Evolving Informational Credentials: The (Mis)Attribution of Believable Facts to Credible Sources

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Three studies demonstrate that individuals often rely on a "belief force equals credible source" heuristic to make source judgments, wherein they assume that statements they believe originate from credible sources. In Study 1, participants who were exposed to a statement many times (and hence believed it) were more likely to attribute it to Consumer Reports than to the National Enquirer. In Study 2, participants read a murder investigation article containing evidence against two suspects from credible and noncredible sources. When participants believed a particular suspect to be guilty, they misattributed evidence incriminating that suspect to the high-credibility source. Study 3 demonstrated that this phenomenon occurs because individuals assume their beliefs are true and that true beliefs come from credible sources; when participants were given feedback that their beliefs were incorrect, the relationship between beliefs and source inferences did not occur.

Keywords: *source credibility; belief; source monitoring; rumors*

> Several shipments of bananas from Costa Rica have been infected with necrotizing fasciitis, otherwise known as flesh-eating bacteria. . . . The skin infection from necrotizing fasciitis is very painful and eats two to three centimeters of flesh per hour. Amputation is likely, death is possible. If you are more than an hour from a medical center burning the flesh ahead of the infected area is advised to help slow the spread of the infection.
> —*Urban Legends Reference Pages* (n.d.-a)

Why do rumors spread? From classic urban legends to everyday water-cooler commentary, the rumor transmission literature is replete with examples of individuals spreading misinformation, even when they are trying to be accurate (Allport & Postman, 1947; Brunvand, 1981, 1999; Rosnow & Fine, 1976; Shibutani, 1966). Regardless of whether a rumor has a foundation in fact, rumors survive and thrive when they are perceived as true. Consequently, rumors often supply their own informational credentials, or details of the rumor that lead listeners to believe that the rumor is accurate. One of the most important types of credentials is a specific reference to an authoritative source. Rumors that are purportedly verified by trusted sources are viewed as more credible, and hence propagate more effectively, than those that are not (Brunvand, 1981; Kapferer, 1990; Koenig, 1985).

Ironically, source references, although they increase the likelihood that people will perceive a rumor as true, are not necessarily true themselves. The alleged source of a rumor often changes over time as storytellers attribute the rumor to whatever source is most credible at the moment the story is told (Brunvand, 1981; Koenig, 1985; Shibutani, 1966). For example, the widespread Internet rumor about flesh-eating bananas evolved over time, continually migrating to more credible sources as it propagated. Originally, it was attributed to the fictitious "Manheim Research Institute," but after an employee of the University of California (UC) at Riverside forwarded the rumor, its source was changed to the UC Riverside

College of Natural and Agricultural Sciences. Eventually, both the *Los Angeles Times* and the Centers for Disease Control (CDC) made statements debunking it, but these efforts proved largely unsuccessful and subsequent versions of the rumor even attributed the story to the *Los Angeles Times* and the CDC (Emery, 2000).

Although similar examples of source mutations abound in the rumor and folklore literature, surprisingly little is known about why this evolution occurs. Traditional research on rumor transmission has generally ignored the role of informational credentials, such as references to a credible source. In fact, the absence of informational credentials has often been cited as a central component of the prototypical rumor. For example, in a classic, widely cited definition, Allport and Postman (1947) define rumor as a "proposition for belief, passed along from person to person . . . without secure standards of evidence being present" (p. ix). This definition ignores the potential for informational credentials by defining rumors as information that circulates without evidence.

More recently, some rumor researchers have criticized this aspect of the classic definition, noting that rumors often supply what appear to be "secure standards of evidence" (Kapferer, 1990). Generally, researchers have typically assumed that storytellers may intentionally invent these informational credentials so that their stories are more likely to be accepted as true, yet this process has not been empirically tested (Kapferer, 1990; Koenig, 1985). Although we do not doubt that storytellers sometimes deliberately attach credible sources to their statements, we suggest that rumors often may evolve their informational credentials accidentally as people reconstruct a story from fallible memory (Rubin, 1995).

Specifically, we suggest that rumor-tellers attribute rumors to credible sources not just so that they will be believed by listeners, but also because they are believed by storytellers. When people believe in a proposition, they may use their belief as a heuristic that the proposition arose from a credible source; the more one believes in a proposition, the more likely one is to (mis)attribute it to a high-credibility source. In the case of the flesh-eating bananas, people may have believed the rumor and when they passed it along to others they simply assumed or misremembered the source as being highly credible. Thus, the rumor may have gained strength over time as propagators of the story unwittingly upgraded the reporting organization from the unknown "Manheim Research Institute" to the reputable CDC. In this article, we explore whether individuals use their beliefs as cues for source attributions, which may lead to the unintentional credentialing that can often cause rumors to run rampant.

SOURCE CREDIBILITY AND BELIEF

Beginning with the Yale Communication Program in the 1950s (Hovland, Janis, & Kelley, 1953), researchers have extensively investigated the relationship between the credibility of a message's source and its persuasive impact. In general, people are more persuaded by high-credibility sources (Hovland & Weiss, 1951; Kelman & Hovland, 1953). High-credibility sources make individuals more likely to agree with counterattitudinal viewpoints (Aronson, Turner, & Carlsmith, 1963; Hovland & Weiss, 1951), increase their fear about social problems such as crime (Koomen, Visser, & Stapel, 2000), and can even influence their memories so that they recall false memories consistent with the testimony of a high-credibility source (Underwood & Pezdek, 1998).

