WEB DESIGN’S EFFECT ON PERCEIVED CREDIBILITY OF ONLINE NEWS STORIES

By

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This thesis is dedicated to Alison Burgess, my wife-to-be and best friend, who kept me sane though all of this.
ACKNOWLEDGMENTS

I thank my committee for being patient and available despite more pressing matters and time constraints. I also thank my parents, who instilled in me a dedication and pride in my work.
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Abstract of Thesis Presented to the Graduate School
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WEB DESIGN’S EFFECT ON PERCEIVED CREDIBILITY OF ONLINE NEWS STORIES

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This study used a post-test only experimental design to investigate Web design’s effect on perceived credibility of online news stories. Eighty-seven University of Florida students, ages 18 to 37, were randomly assigned to read one of three variations of a Web page. The stories on the page were the same, but the designs varied by level of adherence to design principles and elements. The study failed to reject the null hypothesis that “there will be no significant difference in the perceived credibility of news stories placed on well-designed Web pages and news stories placed on more poorly designed Web pages.” This is important because it runs contrary to the literature and suggests that, on the Internet, people may not pay much attention to such peripheral cues. However, when the best page design was compared to the poorest page design, there was a significant difference in the perceived credibility score of the stories.
CHAPTER 1
PURPOSE

With the growing concern in society about media credibility, it is imperative that the components that affect this credibility be studied. Our study addressed the component of design. Design is a part of a growing sector in society with its attachment to online news in the form of Web design. The number of people who get their news from traditional sources is shrinking, but the number getting news from the Internet is growing (Project for Excellence in Journalism, 2001). Despite the growing number of newspapers that syndicate their message and information via the Internet, few studies exist that examine the relationship between credibility and page design of news Web sites (Xigen, 2002). With more than 4,000 newspapers online in the United States alone (NewsLink, 2000), this lack of knowledge makes studying that relationship critical. In journalism, credibility is paramount as varying news organizations vie to produce the best product and attract the largest audience. An old adage is that all journalists have is their credibility. News organizations are the same way. The most important attribute for any news organization is its credibility, for as Duke University Professor Susan E. Tifft said, “Unless news consumers are confident they are getting the news they need, presented with fairness and balance, they will find other ways to keep abreast of current events.” (2000, 4)

A news product’s credibility also can dictate decisions about content selection when an audience member is inundated with information (Abdulla, Garrison, Salwen, Driscoll & Casey, 2002), meaning that audience members who are presented with more
information than they can handle will choose which information to process based on their perceived credibility of the individual information sources. Credibility also ultimately may determine the success or failure of a particular medium (Abdulla, et al., 2002). Tifft (2000) mentions substance as influencing the perceived credibility. But what about style? Could the design of a news Web site affect the perceived credibility of the substance?

According to a 2001 Pew Research Center study, approximately 104 million American adults have access to the Internet. Surveys done in 2000 show that 6.9 million individuals got their news from CNet.com, 4.9 million went to ZDNet.com, and 4.5 million went to Pathfinder.com (host to Time.com). Approximately 6.7 million people visited MSNBC.com, 4.5 million went to CNN.com and 3.2 million went to ABC.com (Smith, 2000). By March 2000, about 52 million Americans (60% of Internet users) had gone online for news. By October 2002 that figure had increased to 82 million (70% of Internet users). One-fourth of the Internet population goes online daily to get news (Pew Research Foundation, 2001). With such growth, the people running these online news companies need to know how to maximize the credibility that is perceived by this audience.

Since newspapers began being printed, the industry has invested time and consideration into the appearance of its product, and the design principles for presenting an informative message have evolved throughout U.S. history. *Public Occurrences* debuted in the 17th Century as America’s first newspaper. It resembled a book rather than today’s broadsheet. Soon after the American Revolution, dailies appeared, bringing in some new elements of design. The columns became thinner, headlines began to emerge, and advertisements made their first appearance. In the 19th Century, long
columns with vertical rules between columns became popular in almost all newspapers. Newspapers also began to give headlines more space (Harrower, 2002).

