavior	.17*		.10	.02		.15
R ²	.37	.31	.59	.04	.08	.07

Note. The entries in each column represent standardized betas from the OLS regressions.

† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

cantly increased the probability that a Web site would catalogue a particular legend.⁷ Because these Web sites exist to catalogue and debunk legends that are prominent in the broader social environment, it is plausible to argue that, consistent with emotional selection, more disgusting legends are more successful in the social environment.

General Discussion

This article presents three studies that explore how memes are selected in the marketplace of ideas. We studied contemporary legends because they are socially prominent memes and are told as true, and we contrasted the impact of informational and emotional selection. In general, the studies provide converging evidence for emotional selection. Study 1 shows that when informational aspects of truth and usefulness were controlled, people were more willing to pass along stories that elicited stronger disgust. Study 2 manipulates levels of disgust and shows that people preferred to pass along the versions that produced the highest level of disgust. Study 3 shows that legends could be reliably coded for individual story motifs that produce disgust (e.g., ingestion of a contaminated substance). It also shows that the number of motifs affected popularity; legends that contained more disgust motifs were more likely to be passed along and were distributed more widely on Web sites that specialize in contemporary legends. The results of Study 3 are particularly interesting because they suggest that emotional selection may alter the distribution of memes in the social environment.

Limitations of the Current Article

Although the current studies provide evidence of emotional selection, they have important limitations. Our studies controlled for factors that may influence transmission of information, such as informational selection, story characteristics, gloating, and social

comparison. However, there may be other potential mediators we did not test (e.g., we did not provide a direct test of generalized anxiety).

Probably the most important limitation of these studies is that they focus only on emotional selection for disgust. We chose disgust because it is a common negative emotion in contemporary legends and because the prediction of emotional selection for disgust is somewhat less intuitive than is the prediction for other negative emotions, such as fear and anger. However, it would be desirable to extend these results to other emotions. At present, this is difficult because other basic emotions have typically not been described at a level of detail that allows us, for example, to list specific motifs such as the ones we used to select our legends in Study 1 or to construct the motif scale in Study 3.

Another limitation of this article, and a direction for future research, is that we have not examined why emotional selection occurs. How much is it driven by emotional consumption, by social bonding, and by other factors? The current studies do not examine social interaction, and future studies could make a contribution by exploring whether emotional memes succeed because they increase emotional consumption or social bonding (as we speculated in the introduction) or for other reasons—for example, because they provide a more successful basis for social exchange (Rosnow & Fine, 1976) as people vie to pass along the most interesting, emotionally engaging stories.

Implications of the Current Article for Theory

In this article, we have adopted the term *meme* to refer to the cultural practices that undergo selection because we want to highlight that our approach is not limited to contemporary legends but is more general. Previous researchers have considered a number of topics that we feel are related to the evolution of memes in culture, but researchers in one literature seldom cite or borrow from researchers in another because each group of researchers defines their domain narrowly. We think this is unfortunate, because the literatures have much to learn from each other. For example, as we described in the introduction, there are rich, interesting literatures on both rumors and contemporary legends, but these literatures have historically not communicated much with each other, probably to the detriment of both. To name some other literatures that only rarely cite each other, we suspect that emotional selection may also play a role in propagating memes such as fear-inducing cascades of information about carcinogens or environmental contaminants (Kuran & Sunstein, 2000), moral panics about deviant behavior (Goode & Nachman, 1994) or hysterias about satanic ritual child abuse (Showalter, 1997), media attention to homicides and auto accidents but not to diabetes or stomach cancer (Combs & Slovic, 1979) or to road rage and flesh-eating bacteria but not to poverty or workplace safety (Glassner, 1999). We have adopted

⁷ Table 6 displays a couple of results that are inconsistent with emotional selection—legends were less successful when they evoked greater joy (Regression 2) or anger (Regression 4). Given the evidence in the introduction that some classes of rumors and legends do produce joy or anger, we speculate that rumors and legends may evolve to highlight a focal emotion. If stories are selected to produce a focal emotion, then additional emotions other than generic interest or surprise may interfere with selection for the focal emotion and, as a result, be selected against.

the term *meme* as a general term to remind ourselves that it is worth looking for general psychological and sociological processes that lead to the selection of stories, attitudes, factoids, rumors, legends, news, ideas, and other such memes.

The approach we have taken in this article can be adapted to explore other forms of meme selection. Just as biological organisms evolve to fit a physical environment, memes should evolve to fit an environment determined by shared psychological and sociological characteristics. In this article we have explored how memes may evolve to fit shared emotional reactions, but, for example, a cognitive psychologist might examine how memes evolve to fit within shared cognitive constraints. It is probably no accident that folk taxonomies in cultures around the world tend to evolve systems for classifying kin, animals, or other objects that include less than 7 ± 2 categories (D'Andrade, 1995, pp. 42–43). Alternatively, consider David Rubin's (1995) brilliant book *Memory in Oral Traditions*, in which he explored how cultures manage to transmit across generations complex oral traditions like epic poetry or ballads. He provided evidence that the aspects of epics that are retained over time are those that take advantage of people's natural abilities to remember certain kinds of material—for example, concrete, high-imagery actions (vs. abstract concepts) and phrases that involve sound cues, such as alliteration or rhyme. Rubin's work on cognitive selection and our work on emotional selection are both examples of a more general approach to memes: a variation–selection–retention approach that looks for some consistent aspect of the shared cognitive or social environment and investigates how memes evolve to fit that shared environment.

Implications for Social Dynamics

Emotional selection is theoretically interesting because it tells us that informational selection is not the only process at work in the marketplace of ideas. However, emotional selection may also be practically important because it has the potential to alter social and community relationships.

For example, if memes are selected for their emotional content, then social systems may sometimes experience *emotional snowballing*—runaway selection for emotional content rather than for information. Consider, for example, the Halloween trick-or-treat legends in the introduction. Over the last 20 years or so, these contemporary legends have undermined an annual ritual that provided a small but important part of the community fabric in many neighborhoods. As another example of how runaway memes can affect social dynamics, consider the common courtesy whereby drivers flash their lights at other drivers who have forgotten to turn on their headlights. This custom is a simple way of looking out for others, but a few years back it was undermined in many urban areas by a fear-inducing legend. According to the legend, some urban gangs required prospective members to kill a person as a part of the gang initiation. How was the unlucky victim selected? According to the legend, the gangs would drive around in a car with its lights off. The first driver who flashed his or her lights at the car would be hunted down and killed.

Certain memes also operate to undermine public faith in governmental or social institutions. Legends that evoke anger against “welfare queens” who abuse the welfare system make people suspicious of our social safety net (Glassner, 1999). Our faith in the judicial system may be undermined by stories about criminals

who abuse the insanity defense (Caplan, 1992) or about individuals who seem to benefit unfairly from the tort system (Bailis & MacCoun, 1996)—as in the famous case of the woman who “received millions” when she spilled a hot cup of coffee on her lap and sued “because it was too hot.”

In legal and public policy circles, researchers have expressed repeated concerns that the media may skew public policy by provoking irrational fears. By provoking such fears, the media may cause society to skew public policy toward trivial but emotional “problems” and away from legitimate problems that are less emotional (Bailis & MacCoun, 1996; Edelman, Abraham, & Erlanger, 1992; Glassner, 1999; Marsh, 1991). Although the media may deserve all the criticism it gets, irrational fears often propagate in the form of informal contemporary legends that use as experts only the ubiquitous “friend of a friend.” Until we understand more about emotional selection, we are unlikely to understand the social implications of a marketplace of ideas that competes not only over truth but also over emotion.

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