Source credibility influences beliefs because individuals have a well-developed association between credible sources and truthful information. Credible sources, by definition, are those that have a reputation of accurate and truthful reporting. Thus, it is easy for individuals to rely on the simple-decision rule, or heuristic (Tversky & Kahneman, 1973), "experts are usually correct" when judging the likely truth of a statement. Because this heuristic is a well-learned cognitive shortcut, individuals can invoke it spontaneously and without much conscious thought, but can also use it in a deliberate, conscious manner (Chaiken, Lieberman, & Eagly, 1989).

Thus, previous work suggests that individuals may come to believe information from a credible source. We suggest a related phenomenon: Individuals may infer credible sources for information they believe. Everyday experience indicates that source amnesia occurs frequently and individuals are often forced to begin stories with the common opener "I think I read somewhere . . . " (see Johnson, Hashtroudi, & Lindsay, 1993, for a review of source monitoring; see also Hovland & Weiss, 1951; Macrae, Bodenhausen, & Calvini, 1999; Taylor, Fiske, Etcoff, & Ruderman, 1978, for empirical examples of failed source recall). Consequently, individuals are often in a position of having to reconstruct the sources of their memories. Because source information is critical to distinguishing reality from imagination, fact from fiction, and reliable data from gossip, attempts at source recollection occur frequently and spontaneously: When source information is absent, individuals will instinctively use details about a memory to attempt to reconstruct the source of this memory (Johnson et al., 1993).

We argue that individuals spontaneously invoke a "belief force equals credible source" heuristic when reconstructing source memories. We suggest that beliefs inform source inferences because individuals equate their subjective evaluation of the truth of a statement (i.e., their belief) with the objective truth of the state-

ment. In other words, individuals naturally assume their beliefs are true (otherwise, they would have been unlikely to hold these beliefs in the first place). Furthermore, individuals associate true statements with credible sources. The "experts are usually correct" heuristic is one consequence of this association, but we suggest that this association is bidirectional and individuals can just as easily infer sources based on their beliefs. Taken together, these two processes imply that individuals may naturally and automatically use their beliefs to make source inferences. An individual trying to determine the source of a rumor might infer that if he believed the statement it is probably objectively true, and thus is likely to have originated from a credible source.

Like all judgment heuristics, the "belief force equals credible source" heuristic may often be functional (Arkes, 1991). In many cases, it may enable individuals to quickly and accurately reconstruct source information because individuals are in fact more likely to express strong belief in statements that were originally reported by a credible source (Hovland & Weiss, 1951). However, source credibility is not the only factor that influences belief, and individuals may come to believe a rumor for many reasons, including the persuasiveness of the message itself, the number of arguments it contains (Petty & Cacioppo, 1984), or sheer repetition (Arkes, Hackett, & Boehm, 1989; Bacon, 1979; Hasher, Goldstein, & Toppino, 1977; Hawkins & Hoch, 1992; Hawkins, Hoch, & Meyers-Levy, 2001). In such cases, individuals may mistakenly apply this heuristic and infer that their beliefs must have originated with trusted sources, even when they did not.

The notion that beliefs may be used to reconstruct source information is supported by related research examining how people's beliefs affect how they assess the credibility of unknown sources. In many cases, individuals may have little information about the credibility of a new or unfamiliar source (e.g., a fellow passenger on an airplane flight), and they may use their evaluation of the message itself to infer source credibility. In such situations, believing a message makes people think the unfamiliar source is credible whereas disbelieving the message decreases credibility (Rhine & Severance, 1970; Slater & Rouner, 1996). Thus, this research demonstrates that individuals' views about how credible the communicator is may be shaped by their beliefs. In our research, we test a different, and perhaps more radical, proposition: Individuals' views about *who* the communicator is also may be shaped by their beliefs. In situations where the original source of a message cannot be recalled with certainty, individuals may infer a source of known credibility that is consistent with their beliefs.

To test our hypothesis, we conducted three studies to determine whether statements that are believed are more likely to be attributed (and even misattributed) to credible sources. Study 1 examined how individuals' beliefs in "urban legends" affected perceptions of source credibility when the original source of the statement was not presented. In Study 2, we presented participants with statements from high- and low-credibility sources about an ongoing murder investigation and then manipulated their beliefs about the guilt or innocence of two murder suspects to examine whether participants would misattribute statements to sources based on their manipulated beliefs. In Study 3, participants rated their belief in several statements and were later asked to self-generate sources for these statements. In addition, we explored the mechanism for the "belief force equals credible source" heuristic in Study 3 by disrupting the assumption that one's beliefs are true for some participants; we gave participants feedback that their beliefs were incorrect and examined whether they continued to attribute their beliefs to credible sources.

STUDY 1

Method

In this study, we manipulated participants' beliefs in several urban legends concerning food contamination and assessed how these beliefs affected source attributions. We selected food contamination legends for two reasons. First, pretests indicated that these legends are ambiguous in terms of their validity and thus participants vary in their levels of belief. Second, food contamination legends, such as stories of fast-food employees spitting in customers' hamburgers, evoke emotions of disgust that are common motifs in the legends and rumors that circulate in everyday life (Dominowitz, 1979; Fine, 1992; Heath, Bell, & Sternberg, 2001; Koenig, 1985).