A photograph first appeared in a newspaper in 1880, but photographs did not become common until the 1900s. About this time, headlines again became more prominent, and the long decks that had prevailed in the 19th Century were eliminated. Later, papers began using more photographs and moved from as many as nine columns to the present standard six-column page. Also, the rules that ran between the columns were replaced with white gutters. By the 1980s, color photographs had become standard (Harrower, 2002).

Today’s papers are dominated by color, informational graphics, packaged roundups, and modular layout (with all elements rectangular in shape). As for typology, the most common combination is a sans-serif font for headlines and serif fonts for body type, and both generally run flush left. Anchoring reoccurring sections (such as an index) in one spot in every edition also is considered good design (Harrower, 2002).

Like the print editions of newspapers, online news products have some sort of design plan that determines the appearance of information included on the site. In the context of online news, discovering whether the design affects the credibility of the news will help editors and publishers better address some questions that affect the news organizations’ success on the Web. Will the design affect the credibility the audience perceives regarding the news site’s content? Our study will be designed to help to answer that question directly.
CHAPTER 2
LITERATURE REVIEW

For a theoretical framework, this study uses the source credibility theory laid out by Hovland et al. (1953), who identified perceived trustworthiness and perceived expertise as the main dimensions of a source’s credibility. Hovland theorized that a source that is perceived to have higher trustworthiness and expertise will lead to readers or viewers giving more importance to information coming from that source. This theory has been narrowed into three models. The model of interest for this study is the factor model, which helps determine to what extent the receiver judges the source as credible. One peripheral cue that falls into this model is the attractiveness of the source (Pederson, Wright & Weitz, 1984). In this study, design will be a peripheral cue, representing the source’s (the Web page) attractiveness.

Credibility is a trait media outlets strive to have audiences associate with their news products. Credibility is a major criterion on which audiences judge a medium or a source (; Bruzzone & Tallyn, 1997; Kiousis, 2003; & Rodriguez, 1995; & Van Der Weyden, 1997). Online news products have been perhaps the least studied in regard to credibility. However, with the expansion of computer mediated communication (CMC) and the increasing popularity of the Internet as a source of news, it is clear that news organizations need to understand the factors that affect online news credibility (Kenney, Gorelik & Mwangi, 2000; Meyer, 2000).

In 1995, there only were a handful of online newspapers (Pew Research Foundation, 2001). The latest figures indicate that 90% of the United State’s 1,400 dailies
have an online edition (Singleton, 2003). Given that producing an online edition of a newspaper can be as much as 400 times cheaper than producing the hard edition, that number surely will rise. A concurrent rise in the percentages of people using online sources for news also seems highly likely. With such an increase in use comes a greater need to understand how the U.S. population judges the credibility of online news. In 2001, Kiousis also conducted survey research that indicated that online stories rated ahead of television but behind print newspapers in perceived credibility. Flanigan and Metzger (2000) found similar results.

**Credibility and Design**

There is very little literature concerning how the overall design of a single Web page affects its credibility. Most research that has been conducted has examined individual elements of design, such as navigation, interactivity, and links. The literature on credibility branches into two overlapping categories: studies focused on source credibility and studies examining medium credibility (Kiousis, 2001). Source credibility studies have examined how characteristics of a communicator affect how a message is perceived and processed by the receiver or receivers (e.g. Austin & Dong, 1994; Hovland, Janis & Kelley, 1953; Hovland & Weiss, 1951). Medium credibility studies have examined the channel through which the message is delivered (e.g. Kiousis, 2001; Johnson & Kaye 1998; Newhagen & Nass, 1989; Slater & Rouner 1996). The two branches are not distinct (Kiousis 2001), and therefore, both need to be reviewed.

