EFFECT OF SOURCE ATTRIBUTION ON PERCEPTION OF ONLINE NEWS STORIES

By S. Shyam Sundar

Are quoted sources in online news as psychologically meaningful as those in printed and broadcast news? A within-subjects experiment was designed to answer this question. On a website, forty-eight subjects read three online news stories with quotes and three stories without source attribution. They rated stories with quotes significantly higher in credibility and quality than identical stories without quotes. However, quotes did not seem to affect their ratings of liking for—and representativeness (newsworthiness) of—online news.

Most online users receive "news" from various sources—electronic mail from cyber-acquaintances, mailings from distribution lists, newsgroup postings, web sites, and a growing number of online news services. Given such a multiplicity of sources, it is likely that online users may not remember which source supplied which piece of information or news. That is, they may not store information content along with source attribution in their long-term memory, leading to the "I-read-somewhere-that" phenomenon whereby users may use information obtained by online means in their non-online lives without adequately adjusting for the validity or credibility of the source of that information. This is especially worrisome with the recent proliferation of online stories that have little or no sourcing. The Internet has made it possible for gossip and rumor to not only gain wide circulation but also attain the status of "news." Many mainstream press reports, about topics as wide-ranging as a conspiracy behind the TWA Flight 800 crash investigation and President Clinton's sexual liaisons, are based on unsubstantiated information posted on the Internet.

An important implication of this phenomenon is the gradual decline in the psychological importance of sources in online news stories. While sources constitute the backbone of a news story in traditional media like print and broadcast, they may not be as important to users' judgments of the veridicality of online news stories.

An experiment was designed to test this possibility. "Source" was operationalized as a person or institution quoted within a news story. The presence or absence of a quoted source constituted the independent variable. Users' evaluations of news stories constituted the dependent variable. The purpose of this experiment was to determine if the presence of quoted sources in online news stories made any difference to readers' perceptions of news content.

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This article will first review prior empirical research on source attribution. It will then present the methods and results of an experiment designed to test the effects of source attribution on the perception of online news stories.

As Newhagen and Nass point out, considerable ambiguity surrounds the concept of "source" in communication research. While some researchers have conceptualized sources at the level of media channels and technologies, others, especially source-credibility researchers, consider gatekeepers as sources of news. However, when journalists refer to sources, they usually mean the information providers quoted within news stories.

For journalists, "source" represents the bread and butter of a news story. Editors constantly demand that reporters get "quotes" for their stories. "Quotes" are quotations from the right sources, from sources that would not only be relevant but also credible given the context. Getting quotes and attributing them to credible sources are essential aspects of journalistic practice, regardless of the medium of news delivery. While the print media publish the quotes, as far as possible within direct quotation marks and sometimes with photographs of the quoted sources, the electronic media make elaborate arrangements to record sources for broadcasting. Sometimes, television crews travel hundreds of miles just to get a one-line quote from a source on camera. Even radio news stories often air quotes -- if not directly from the source's mouth then by having somebody else other than the main newsreader say it -- to lend veridicality to the stories. This phenomenon of "sourcing" is so integral to good journalism that a truly newsworthy statement of fact is rarely if ever published if it is not properly attributed to a legitimate source.

Much of the journalistic preoccupation with sourcing is premised on the belief that receivers actively monitor sources while processing and evaluating the piece of news presented to them. To that extent, journalists present themselves as mere conduits passing along information from sources to receivers. They treat themselves a part of the medium of transmission rather than as originators or sources of information.

Whether this assumption is psychologically valid is a question up for debate, especially given the research findings in source credibility and gatekeeping effects which emphasize the effects of the information presenter over those of the content itself. That is, do receivers process sources embedded within news stories or do they evaluate journalistic information wholly based on who delivers it to them? While there is substantial evidence pointing to receivers' bias for human sources (as opposed to statistical sources) in information processing and perceptions of story content, evidence on the effects of within-story sources on readers' evaluations of newsworthiness, story credibility, and other aspects of the story is inconclusive.