To manipulate belief in these statements, we varied the number of times that participants were exposed to each statement. Previous research has demonstrated a truth effect whereby repeated exposure to statements is sufficient to alter people's beliefs: The more times one is exposed to a particular statement, the more one is likely to believe the statement to be true (Arkes et al., 1989; Bacon, 1979; Hasher et al., 1977; Hawkins et al., 2001; Hawkins & Hoch, 1992). This relationship between repetition and perceived truth is mediated by familiarity; repetition increases familiarity and, in turn, familiarity is used as a heuristic for determining the truth of a statement (Hawkins & Hoch, 1992). In Study 1, we used this paradigm to manipulate belief in the food contamination allegations by varying the number of times participants were exposed to them. Based on the prior research demonstrating the repetition-truth link, participants exposed to a statement several times should express

more belief in the statement and consequently be more likely to attribute this statement to a high-credibility source than a statement that has only been presented a few times.

We selected two print media sources to assess perceptions of credibility. Previous research has demonstrated that individuals perceive a clear distinction between tabloid sources, such as the *National Enquirer*, and fact-based print sources, such as *The Washington Post* (Kaufman, Stasson, & Hart, 1999). For this study, we selected two sources, the *National Enquirer* and *Consumer Reports*, that differed in perceived credibility but were both likely to print stories regarding food contamination allegations (Koenig, 1985).[1] We predicted that the more a participant believed a legend to be true, the more likely they would be to attribute it to *Consumer Reports* than to the *National Enquirer*.

PARTICIPANTS

Forty Stanford University undergraduates participated in this study in exchange for $5.

MATERIALS AND PROCEDURE

We searched several urban legend Web sites for food contamination allegations. We pretested several of these allegations and selected six that pretest participants considered to have a roughly equal likelihood of being reported in the *National Enquirer* or *Consumer Reports*. These allegations concerned the products of Pepsi, Star-Kist, Tropical Fantasy, Cup-o-Noodles, Coca-Cola, and Jack-in-the-Box (see the appendix for the complete text of each allegation).

We created two packets of flashcards with one of the six allegations printed on the front side of each flashcard. Each of these six allegations was repeated either two or five times in the flashcard packet, depending on condition. In one version (Version 1), the allegations concerning Coca-Cola, Star-Kist, and Tropical Fantasy (Group A) were repeated five times and the Pepsi, Jack-in-the-Box, and Cup-o-Noodles statements (Group B) were presented two times, resulting in 21 statements in the flashcard packet. In the other version (Version 2), the number of repetitions for each statement was reversed.

To ensure that participants attended to each statement and to provide a plausible justification for presenting statements multiple times, the back side of each flashcard contained one of five different thought questions: (a) whether the product was increasing or decreasing in popularity over time, (b) how often the participant purchased that type of product, (c) how often the participant purchased that specific brand, (d) how the allegation affected the sales of the product, and (e) how the alleged problem may have occurred. The exact wording for these questions can be found in the appen-

dix. For statements that appeared five times in a flashcard packet, each of the five questions was presented exactly once. For the three statements that appeared twice in a packet, questions were randomly printed on the backs of these six flashcards such that each of the five questions appeared once and one question ("Is the product becoming more or less popular over time?") appeared twice.

After arriving in the laboratory, the experimenter informed participants that the objective of the study was to assess how individuals respond to allegations that widely used products might actually be harmful. Participants were told that they would be presented with flashcards containing statements about alleged problems with the products of large food and beverage manufacturers and that it would be possible for a statement to appear in the set of flashcards more than once. The experimenter instructed participants to go through their flashcard packet reading the statement on the front of the card and then turning the card over and thinking of an answer to the question on the back of the card. After reading the statements and questions on all of the cards, participants completed a questionnaire. The questionnaire indicated that each of the six alleged problems was originally reported in one of two sources, the *National Enquirer* or *Consumer Reports*, and participants were asked to indicate which source they thought was most likely for each statement. After completing the study, participants were fully debriefed and informed that the six product allegations were selected from various Web sites, not the *National Enquirer* or *Consumer Reports*, and may or may not be true. Finally, participants were thanked and paid for their participation.

Results and Discussion

The dependent measure of interest in this study was the percentage of times that statements were attributed to the high-credibility source, *Consumer Reports*. Within each of the two belief conditions (two vs. five repetitions), we averaged participants' three source choices to calculate the percentage of statements attributed to the high-credibility source. A 2 (flashcard packet: Version 1 vs. Version 2) × 2 (statement repetition: two vs. five) ANOVA, with repetition as a within-subjects factor, revealed a main effect of repetition, $F(1, 38) = 5.70$, $p = .022$. Statements were more likely to be assigned to *Consumer Reports* when they were presented five times (i.e., high-belief condition; $M = 62\%$) than when they were presented twice (i.e., low-belief condition; $M = 48\%$). In addition, there was a significant interaction between version and repetition, $F(1, 38) = 4.44$, $p = .042$. As may be seen in Table 1, this occurred because one group of statements was slightly more likely overall to be attributed to *Consumer Reports* than the other group. However, the

TABLE 1:   Study 1: Percentage of Statements Attributed to *Consumer Reports* as a Function of Statement Repetition

	Repetitions	
Statement Group	Two	Five
Group A		
Coca-Cola		
Star-Kist		
Tropical Fantasy	43	53
Group B		
Pepsi		
Jack-in-the-Box		
Cup-o-Noodles	52	70

means for both statement groups were in the predicted direction, with a higher percentage of statements attributed to *Consumer Reports* in the high-belief condition than in the low-belief condition. Overall, these results support our assertion that individuals will use their belief in a statement to make inferences about the statement's source, such that statements that are believed are more likely to be attributed to highly credible sources than those that are not.