**Source Credibility**

The study of perceived credibility extends back to long before the Internet was even conceptualized. Although not addressing design or online news, Hovland and Weiss (1951) found that a source’s trustworthiness significantly affected acceptance of the
message. Some of the concepts found to affect credibility include fairness, justifiability,
and accuracy (Hovland, Janis & Kelley, 1953). Berlo, et al. (1970) rejected these
findings, claiming that source credibility is multidimensional. Berlo, Lemert, and Mertz
(1970) instead proposed three dimensions for source credibility: safety (the
trustworthiness of the source), qualifications (to disseminate information about the
subject), and dynamism (gestures and movement). Around the same time, Whitehead
(1968) claimed that competency and objectivity had to be included in the dimensions of
source credibility.

After these studies, many others were conducted with different variables to
examine the components of source credibility. Slater and Rouner (1996) found that
message quality (how well the message was delivered), bias (perceived from the
messenger), and prior knowledge (the messenger has on the subject) all affected
perceived credibility. In more contemporary studies, dynamism has been added to the list
of dimensions believed to affect perceived credibility. When the receiver of a message
perceives the message as highly dynamic, the receiver’s perception of source credibility
rises (Hamilton, 1998).

Medium Credibility

In a study examining political campaigns on the Internet, Johnson and Kaye (1998)
used an online survey asking questioners to rate medium credibility based on Meyer’s
scale, which used dimensions of fairness, bias, depth, accuracy, and trustworthiness.
They found that information about political candidates on the Web was perceived to be
just as credible as information on television and slightly more credible than that in
newspapers, thus supporting some of the earliest findings on medium credibility by
Westley and Severin (1964). Their study revealed that the medium through which the
message was delivered affected perceived credibility. And while Johnson and Kaye found online media to be perceived as slightly more credible than newspapers, Kiousis (2001) found that newspapers were perceived as most credible, with online second, followed by television. These findings replicated the results of previous scholars (Gaziano & McGrath, 1986; Newhagen & Nass, 1989).

That being said, there was not a large difference in the amount of perceived credibility in any of the three types of media. Flanigan and Metzger (2000) operationalized credibility as a multidimensional concept consisting of believability, accuracy, trustworthiness, bias, and completeness in their survey study of more than 1,000 undergraduates. They found that people consider information obtained online to be as credible as television, radio, and magazine information, but not as credible as information in newspapers.

Austin and Dong (1994) found that message judgments were more strongly associated with overall assessments of credibility as opposed to judgments about the source. Thus, they added the dimension of believability or the perception of how much the apparent reality accurately reflects facts of the social reality. Sundar (1999) analyzed readers' ratings of a wide variety of news and found that audience members use at least four dimensions in their perception of printed and online news stimuli: biased, fair, objective, accurate, and believable.

Recent research has not looked at design and credibility but has combined design with other factors. In a qualitative study, Rieh (2002) conducted in-depth interviews with subjects on how they rated the information quality of Web sites. Based on content analysis of the interviews, five facets emerged from the participants: goodness, accuracy,
currency, usefulness, and importance. The subjects evaluated sites based on information objects (type, title, content, organization, structure, presentation, graphics, functionality), and characteristics of the source (URL/Internet address/domain, type of information presented on the source, reputation of the Web site, one-collective, author/creator credentials). These findings built on Rieh’s previous research (Rieh & Belkin, 1998), which found institutional sites, such as those run by corporations or businesses, to be perceived as more credible than individual sites, meaning sites run by one individual or a few individuals. This raises the question of why organizational sites were perceived as more credible. Aside from an established name, could design elements, such as typography, color and proximity, have affected the results?

Just as there is debate on what dimensions go into evaluating source credibility, a similar debate has taken place involving medium credibility. Two of the most popular indices used to evaluate medium credibility are those from the studies of Gaziano and McGrath (1986) and Meyer (1988); their research demonstrated that ratings of fairness, bias, depth, accuracy, and trustworthiness influence overall medium credibility. Through factor analysis, Gaziano and McGrath (1986) found one dominant factor of news credibility. However, Meyer (1988) argued that their scale gauges both believability and community affiliation, not just one dominant factor. West (1994) examined the reliability of both models and concluded that both scales gauged more than one factor and that Meyer's believability dimension was reliable, but the community affiliation dimension was not reliable. A more recent study, which assessed the credibility of online health information, indicated that audiences’ perceptions of accuracy, believability, and factualness are the key influences on perceived credibility (Eastin, 2001); these findings
were consistent with the results of previous research (Gaziano & McGrath 1986; Johnson & Kaye, 1998; Meyer 1988).