For example, an experiment comparing direct quotes with paraphrases failed to yield differences on readers' ratings not only of story attributes such as accuracy, objectivity, believability, informativeness, and readability, but also of source attributes such as dramatic, informed, effective, colorful, precise, and emotional. Another study found no differences in believability between the following three versions of the same news stories: with specific attribution to a named source, with general attribution to source consisting of a title but no name, and no attribution at all. The
perceived accuracy of one of the two news stories in the experiment did vary with source attribution: The version with specific attribution was rated slightly but significantly more accurate than the other two versions.13 But, an earlier study had the reverse result: Stories without sources or with unidentified sources were rated more accurate and more significant, and subjects agreed with them more, than stories with a named source.14

Culbertson and Somerick found no differences in perceived accuracy or truthfulness between news stories with and without named sources.15 This is not to say that readers do not notice sources within news stories. In a later analysis, the researchers found that people tend to maintain a symbiotic relationship with news sources; regular readers tend more than others to depend on source attribution. Specifically, they found that readers' "print-orientation" (i.e., greater reliance on - and preference for - print compared to other media) corresponded positively with attentiveness to sourcing in news stories.16

Gibson and Zillmann also noticed a medium difference when they investigated the effects of quotations upon impression formation.17 They found a big difference between quotations and paraphrases on issue perception, but this effect was observed for print and not radio. Subjects presented with quotations from sources questioning the safety of amusement parks perceived the overall safety of such parks to be less adequate than did subjects given the same information in paraphrased form, or without any sources.

The perceptual effects of quoted sources within news stories can be summarized as follows: Readers, especially those with a print orientation, seem to notice sources of quotes as well as to form impressions based upon the sources' quoted remarks. However, their reliance upon quoted sources for evaluating the quality, credibility, and newsworthiness of news stories is unclear given the ambiguous findings in past research.

The present study is designed in part to address this ambiguity by investigating the effects of source attribution in four distinct areas of news story perception: Credibility, Liking, Quality, and Representativeness. The concept of credibility, as applied to news content, may be defined as a global evaluation of the objectivity of a given story.18 Liking is overall affective reaction.19 Applied to a news story, liking is an indicator of a news receiver's feelings toward - or evoked by - the overall content of the news.20 Quality means the degree or level of overall excellence of a news story. It signifies an evaluation of the goodness of a communication message.21

Representativeness of a news story is a summary judgment of the extent to which the story is representative of the category of news.22 It is a measure of readers' estimation of a story's newsworthiness. In other words, it is the answer to the following question: What is the probability that the story, taken as a whole, belongs to the class of entities that we call "news"? To the extent a story manifests features that are considered integral to the broad psychological notion of news, it would be considered a news story.23 That is, it would be judged as representative of news.

This study investigated whether readers' perceptions of online news stories varies as a function of source attribution in those stories. Specifically, it measured differences in receivers' ratings of credibility, liking, quality, and representativeness of the content as a function of the presence or absence of quoted sources, through a within-subjects experiment. The context for this research is online news, the independent variable is Quotes (with two values...
- presence and absence), and the dependent variables are users' ratings of Credibility, Liking, Quality, and Representativeness of online news stories.

Subjects. Forty-eight undergraduate and graduate students enrolled in communication classes participated in the experiment. None of the subjects were journalism students; therefore, they were not sensitized to professional news values regarding use of quotes and attribution. Each subject was paid $10 for participation.

The experiment was administered to subjects in groups ranging in size from three to twelve persons.

All subjects were asked to sign an informed consent form before commencing the experiment. They were then instructed, as a group, to read six news stories through an online service and answer a paper-and-pencil questionnaire after every story. As promised in the consent form, all sessions of the experiment lasted a little under forty-five minutes.

Design Overview. The study employed a within-subjects, repeated-measures design whereby all subjects were exposed to identical content, but half the content had one value of the independent variable (presence of quotes) while the other half had another value (absence of quotes).

Operationally, the design may be summarized as follows: All subjects read six news stories each on an online news service. Three of these six stories had quotes in them while the other three did not have any quotes. After reading each story, subjects filled out a paper-and-pencil questionnaire evaluating their liking for -- and the credibility, quality, and representativeness of -- the news story they had just read.