STUDY 2

Method

Study 2 was designed to replicate and extend the findings of Study 1. This study differed from the first study in two significant ways. First, to provide additional experimental control, we generated fictitious statements and sources. The stimulus materials and sources used in Study 1 were taken from a common social context, the Internet. Although these materials may have increased the ecological validity of our studies, they reduced our experimental control because participants may have been exposed to the legends (or similar ones) before. Furthermore, because participants were presumably familiar with the general content of the *National Enquirer* and *Consumer Reports*, they may have relied on cues other than belief, such as their knowledge of the style and content of these publications, to determine a likely source. To address these potential limitations, Study 2 used a fictitious scenario with novel statements and sources.

More important, Study 2 was designed to provide a more externally valid test of our predictions by examining how beliefs affect source misattribution. Study 1 demonstrated that beliefs affect source attributions when source information is absent. In situations where individuals are aware that the original source of a statement was not presented, it may be natural to use belief as a cue for source credibility because no other more objective information is available. However, it is not clear that they would do so if a source were originally provided.

TABLE 2:   Study 2: Percentage of Source Attributions to High-Credibility Source (*The Palos Times*)

	Arrested Suspect	
	Benik (N = 44)	Finch (N = 33)
Statements from *The Palos Talk*		
Incriminating Benik		
Benik threatened Muler for flirting with Benik's daughter	27	12
Benik knew Muler had an affair with Benik's daughter	23	9
Incriminating Finch		
Finch had history of substance abuse	41	52
Finch stole $1,300 from Muler 2 years before murder	48	73
Statements from *The Palos Times*		
Incriminating Benik		
Muler cut funds for Benik's business, infuriating Benik	37	24
Incriminating Finch		
Finch stole $1,260 from Muler a week before murder	37	58

Study 2 addressed this issue by attributing statements to either a high- or low-credibility source and then measuring how belief in these statements affected individuals' recall of this source information at a later time.

For this study, we developed a newspaper article describing a 20-year-old murder investigation with two prominent suspects. The article summarized information from two unfamiliar sources of differing credibility (i.e., a high- and low-credibility source) that had written about the murder shortly after it occurred. In the context of this newspaper article, we manipulated belief in statements by informing participants at the end of the article that one of the two suspects had recently been convicted. We hypothesized that people would tend to misattribute evidence to the high-credibility source when it implicated the suspect who was eventually convicted.

PARTICIPANTS

Ninety Stanford University Undergraduates participated in this study in exchange for $5.

MATERIALS AND PROCEDURE

Murder mystery scenario. Participants read a one-page story about the murder of a Palos Verdes businessman, written in the style of a newspaper article. It provided details about the victim, Joseph Muler, and discussed particular pieces of evidence that incriminated the two likely suspects, Oscar Benik and Martin Finch. Six target statements were presented in the article, each involving a specific piece of evidence: three incriminated Benik and three incriminated Finch (see Table 2 for

paraphrased content of these statements). For each suspect, two of the incriminating statements were made by the low-credibility source, *The Palos Talk* (described as the local gossip sheet), and one was made by the high-credibility source, *The Palos Times* (described as the local newspaper).[2]

All participants read the same article, with the exception of one sentence, which served as the belief manipulation. This sentence revealed that recent DNA evidence from the original crime scene had conclusively linked one suspect (either Benik or Finch, depending on condition) to the murder. To ensure that participants did not differentially attend to the six target pieces of evidence based on their knowledge of the arrested suspect, the sentence revealing the arrest was the second-to-last sentence of the one-page article. Thus, until the end of the article, all participants were unaware of which suspect, if any, was charged with the crime.

Posttask questionnaire. After reading the article, participants completed a questionnaire with two sections. First, participants indicated which suspect murdered Muler, either Benik or Finch. This question served as a manipulation check. Second, participants were reminded that each of the six statements was originally reported in either *The Palos Talk* or *The Palos Times* and were asked to indicate the most likely source for each statement. The questionnaire stated that participants were not to look back at the article when answering these questions, and the experimenter monitored the laboratory room to ensure that participants complied with this instruction.

Results and Discussion

MANIPULATION CHECK

As intended, participants believed that the true murderer was the one whose DNA was found at the crime scene, $\chi^2(1) = 47.24$, $p < .001$. However, 13 of our 90 participants failed to select the murderer implicated by the DNA evidence. This may have resulted from the intentional subtlety of the belief manipulation: Because it was only one sentence at the end of the 1,000-word article, some participants may have skimmed over it. We had constructed the DNA evidence to be highly convincing to those who read it, so we suspected that these 13 participants did not carefully attend to the experimental materials. Thus, we excluded them from the analyses below.

SOURCE MISATTRIBUTION

The main dependent measure in this experiment was the percentage of statements attributed to the high-credibility source, *The Palos Times*. To assess the effect of beliefs on source (mis)attributions, we conducted a 2 (guilty suspect: Benik vs. Finch) × 2 (original source: *Talk* vs. *Times*) × 2 (incriminating evidence: Benik vs. Finch)

ANOVA with source and incriminating evidence as within-subject factors. This analysis revealed a two-way interaction between arrested suspect and incriminating evidence, $F(1, 74) = 7.15$, $p = .009$.[3] Pairwise comparisons supported our predictions: Statements incriminating Benik were marginally more likely to be attributed to *The Times* when Benik was arrested than when Finch was arrested, $F(1, 74) = 3.23$, $p = .076$, whereas statements incriminating Finch were more often attributed to *The Times* when Finch was arrested, $F(1, 74) = 5.97$, $p = .017$.