**Message Credibility**

A third and less studied credibility topic concerns the perceived credibility of a message itself (Kiousis 2003). Sundar and Nass (2001) studied such credibility when they measured peoples’ perceived credibility of online news stories instead of having them rate the credibility of the Internet as a whole or examining the credibility in terms of the writer (source).

Sutherland and Sethu (1987) used television commercials that employed humorous appeals for familiar as well as unfamiliar products with the straight versions created by removing the humorous components of the commercials. Their results indicated that humor, a component of the message, had no affect on message credibility. Perman and Henley (2003) examined message credibility by measuring drug users’ responses to anti-drug campaigns. They found that messages with the most credibility stressed that not using drugs would help drug users to avoid harm. In these cases, the researchers are not focused on how the channel (medium) or the disseminator (source) is seen in terms of credibility. Instead, message credibility focuses solely on the message itself.

This procedure is similar to what this study will examined; participants were not asked to compare the Internet to any other medium, and the source of the news stories will be identical.

**Design**

No study has adequately defined what good design means, especially in regard to Web design. Conceptually and in general terms, good Web design is visually pleasing and easy to navigate (Ramon, 2000; Champ, 2004; Midwest New Media, 2004; Garcia,
In Xigen’s (2002) study examining five major U.S. newspapers, analyzing design and informational retrieval, the scholar calculated an efficiency score for each newspaper based on “key aspects of Web design” (2002, p 42). However, the scholar does not divulge exactly what those key aspects are. Instead, Xigen broke Web design into two dimension: presentation and navigation. He separated presentation into graphic, textual, and balance characteristics. Schierhon et al. (1999) stated that design was “the appearance or ‘look’ of the pages, headlines, photos, artwork, graphics and text of the newspaper in its various formats” (p. 6). In terms of design preference, Schierhon et al.’s (1999) survey of 184 undergraduates produced mixed findings, but the researchers concluded that online news readers prefer a vertical layout to a horizontal layout.

Another aspect of good design is balance. This means varying the size of photos and text to keep a balanced look to the page. At the same time, emphasizing what is important is considered good design. The more important stories, elements or photographs should be displayed larger and nearer to the top of the newspaper page. While having art adds to the overall appearance of a story, no graphic elements should be placed in the middle of a leg of type (Harrower, 2002).

Newspapers began to jump on the Internet bandwagon in the early 1990s, and while some new elements were added, many of the same design principles used to lay out a newspaper were carried over into the online editions (Harrower, 2002). One design element that has been eliminated in online news is using multiple legs of type. While print newspaper stories many times span more than one column, putting the story in one column on a Web site is considered better design, as is adding more white space between story components (Harrower, 2002). Rules for the use of modular design, photos,
headlines, and balance carry over from newspaper design (Navarro, 2001; Lynch & Horton, 2002). It also is recommended that designers should avoid placing advertisements close to the flag or title of the newspaper (Harrower, 2002). As for text of a news story online, the most common design principle is to use black text on a white background (Harrower, 2002). Design experts generally discourage underlining text except for hypertext links. Design recommendations for type face follow rules similar to those for print news publications. Sans-serif is best used for headlines and short bodies of text, a serif type is best used for long bodies of type (Harrower, 2002; Williams & Tollett, 2000), and no more than two or three font families should be used on a page (Lie & Bos, 1999).