Experimental Treatment Conditions. As mentioned earlier, the independent variable had two within-subjects values -- presence and absence of quotations in the news story. These two values will henceforth be referred to as Quote and No-Quote.24

All subjects in the experiment read six news stories -- one each in the following common categories of news: National, International, Local, Business, Sports, and Entertainment. Six news stories were created especially for this study by rewriting articles that had already appeared in mainstream newspapers. These stories were chosen because they were routine and would not evoke particularly strong negative or positive reactions. The national story was about a Supreme Court ruling in a child custody case, the international story concerned a family planning program in Iran, the local story related to funding for a local highway link, the business story centered around statistical data about American business productivity in the last five years, the sports story was about cheerleaders forming an employees union, and the entertainment story dealt with a television personality moving from one network to another.

All subjects in the experiment read the same six stories, with minor variations in attribution of quoted sources as described below:

Two versions of each of the six stories were created such that one had quotations and one did not. The stories were equated for content in an effort to make sure that the only difference between the Quote and No-Quote versions was attribution to a quoted source. For example, the Quote version of the business news story read as follows:

WASHINGTON—American business productivity improved in 1994 for the fifth straight year, boosted by the largest output growth since 1984. At the same time, businesses held labor costs to the smallest gain in 30 years. Some
observers say that this is "an indication of further growth" but other observers feel that it could be "a sign of peaking before decline in growth."

Productivity – defined as output per hours worked – jumped 2.2 percent last year, faster than the 1.5 percent advance in 1993. It was the fifth consecutive gain since productivity fell 0.9 percent in 1989.

Over time, productivity determines the nation’s living standards and the competitiveness of its products overseas. Strong productivity is likely to hold off inflationary pressures.

Some analysts maintain that growth in productivity will slow and then decline as companies continue to add workers and the current business cycle continues.

But many disagree.

"The opposing view is that employers will continue to get more out of their workers by re-engineering their manufacturing and service processes, and by outsourcing," said Stephen Roach, an economist with Morgan Stanley & Co.

Growth in productivity slowed to a seasonally adjusted annual rate of 1.8 percent in the final three months of 1994, from a strong 3.2 percent in the previous quarter.

This story had actually appeared in a major metropolitan newspaper. It had attribution to two sources, which were retained for the Quote version. However, for the No-Quote version of the same story, the quotation marks and the source attributions were removed, but the content of the quoted remarks was retained. The No-Quote version of the above story read as follows:

WASHINGTON–American business productivity improved in 1994 for the fifth straight year, boosted by the largest output growth since 1984. At the same time, businesses held labor costs to the smallest gain in 30 years. This is an indication of further growth but it could be a sign of peaking before decline in growth.

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Similarly, two versions (Quote version and No-Quote version) of the same story were created for each of the other five types of news stories used in this experiment.

Although the independent variable in this study was varied within subjects, each subject read only one of the two versions of each story. This was achieved by counterbalancing the quote manipulation and the story type. Of the six stories read by each subject, three belonged to the Quote value and three belonged to the No-Quote value. For example, if the national, international, and local stories read by a subject all had quotes in them, the sports, business, and entertainment stories would not have any quotes. However, for every subject who got this combination of story type and manipulation, there was another subject who read the No-Quote versions of the national, international, and local stories and the Quote versions of the sports, business, and entertainment stories. Six different combinations of story type and manipulation were created such that equal numbers of subjects read the Quote and the No-Quote versions of each of the six news stories.

**Dependent Measures.** Content perception was the main dependent variable in this study. This was operationalized in terms of subjects' ratings of credibility, liking, quality, and representativeness of the news story.

All measures were in the form of adjectives so that subjects could easily rate characteristics of news stories on a Likert-type scale.

The following six measures comprised the credibility variable in this study: Accurate, Believable, Biased, Fair, Objective, and Sensationalistic.

The following five adjectival measures were used to measure subjects' liking for a news story: Boring, Lively, Enjoyable, Interesting, and Pleasing.

The following battery of five measures was used for assessing news story quality: Clear, Coherent, Comprehensive, Concise, and Well-written.

The following five measures comprised the representativeness variable in this study: Disturbing, Important, Informative, Relevant, and Timely.

In all, 21 measures were used to capture the four areas of news perception in the study. These measures were in the form of adjectives placed at the left-hand side of a 10-point scale anchored between "Describes Very Poorly" and "Describes Very Well".

**Procedure.** An online site was established on the World Wide Web especially for this experiment. The experiment was conducted in a journalism laboratory which had eighteen Macintosh computers with access to the internet.

When subjects arrived at the lab, all monitors displayed the first screen of "Online News." They were told they would be "reading news stories online and responding to questions in the booklet" given to them.