Of importance, this pattern of results occurred regardless of which source originally reported the statement. As may be seen in Table 2, for statements originally reported in *The Palos Talk*, individuals made more "upward misattributions" for statements that were consistent with their beliefs (i.e., they incorrectly attributed a statement to a source more credible than the actual source). Thus, individuals were more likely to misattribute evidence against Benik to *The Times* when Benik was arrested rather than Finch ($M = 24\%$ and $M = 11\%$, respectively) and more likely to misattribute evidence against Finch to *The Times* when Finch was arrested rather than Benik ($M = 62\%$ and $M = 44\%$, respectively).

The same pattern emerged for statements originally reported in *The Palos Times* (see Table 2). Participants were more likely to (correctly) attribute the statement implicating Benik to *The Times* when he was arrested rather than Finch ($M = 37\%$ and $M = 24\%$, respectively), and they were more likely to attribute the Finch statement to *The Times* when he was arrested ($M = 58\%$) rather than Benik ($M = 37\%$). Because both of these statements were originally reported in *The Times*, these percentages represent correct attributions (i.e., originally reported in *The Times* and attributed to *The Times*). Interpreting these results another way, participants made more "downward misattributions" when statements were inconsistent with their beliefs (i.e., they incorrectly attributed a statement to a source less credible than the actual source).

The findings from this study replicate the results of Study 1: Individuals attributed statements consistent with their beliefs to higher credibility sources and attributed statements inconsistent with their beliefs to lower credibility sources. Because individuals in this experiment were given original sources and had an opportunity to be accurate, these misattributions provide an especially stringent test of whether belief force causes people to invoke a credible source.

It is clear that the task in this study was difficult, although probably not more difficult than the source attribution tasks individuals face in their day-to-day lives. On a daily basis, individuals acquire many different

pieces of information from the Internet, newspapers, and television. Frequently, each source presents multiple pieces of often-conflicting information, which are further attributed to many different sources (e.g., a newspaper article that quotes several local politicians). Most of this information will be unnecessary and, hence, forgotten, but occasionally individuals will need or want to remember a particular source and will be forced to rely on any available cues to reconstruct their memory. The materials used in this study were designed to capture, to the extent possible, this everyday experience. Of course, some features of our study gave participants advantages in making correct source attributions that might not exist in daily life. Participants were asked to recall sources immediately after reading the article and they knew that each statement came from one of only two sources. The fact that we found significant source misattribution in these circumstances suggests that source errors may be even more prevalent in everyday life, where we typically do not have such cues to guide us.

STUDY 3

Method

Studies 1 and 2 provide converging evidence that individuals use their beliefs to make source inferences. Across two studies using different stimulus materials, belief manipulations, and sources, individuals attributed statements they believed to high-credibility sources and statements they did not believe to low-credibility sources. The objective of Study 3 was twofold: First, we wanted to extend the generalizability of our results by using a more ecologically valid measure of source attribution. One limitation of Studies 1 and 2 was the use of a forced-choice dependent measure. We have argued that individuals will construct sources that are consistent with their beliefs, yet the previous studies did not give participants the opportunity to do so. To more clearly demonstrate that beliefs are used as cues to generate sources, Study 3 used a free-response format in which participants were asked to self-generate sources. In addition, to avoid forcing participants to make source attributions, we gave them a nonresponse option in the source-generation task.

The second objective of Study 3 was to investigate the psychological mechanism underlying the "belief force equals credible source" heuristic. We have argued that individuals generally reason that if they believed a statement, it is probably objectively true, and if it is true it is likely to have originated with a credible source. In this study, we sought to demonstrate that the first stage in this process, the assumption that one's beliefs are true, is necessary for beliefs to influence source attributions. To do so, we gave some participants explicit feedback about the accuracy of their beliefs, designed to either disrupt or reinforce this link between belief and truth. Participants in the study were first asked to indicate their belief in several statements. In one condition (control condition), participants then simply indicated a likely source for each statement. However, in two other conditions, participants were told that their beliefs were either primarily true (true beliefs condition) or primarily false (false beliefs condition) before generating a source for each statement. If individuals attribute their beliefs to credible sources because they assume their beliefs are true, then participants in both the control and true beliefs conditions should display the pattern demonstrated in Studies 1 and 2: Statements that are believed should be attributed to higher credibility sources than statements that are not believed. Furthermore, the strength of this relationship between beliefs and sources should not differ between these two conditions because participants in the true beliefs condition are simply being told what participants in the control condition already assume: Their beliefs are objectively correct. However, participants in the false belief condition will not be able to assume that their beliefs are true because they have been given explicit feedback contradicting this assumption. Thus, participants in the false belief condition should not use their beliefs to infer source credibility.

PARTICIPANTS

Thirty-seven Stanford University members participated in this study in exchange for $5. Two participants in the control condition were excluded for not following instructions. Thus, the reported results are based on the remaining 35 participants.