Williams and Tollett (2000) highlight four basic principles of good Web design: alignment, proximity, repetition, and contrast. Alignment refers to the notion that all the elements on the page should have the same alignment: either flush right, flush left or centered. Proximity is the physical closeness two elements share on a page. For example, if there is a subhead that reads “The survivors,” the block of text that accompanies that subhead should be physically closer to that subhead than to any other element on that page (Navarro, 2001). Repetition is similar to consistency in that the design from one page to the next should be related (Lynch & Horton, 2002). Repetition also can refer to a pattern of items, such as bullets, on a single page (Navarro, 2001). Contrast helps in creating a hierarchy of importance (Williams & Tollett, 2000), drawing an audience member’s attention to a certain element (Navarro, 2001; Lynch & Horton, 2002). This is similar to Harrower’s (2002) idea of a dominant element. In essence, the experts recommend that the most important information, such as a headline, be displayed more
prominently than the lesser information, such as the body text. Designers should not use blocks of type that stretch from one side of the screen to the other or design pages that require scrolling horizontally to see the entire content (Williams & Tollett, 2000; Lynch & Horton, 2002). Vertically, a Web page should not contain more than one or two screens’ worth of information (Lynch & Horton, 2002). The type of quote marks and apostrophes used also can affect the design appearance of a Web site (Williams & Tollett, 2000). Straight vertical marks ("" ') are considered less professional, while curved marks (“” ‘) improve the design appearance of a Web page (Williams & Tollett, 2000).

Web designers have the option of making their page layout with relative-width columns or fixed-width columns. Relative layout means that the site will adjust the size of certain elements proportionally to match the size of users’ windows. This style is more flexible (Niederst, 2001). Fixed-width design means that the elements on the screen stay the same size no matter what the users’ display is set up to be. Fixed-width columns give designers more control and predictability, (Niederst, 2001) and are used more widely on news sites. Fixed-width design also helps control the number of words that appear on a line. For ideal design, there should be 10 to 12 words per line (Lynch & Horton, 2002).

Because no research has examined explicitly what good design is and what poor design is, it is necessary to examine all these principles to create a survey of what design principles make up good design. Again, good design is largely subjective and can vary over time, but generally good design is visually pleasing and easy to navigate (Ramon, 2000; Champ, 2004; Midwest New Media, 2004; Garcia, 2004). However, navigation does not enter this study since participants were instructed not to use the navigational components of the design.
Web design standards are largely subjective, but there are sets of rules that a page should follow to be considered well designed (Garcia, 2004). Garcia (2004) breaks these sets into elements -- the ingredients for good design -- and principles, the recipe or set of instructions that help organize the elements. Garcia’s list of elements includes shape, space, line, size, color, pattern, value, and typography. The list of principles includes unity, hierarchy, proportion, scale, balance, repetition, proximity, and emphasis.

Unity refers to using shape, color and pattern in a predictable way. Individual items should share similar colors, themes or shapes; all photography should be used in the same manner, such as using all rectangular borders or all elliptical borders, and elements should be repeated throughout the site. Hierarchy is similar to what Harrower (2002) calls balance. Hierarchy refers to using size and weight of both graphic elements and type to indicate importance of the stories and photos. Proportion refers to “how the elements of the design interact and relate with both each other and the canvas for which you are designing” (Garcia, 2004, ¶14), including margins and page location within the browser. Scale is how well the elements in a design are sized relative to each other. For instance, having graphics of varying sizes in a navigational bar would violate this principle (Garcia 2004). Garcia (2004) breaks down balance into symmetrical balance, asymmetrical (or dynamic) balance, and radial balance. Symmetrical balance is used when the design needs to be more conservative and orderly (Garcia 2004), such as the design of most online news sites. Repetition refers to the consistency of elements from page to page. Proximity is the logical placement or space that exists between elements on a page (Garcia 2004). This principle says items that are of the same unit should be grouped closer together than unrelated or less related items. Emphasis is using one of the
elements or principles to create focus points. This can be achieved by bolding text, varying a pattern, adding space around the element, or making an element larger, as well as other techniques.