Since the experiment was administered in groups, the experimenter directed subjects through the procedure, one segment at a time. That is, subjects were instructed to work at their own pace, but were asked to read one story only or fill out one questionnaire only, then turn to the separation page and wait for further instructions to continue.

Upon reading the first screen, they were instructed to click on the underlined text (hyperlink) that took them to the first story—a national news story. They were asked to read the story within the next three minutes. After everyone finished reading the national story, they were directed to turn to page 6 of their booklets and answer questions about the national story they
had just read. Page 6 contained the battery of dependent measures used in this study. The instruction at the top of the page read, “For each word below, please CIRCLE THE DOT to indicate how well the word describes the national news story you just read.” This was followed by the list of twenty-one adjectives used as dependent measures in the study.

This procedure was repeated for the international, local, sports, business, and entertainment stories. After respondents finished answering questions about the last story, they were asked to furnish some personal information for the purpose of making payments. Questionnaire booklets were then collected from all respondents. They were debriefed, thanked for their participation, and dismissed.

**Data Analysis.** The measures comprising each of the four areas of news perception were correlated and checked for internal consistency (multiple-item reliability). Indices were then created by summing the measures under each area. All measures under a given index were weighted equally. Indices were computed for each of the six stories separately. In order to control for differences between the six story types, the mean score of all subjects for each of the six story types on a given index was subtracted from every subject’s score for the corresponding story types on that index. For example, if the overall mean score (all subjects combined) on the credibility index was \( x \) for the national story, \( y \) for the international story, \( z \) for the local story, \( p \) for the sports story, \( q \) for the business story, and \( r \) for the entertainment story, and a subject’s score on the credibility of national story was \( n \), the credibility of international story was \( i \), of the local story \( l \), of the sports story \( s \), of the business story \( h \), and of the entertainment story \( e \), then that subject’s rating of the national story on the credibility index was given by \( n-x \). Similarly, the subject’s credibility rating for the international, local, sports, business, and entertainment stories were given by \( i-y \), \( l-z \), \( s-p \), \( h-q \), and \( e-r \) respectively.

For each of the four indices, two means were computed for every subject: one was the average of the subject’s ratings on the three news stories with quotations, and another was the average of the ratings on the three stories without quotations. Thus, each subject had two lines of data instead of six. The two lines referred to the two levels of the within-subjects quote manipulation in this experiment. This reduced the 288-row dataset to 96 rows.

The indices were first used as dependent variables together in a multivariate analysis of variance. They were then entered, one at a time, in a series of repeated-measures analyses of variance. Results of these analyses were examined for significant differences on the four indices as a function of the presence of quotations in news stories.

The measures comprising each of the four indices had highly acceptable levels of internal consistency. The multivariate analysis of variance, using all four algorithms (Wilks, Pillai, Hotelling and Roy), showed a significant effect for the quote manipulation, \( F(3,45) = 11.63, p < .0001 \).

When the repeated-measures analysis was run with the Credibility index (Cronbach’s \( \alpha = 0.84 \)) as the dependent variable, the quote manipulation showed a significant effect, \( F(1,47) = 40.46, p < .0001 \). News stories with quotes were perceived by subjects as being significantly more credible than the same news stories without quotes (See Figure 1 for means on a 10-point scale).
When the Liking index (Cronbach’s $\alpha = 0.83$) was used as the dependent variable, no significant difference as a function of quotations was observed, $F(1,47) = 0.15, p = 0.7$.

With the Quality index (Cronbach’s $\alpha = 0.86$) as the dependent variable in the analysis of variance, the quote manipulation was significant, $F(1,47) = 23.66, p < .0001$. Subjects rated news stories with quotes significantly higher in quality than the same stories without quotes (See Figure 1).

The quote manipulation did not show a significant effect on the Representativeness index (Cronbach’s $\alpha = 0.78$), $F(1,47) = 0.00, p = 0.93$.

In summary, results from data analyses indicate that the presence of quotes in online news stories enhances the perceived credibility and quality of the stories. However, it does not seem to influence the perceived representativeness (or newsworthiness) of the stories. Nor does it seem to affect readers’ liking for online stories.28
The experiment yielded significant differences in readers’ perceptions of online news content as a function of source attribution. Moreover, the findings were clear and unambiguous, with differences showing up as either extremely statistically significant or extremely insignificant.