MATERIALS AND PROCEDURE

All stimulus materials and questionnaire items were presented using a computer program that was programmed and launched in MediaLab (Jarvis, 2000). After arriving at the study, participants were seated at individual computer terminals. The instructions provided via computer informed participants that they would be participating in a health information study and would answer several questions about recent food contamination allegations. Furthermore, participants were informed that they might receive feedback about the accuracy of their responses at various stages of the experiment. After reading these instructions, participants were exposed to the same six food contamination allegations used in Study 1. Each allegation was presented individually on the computer screen, and participants indicated whether they thought the allegation was true or false.

After participants indicated their beliefs for all six statements, participants in the true beliefs ($N = 11$) and false beliefs ($N = 13$) conditions saw a screen with the message "Please wait . . . computing feedback." There was a 2-s delay, designed to create the impression that the computer was calculating a score, and then participants saw one of two message screens, depending on condition. In the true (false) beliefs condition, participants read, "You were (not) very accurate in Part 1 of the experiment. You gave the correct response for five (one) of the six allegations." Participants in the control condition ($N = 11$) were not given any accuracy feedback.

In Part 2 of the experiment, participants were given an opportunity to list a likely source for each statement presented in Part 1. The first screen in this section contained the following instructions: "For each food contamination allegation that you read in Part 1, please list one specific news source (e.g., *The Tulsa Sun-Times*) that you think is likely to have reported it. If you feel that you cannot think of a likely source for a particular statement, please type 'I don't know' in the space provided." Participants then saw a series of six screens, one for each statement. At the top of each screen, the above instructions were repeated. Immediately below the instructions, the statement was presented along with a space for participants to type their response.

Following the source generation task, participants completed several questions regarding their experience in the study. As part of this questionnaire, participants indicated how accurate they thought their responses were in Part 1 (1 = *not at all*, 7 = *very much*); this question served as a manipulation check. In addition, to probe for suspicion regarding the feedback presented between Parts 1 and 2, participants were given a free-response question that asked them to indicate their thoughts about the purpose of the experiment. None of the participants gave any indication that they were skeptical about the feedback that they had received.[4]

After completing the questionnaire, participants were debriefed about the experiment and paid for their participation.

SOURCE CODING

In the source generation task, participants listed both specific sources, such as *The Wall Street Journal*, as well as general source types, such as "an e-mail hoax." In total, participants listed 58 different sources. All sources were coded on 7-point scales (1 = *not at all credible*, 7 = *very credible*) by three coders (the first author and two additional coders who were blind to hypotheses and experimental conditions). The coders' ratings were highly reliable (α = .94); thus, they were averaged to create a credibility score for each source. The credibility scores ranged from 1.00 (for five sources, including the *National*

Enquirer and *Star*) to 6.67 (for four sources, including the *New York Times* and *CNN*), with a mean of 4.44.

Results

MANIPULATION CHECK

We first assessed how participants rated the accuracy of their responses using a one-way ANOVA (accuracy feedback: true beliefs vs. false beliefs vs. control). The feedback condition altered how people perceived the accuracy of their beliefs, $F(2, 32) = 6.22$, $p = .005$. Pairwise comparisons revealed that participants in both the control ($M = 5.09$) and the true beliefs ($M = 5.18$) conditions thought their beliefs in Part 1 of the experiment were more accurate than did participants in the false beliefs condition ($M = 3.54$), $t(32) = 2.92$, $p = .006$ and $t(32) = 3.09$, $p = .004$, respectively. There was no difference in perceived accuracy between participants in the control and true beliefs conditions, $t(32) = -0.16$, *ns*, indicating that participants who received no feedback assumed that their beliefs were just as true as participants who were given explicit positive feedback.

SOURCE GENERATION

Relationship between beliefs and nonresponses ("I don't know"). In the source generation task, the mean number of "I don't know" responses per participant was 1.8 (out of 6 possible response opportunities). Across all participants and allegations, there were a total of 63 nonresponses, which constituted 30% of the total number of source generation opportunities. Thus, even though participants had an opportunity to avoid making source inferences altogether, they did so substantially less than half of the time.[5]

Relationship between beliefs and generated sources. The main dependent measure of interest in this study was the relationship between participants' beliefs and the sources they generated. We constructed a general linear model that predicted source credibility (calculated as the average credibility rating for all sources listed by the participant) based on one continuous variable, average belief (calculated as the percentage of statements, for which a source was listed, that the participant believed to be true); one categorical variable, feedback condition; and the interaction between these two variables. The three-level feedback condition variable was represented by two orthogonal contrasts: The contrast weights for the first contrast were 1 for control, 1 for true beliefs, and –2 for false beliefs. The contrast weights for the second contrast were –1 for control, 1 for true beliefs, and 0 for false beliefs. Variables were centered at 0 prior to conducting regression analyses.

The results of these analyses support our predictions. There was a main effect of belief, $\beta = .57$, $F(1, 28) = 21.96$, $p < .001$. However, this effect was qualified by a significant

interaction between level of belief and the first feedback condition contrast, $\beta = .42$, $F(1, 28) = 12.55$, $p = .001$: Participants in the false beliefs condition exhibited a different relationship between beliefs and generated sources than participants in either the control or true beliefs conditions. To interpret this interaction, we conducted simple effects tests to predict source credibility based on belief at these two levels of feedback condition (false beliefs vs. control and true beliefs). These analyses revealed that for participants in the control and true beliefs conditions, the relationship between beliefs and the credibility of generated sources was positive and significant, $\beta = .88$, $F(1, 19) = 62.97$, $p < .001$: Participants generated more credible sources for statements as their level of belief in the statements increased. However, this relationship disappeared in the false beliefs condition, $\beta = -.06$, $F(1, 11) = .03$, *ns*: When participants knew that their beliefs were incorrect, their beliefs did not predict the credibility of the sources they generated.