Table 2-1. Design Principles

<table>
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<th>Principle</th>
<th>Meaning</th>
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<tr>
<td>Emphasis</td>
<td>Using one of the elements or principles to create focus points.</td>
</tr>
<tr>
<td>Proximity</td>
<td>The logical placement or space that exists between elements on a page</td>
</tr>
<tr>
<td>Repetition</td>
<td>The consistency of elements from page to page</td>
</tr>
<tr>
<td>Balance</td>
<td>The appearance of evenness on the page</td>
</tr>
<tr>
<td>Scale</td>
<td>How well the elements in a design are sized relative to each other</td>
</tr>
<tr>
<td>Proportion</td>
<td>How the elements of the design interact relative to other elements</td>
</tr>
<tr>
<td>Hierarchy</td>
<td>Using size and weight of both graphic elements and type to indicate importance of the stories and photos</td>
</tr>
<tr>
<td>Unity</td>
<td>Using shape, color and pattern in a predictable way</td>
</tr>
</tbody>
</table>

As mentioned earlier, according to Garcia (2004), elements are the tools that are used to achieve the aforementioned principles. Shape is basically anything that has a height and a weight such as an oval, square, star, or polynomial. Space is the amount of room between one or more objects. Lines are shapes but with no depth and could be used for such things as creating a sense of direction, bordering a photograph, connecting information, or delineating shapes (Garcia, 2004). Size is how big or small an item is. Pattern is the arrangement of items to give the illusion of visual texture, usually to create emphasis. Value refers to how light or dark the tone of an item is. This is usually used to create emphasis, create form and aid in unity (Garcia 2004). Typography is the use of type: font-family, weight, height, point size, etc. Color, determined by the RGB color model, is the coloring of the characters used in the text.

The literature mentions that certain aspects of a source or a medium can affect perceived credibility. Dimensions including fairness, bias, depth, accuracy, and trustworthiness exist for measuring credibility (Meyer, 1988). Because the literature on
design says that if the principles of good design are followed, the final product will appear more “professional” and those that do not will look “amateurish,” it is hypothesized that a news story on a well-designed Web page will be perceived as more credible than the same story on a poorly designed Web page.

**H1:** News stories on well-designed Web pages will be perceived as significantly more credible than the same stories on more poorly designed Web pages.

Specifically, will the median credibility score for the stories directly increase with the level of design (poor, medium, best) on which they are placed?

Studies of Web design have traditionally focused on usability, graphics, appeal, and download time. This study examines Web design as it relates to credibility. The study can become a tool for future research as well as reveal some unknown effects of Web page design.

**RQ1:** How much does Web design affect the perceived credibility of an online news story?

One of the concerns about this study is that the participants’ level of experience with the Internet, design and Web sites will vary. The literature does not specifically say that a participant with heavy Web design experience will judge such credibility more harshly, but intuition would say that such a participant would at least be more aware of the design aspect of the pages’ these stories are on.

**RQ2:** Will the page design have more affect on the perceived credibility of a news story for participants with previous experience in areas of design or the Internet?
CHAPTER 3
METHODS

This was a between-subjects posttest-only design with no control. This study asked University of Florida students to read two stories from the Minneapolis Star-Tribune. The design of the pages was altered to create three variations of the original. The participants were put in a lab setting and randomly assigned a design and one of the two stories. After reading the first story, participants were instructed to read story they did not read first. Both stories were placed on the same design variation.

Participants

A total of 87 undergraduates from the University of Florida’s College of Journalism and Communications were used to construct three groups. Participants were randomly assigned to one of three conditions. The students were recruited from MMC 2100, Writing for Mass Communication, and JOU 3101, Reporting, and represented the following majors/specialties: Advertising, Journalism, Online, Editing, Telecommunication, Magazine and Feature Writing, and Public Relations. Students are a convenient and non-representative subset of the adult population, but they do represent the largest population of Internet users (Eastin, 2001).