As mentioned in the literature review, journalism research abounds with conflicting findings about the effects of quotations. This is perhaps due to the absence of clearly explicated dependent variables. Most studies seem to use single questionnaire items instead of psychologically relevant composites as dependent measures. In contrast, the present investigation employed four highly reliable indices as dependent variables. Furthermore, the experiment used a strong within-subjects design that not only had a large sample of subjects but also a wide variety of story types, adding to the generalizability of its findings.

The study reported in this article found that quoted sources clearly mattered on two out of the four areas of news perception. Highly significant effects for the quote manipulation were obtained on Credibility and Quality, but not on Liking and Representativeness (See Figure 1). Receivers estimated the credibility and quality of stories with quotations to be significantly higher than identical stories without quotations. That is, they found the stories with source attribution to be significantly more believable and objective than comparable news stories with identical content but without source attribution. They also rated the writing caliber of stories with source attribution to be significantly superior to identical stories without source attribution. However, they did not seem to think that quotations made a difference to either the representativeness of – or their liking for – news stories.

First and foremost, these results confirm that journalists’ preoccupation with getting quotes for news stories is a psychologically valid concern. More important, they dissect the perceptual effects of source attribution and pinpoint the areas in which quoted sources have an effect and areas in which they do not seem to have any effect. In confirmation of Hale’s finding, the present study shows that the perceived credibility of a news story is significantly enhanced by source attribution. Similarly, the lack of a significant effect of source attribution on the representativeness index parallel findings reported by Weaver and colleagues. Furthermore, the present study extends previous results by demonstrating the effect of source attribution upon perceived quality of news stories. It appears that judgments relating to writing quality of a news story – such as clarity, comprehensiveness, and coherence – are significantly influenced by the presence of quoted sources in the text of the story.

While the findings from this study clarify previously ambiguous results with quote effects in journalism research, they also showcase the importance of sources in online news. The results with the credibility and quality indices imply that tidbits of news delivered via the computer screen are not all processed in a cyber-haze but attended to as deliberately as news stories printed in a newspaper. It appears that online users do notice quotes in news stories transmitted digitally, and actively use them in evaluating story credibility and quality.

A clear practical implication of this finding is that poorly sourced stories on the internet will be evaluated negatively by readers. Given the ease of digital publishing, online news sites often carry developing stories without complete and thorough source attribution. The present investigation sug-
gests that such breaking stories, without appropriate source attribution, will not be taken seriously by readers.

On another level, the findings hold implications for internet clipping services as well as for the new practice of "framing," whereby one website displays content from another site. Although the new medium makes it technologically simple for sites to display content gathered from a wide variety of sources, online publishers still need to invest in careful gatekeeping practices in order to be evaluated positively by their readers.

While the findings with credibility and quality highlight the importance of source attribution in online news, those with liking and representativeness suggest that readers' affective reactions as well as their judgments of newsworthiness are unaffected by sourcing. This implies mixed evidence for the "I-read-somewhere-that" phenomenon. Although readers may adjust for the veridicality of the information based upon source attribution, it is likely that news received from various online means will be forwarded, both literally and figuratively, to other consumers based on factors external to source attribution—factors such as perceived enjoyability, liveliness, importance, timeliness, and relevance. The present study suggests that these perceptions of incoming news stimuli are independent of source attribution, and hence raise significant concerns for publishers committed to serious journalistic practice on the internet. For, it is conceivable that a piece of information, which is lively and timely but which lacks appropriate verification or source attribution, may be quickly transmitted across the world with a few key strokes, resulting in rumor masquerading as news.

On the other hand, there might exist individual differences amongst online users, whereby experienced individuals are significantly more attentive to sourcing than novice users, even in matters of liking and representativeness. Just as Culbertson and Somerick found that those who preferred print media over other media showed greater attentiveness to sources in print news stories, future research with online news may discover an "online-orientation" in some subjects and respondents that predisposes them to factor source attributions into all their perceptions of incoming news stimuli. Future research may investigate whether some individuals, more than others, display a strong preference for—and/or dependence upon—online media (as opposed to traditional media) and whether this orientation dictates aspects of their cognitive processing of news, specifically news sources.