As predicted, there was no significant interaction between level of belief and the second feedback condition contrast, $\beta = .14$, $F(1, 28) = 1.41$, *ns*, indicating that the relationship between beliefs and source credibility did not differ between the control and true beliefs conditions.

Discussion

The results of Study 3 extend the findings of Studies 1 and 2 by demonstrating that beliefs affect source generation. In a free-response format where participants had the opportunity to list any source (or none at all), participants in both the control and true beliefs conditions generated higher credibility sources for the statements they believed than the statements they disbelieved. Although participants were given an opportunity to avoid generating sources, they usually did not take advantage of it; in the majority of instances (70%), participants used their beliefs as a guide and attached sources to statements.

This study sheds light on the underlying psychological mechanism responsible for the "belief force equals credible source" heuristic by investigating a boundary condition of this phenomenon. We have argued that individuals use their beliefs to make source inferences because they assume that their beliefs are objectively true and they associate true statements with credible sources. In Study 3, our goal was to provide evidence for this mechanism by disrupting the link between belief and truth for some participants. We found that participants did not use their beliefs to make source inferences when they were given explicit feedback that their beliefs were incorrect (i.e., false beliefs condition). Furthermore, there were no differences in behavior between participants who were given no feedback (i.e., control

condition) and participants who were explicitly informed that their beliefs were correct (i.e., true beliefs condition). The behavioral similarity across these two conditions is also consistent with the notion that individuals assume their beliefs to be true. The accuracy feedback provided in the true beliefs condition was essentially redundant information because participants naturally assume that their beliefs are correct without having to be told explicitly that this is so.

GENERAL DISCUSSION

This article presents three studies that explore how individuals infer sources based on beliefs. Study 1 manipulated belief through repetition and showed that statements were more likely to be attributed to a higher credibility source when they were repeated several times. Study 2 showed that beliefs may result in source misattributions: Even when statements were originally attributed to particular sources, individuals made source recollection errors that were consistent with their beliefs. Individuals made "upward misattributions," attributing statements to a source more credible than the actual source, for statements consistent with their beliefs and made "downward misattributions" for statements inconsistent with their beliefs. Finally, Study 3 demonstrated that beliefs influence source inferences even when participants self-generate sources. In addition, Study 3 demonstrated that the source attributions we documented depend on people assuming that their beliefs are true; when participants were given explicit feedback that their beliefs were untrue, there was no relationship between beliefs and source credibility. Overall, these studies provide converging evidence that individuals often rely on a "belief force equals credible source" heuristic and use beliefs to make source judgments.

Implications of the Current Research

The results presented in this article have several interesting implications for research on the propagation of information and misinformation. Individuals often aspire to be factual and accurate in their communications, but despite this ambition, rumors and falsities sometimes run rampant. Of interest, untruths may flourish by cloaking themselves in symbols of truth, such as attributions to a credible source. Understanding how rumors derive these credentials is critical for understanding the dissemination of misinformation. The studies presented in this article provide, to our knowledge, the first empirical examination of how these informational credentials may arise. As we mentioned in the Introduction, rumor researchers have only recently begun to acknowledge the role that credentials play in the rumor circulation process and usually limit their dis-

cussion of credentialing to cases where credentials are mindfully added by the storyteller to convince a skeptical recipient. Our studies suggest that informational credentials may be generated more spontaneously, and thus be more widespread, than previously thought.

This research also provides a potential explanation for how rumors disseminate with such speed and success. The "belief force equals credible source" heuristic is essentially the inverse of the "experts are usually correct" heuristic discussed in the attitude change literature, whereby individuals use source credibility to determine belief (Chaiken et al., 1989). Taken together, these two heuristics suggest a potential vicious circle of rumor transmission. To illustrate, suppose Ben hears a rumor and finds it believable, which increases the likelihood that he will pass it along (Koenig, 1985). Unable to recall the source, either because it was never known or simply forgotten, Ben uses his belief to help him infer the source of the rumor and, in passing the rumor along to Ray, attributes it to a credible source. The credible source increases the likelihood that Ray will believe the rumor and, in fact, Ray's belief may be even stronger than Ben's because of the addition of this credible source. As a result, Ray's stronger belief may cause him to misattribute the rumor to an even more credible source when he passes the rumor along. Thus, the heuristic we document may cause the source of a rumor to be continuously upgraded as it spreads, which only makes the rumor more believable and hence more likely to spread.

The vicious rumor circle that results from these two complementary heuristics provides a potential explanation for why some rumors, such as the flesh-eating banana scare, enjoy such a long and illustrious life despite many attempts to debunk them. The banana rumor, which has been circulating rapidly on the Internet since January 2000, owes much of its success to the increasingly credible list of sources that have apparently confirmed the rumor (Emery, 2000). Even more impressively, other rumors have been circulating for decades, thanks in part to similar source misattributions. For example, a rumor dating back to the late 1970s alleges that Ray Kroc, the founder of McDonald's, gives 35% of his earnings to the Church of Satan (Koenig, 1985). One of the original fabricated sources of the rumor was *Phil Donahue* but subsequent versions of the story were attributed to the *Johnny Carson Show, 60 Minutes, Merv Griffin, 20/20, Tom Snyder,* and the *Today Show.* The rumor disappeared for a while but resurged in the 1990s, this time alleging that the president of Procter & Gamble was the Church of Satan contributor and attributing this information to contemporary talk shows, such as *Sally Jesse Raphael* and the *Jenny Jones Show* (*Urban Legends Reference Pages,* n.d.-b).