Future research might also consider rectifying an important methodological limitation of the experimental stimuli used in the present investigation. In an effort to keep the information content constant between the two conditions, the quotation marks and the accompanying attributions to sources were simply removed from the Quote version of every news story to create the corresponding No-Quote version. That is, the language of the quoted remarks was not changed for the No-Quote version save for minor transitionary phrases. This meant that some sentences which would be appropriate in a news story only when enclosed in quotation marks appeared in the No-Quote version without any attribution. This might have made the news story read like an opinion article because the sentences with quotation marks removed would presumably be attributed to licentious writing on the part of the journalist. Subjects in the experiment might have been reacting to this perceived editorializing on the part of the writer when they made their evaluations, and not really responding to the absence of source attribution.
Future research should attempt to create news stories, whose Quote and No-Quote versions do not differ in any way other than the presence and absence of quotation marks (and the accompanying source). This may be difficult because news stories without strongly opinionated quotations are not interesting enough to read. Another line of study could investigate if the presence of quotations in non-news stories, like editorials and opinion columns, influences receivers’ ratings of credibility and quality. A third solution would be to employ stimulus sampling by comparing an exhaustive sample of stories with quotes with an equally large but different sample of stories without quotes.

All these suggestions are for small-group experimental studies similar to the one reported in this article. Results from such studies should be interpreted by keeping in mind that experiments typically use small, homogeneous samples and hence have limited generalizability. Clearly, more research on the effects of source attribution with larger, nonstudent populations is required to extend the external validity of the findings reported here.

NOTES

1. Noted journalist Pierre Salinger claimed that the U.S. government was covering up the TWA crash investigation because he found pictorial evidence in various internet sites which suggested that a U.S. Navy missile shot down the commercial aircraft. After many months in the media spotlight, this theory behind the crash was dismissed when the evidence turned out to be false. Similarly, many stories relating to President Clinton’s sex scandal in early 1998 broke on the internet (and was enthusiastically disseminated by mainstream media) but were later proven to be false.


7. Ralph S. Izard, Hugh M. Culbertson, and Donald A. Lambert, Funda-


22. Amos Tversky and Daniel Kahneman, “Judgment Under Uncertainty:


24. In order to measure gatekeeper effects for an unrelated study, a fourth of the subjects were told that the news stories were selected by news editors, another one-fourth were told that they were selected by the computer terminal, yet another one-fourth were told that they were chosen by other members (or users) of the online news service, and the final one-fourth were given a pseudo-selection task leading them to believe that the stories were chosen by themselves. Since this gatekeeper manipulation did not interact significantly with the independent variable on any of the dependent variables, it will not be discussed in this article.

25. One can imagine a third condition wherein the quotation marks are removed but the source attribution is retained. Since this study attempted to study the effects of quoted sources and not quotation marks per se, it was decided not to include this possible third condition in this study.


27. For ease of interpretation, all four indices were reduced to ten-point scales.

28. Means (with standard deviations in parentheses) on the four indices for the two conditions are as follows:

<table>
<thead>
<tr>
<th>Source Attribution</th>
<th>Credibility</th>
<th>Liking</th>
<th>Quality</th>
<th>Representativeness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quote</td>
<td>6.51 (1.48)</td>
<td>4.48 (1.77)</td>
<td>6.24 (1.64)</td>
<td>5.18 (1.90)</td>
</tr>
<tr>
<td>No-Quote</td>
<td>5.47 (1.89)</td>
<td>4.40 (1.71)</td>
<td>5.25 (1.98)</td>
<td>5.20 (1.70)</td>
</tr>
</tbody>
</table>

29. Hale, "Unnamed News Sources."

30. Weaver, Hopkins, Billings, and Cole, "Quotes vs. Paraphrases."


32. A case in point is the enormous circulation enjoyed by under-sourced stories in The Drudge Report, an internet publication run by Matt Drudge, a self-acknowledged scandal monger who uses a wide variety of internet tools (e-mail, listserv, websites) to quickly circulate celebrity and political gossip.

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Regardless of whether his stories eventually turn out to be true or false, they are widely discussed in television talk shows and newspaper columns in the meantime. Many stories in the Drudge Report have later been declared false. Drudge’s most notorious gaffe was a story which claimed that a senior White House official was charged with spousal abuse, a story that he was forced to retract publicly.

33. Culbertson and Somerick, “Variables.”