Limitations and Future Directions

Our studies share a few important limitations that are worthy of mention. First, they focus on one link in a broader social process. Although we would like to generalize our results to the transmission of rumors, our studies have not examined actual transmission. Although this limits our ability to generalize from our results alone, we see our laboratory work as complementary to a variety of careful historical studies that have traced how rumors arise and evolve in important social contexts. For many years, folklorists and social scientists have written about rumor, legend, and other distortions in the marketplace of ideas. In many of these works, researchers have painstakingly documented the history of rumors and recorded many details of how these stories changed over time. However, there is much we do not know about the causal chain of events leading to a rumor's widespread and rapid success or its eventual demise. The objective of the current research was to study some of the psychological underpinnings of a frequently documented phenomenon in the rumor literature: the evolution of informational credentials. In doing so, we aspired to complement the rich tradition of folklore narratives by providing greater insight into one aspect of the causal sequence of rumor transmission.

Second, future research should examine whether informational credentials other than references to source authorities are also generated spontaneously. Although we have focused on one important credential in this article, rumors and legends also derive credibility from other credentials, such as specific references to time and place or specific details (Brunvand, 1981). For example, the flesh-eating bananas warning refers to a specific location, Costa Rica, as well as detailed treatment recommendations (e.g., preventive treatment if you are "more than an hour" from professional medical attention). Similarly, the rumor about McDonalds (or Procter & Gamble) gains credibility from the specific percentage of income allegedly donated to the Church of Satan, 35%. We find it plausible that the same process individuals use to infer credible sources also may allow rumors to evolve other forms of informational credentials. If someone believes a rumor or legend, they may elaborate specific details of their (strongly believed) mental image when they convey it to others. Given the important role that credentials play in the process of rumor transmission, it would be desirable to extend the results of this article to other types of informational credentials. We hope that answering these and other related questions will lead us to a greater understanding of how rumors successfully evolve and adapt to their dynamic social contexts.

APPENDIX

FOOD LEGENDS USED IN STUDIES 1 AND 3

1. Three individuals have been hospitalized after drinking out of Pepsi cans, apparently because the tops of the cans were encrusted with dried rat urine.
2. Star-Kist Tuna was recalled in Minnesota and Wisconsin after consumers found that the cans contained cat food and not tuna.
3. Tropical Fantasy, an inexpensive fruit drink that is marketed mainly in inner-city and low-income areas, contains a chemical that causes sterility.
4. The wax used to line Cup-o-Noodles cups has been shown to cause cancer in rats.
5. Coca-Cola is just as effective as paint thinner at dissolving paint.
6. Jack-in-the-Box has fired two employees for spitting in customers' burgers before serving them.

FLASHCARD QUESTIONS USED IN STUDY 1

1. Do you think [brand name, e.g., Coca-Cola, Tropical Fantasy] is becoming more popular or less popular over time?
2. How frequently do you purchase [brand name] products?
3. How frequently do you purchase [product type, e.g., fast food, soda], in general?
4. How much do you think this allegation has affected [brand name] sales?
5. How do you think this problem happened?

NOTES

1. To ensure that these two sources differed in perceived credibility, a separate group of participants ($N = 23$) rated the credibility of eight nationally circulated newspapers and magazines using 9-point scales ($1 = $ *definitely not credible*, $9 = $ *definitely credible*). As expected, a paired-samples t test revealed that participants rated *Consumer Reports* as significantly more credible ($M = 7.22$) than the *National Enquirer* ($M = 2.04$), $t(22) = 10.93$, $p < .001$.

2. A separate group of participants ($N = 24$) rated the credibility of six fictitious sources (*The Palos Tribune, Herald, Talk, Voice, Weekly,* and *Times*) on 9-point scales ($1 = $ *definitely not credible*, $9 = $ *definitely credible*). *The Times* and *The Talk* had the highest ($M = 7.29$) and lowest ($M = 2.58$) credibility ratings, respectively, of the six pretest sources, $t(23) = 13.13$, $p < .001$.

3. In addition to the predicted interaction, this analysis also revealed two other significant effects. First, there was a main effect of incriminating evidence, $F(1, 74) = 18.48$, $p < .001$, such that evidence incriminating Finch was generally seen as more likely to come from *The Times* than evidence incriminating Benik. We suspect that this occurred because the statements implicating Finch were written in a style suggestive of a more fact-based source; two of the three statements cited specific monetary amounts and concerned the topic of theft. In contrast, two of the statements implicating Benik concerned infidelity and lacked precise details, indicative of the type of information likely to be seen in a gossip page. Second, there was a two-way interaction between original source and incriminating evidence, $F(1, 74) = 5.46$, $p = .022$, also stemming from the overall higher credibility of statements regarding Finch. These effects are not theoretically relevant for our present discussion; thus, we do not discuss them further.

4. Of the 24 participants in the two feedback conditions, only 5 referenced the feedback in their response. Four of these participants were in the false beliefs condition and 1 was in the true beliefs condition. In all cases, the feedback was mentioned in a general way (e.g., "how nega-tive feedback affects confidence") and did not suggest any suspicion on the part of the participants.

5. There was no effect of either participants' beliefs or feedback condition on the number of nonresponses.

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