Materials

The participants were asked to read two online news stories from startribune.com, the Minneapolis-St.Paul Star-Tribune’s Web site. The Star-Tribune was chosen because it is a respected newspaper with a Web site that known in the media industry. However, it is not like The New York Times or other nationally prominent newspapers that carry a
wide stereotype. One story, “How public should public records be?,” was about the openness of public records in Minnesota and was published February 4, 2004. The second story, “Arson behind fire at Maplewood home,” concerned a fire that could be connected to previous fires in the area and was published April 27, 2004. The writers’ names were changed to gender-neutral names to avoid any stereotypes on the part of the participants.

Students viewed the stories on computers in a computer lab. The order the two stories were presented to the student was randomized. Participants viewed both stories in the same design variation. For example, both were viewed in the middle design, both were viewed in the poorly designed variation, or both were viewed in the better designed variation. Each design variation was viewed at the same monitor setting, including a window size of 800 pixels wide by 600 pixels tall. All the variations were viewed on the same Web browser (Internet Explorer). The computers are Dell desktops.

**Design and Procedure**

A pretest was used to produce two variations of the original design. Three design experts rated the variations of the design of the Web page that contained the story. This ensured that one variation was more poorly designed than the original, and the other variation was better designed than the original. Participants viewed one of the three variations. Participants then rated the story’s credibility after they read it (See Appendix A for the rating scale used).

For the purposes of this study, a well-designed Web page was regarded as one that adheres to the principles mentioned in the literature discussed in Chapter 2. A poorly designed Web page was defined as a page that violates all the principles mentioned in the literature. The middle page adhered to some of the principles while violating others.
To create the poorly designed page, the researcher made several alterations to the original page that, according to the literature, would make the design worse. Starting with typography, the body type was changed from a serif type face to a sans-serif type face to decrease readability. The cell that contained the story was widened from 468 pixels to 700 pixels to make the blocks of type longer, which decreases readability and forces readers to scroll horizontally to read the text. The headline was decreased from 20 pixels to 13 pixels, matching the size of the body type. This violates the rule of hierarchy because the headline should be one of the most prominent elements on the page. The line-height or kerning was increased, and the margins were abolished for the paragraphs in the story. This placed all lines of text at an equal distance from the line preceding and following them, affecting the proximity of the text. Finally, the subheads were removed, which left long blocks of uninterrupted text. These long blocks of text were then unbalanced with the rest of the page.

With the element of size, two of the icons on the right side of the page were made larger than the ones around them. This violates the principle of scale because the icons varied in size.

Turning to color and value, the navigation bar, which started as two shades of blue, was made into the same shade of blue, thus violating the principle of unity. The background was changed from white to light gray, decreasing readability and violating the design rule that large bodies of text should have a white background.

The ruler that separated the byline from the published date was removed. Lines, as mentioned, are an element of design, and removing this one adversely affects the principle of emphasis.
For the element of space, the advertisement that was floating to the right side of the body text was changed so it broke up the text, which Harrower (2002) said should always be avoided. This also adds too much white space around the ad, affecting hierarchy by making the ad more prominent. The change also breaks the flow of the text.

The shaded borders running down either side of the story text were removed. These gave a raised appearance to the story, so removing them used the element of pattern to violate the principle of proportion.

Because the startribune.com Web page was professionally designed to begin with, the changes to the improved page were more subtle, yet there were some areas where the principles of design had not been utilized in the original page.

Considering the element of typography, all the " marks were changed to “ and “ marks and ’ marks were changed to ’ marks. Williams and Tollett (2000) said this makes a page appear more professional. Subheads were added to aid in repetition and balance as the first half of the story on the page with the best design had no subheads and the second half had two. The headline was changed from 18 pixels to 22 pixels to add emphasis and hierarchal importance to it. Finally, the links in the top navigation bar were bolded to enhance the principle of emphasis.

As for space, the margins on either side of the story were increased from 5 pixels to 10 pixels. The increase in margins separated the story content from the side links, aiding in the overall proportion of the page. Aside from more subheads being added, all the subheads were moved two pixels closer to the paragraph that the subhead was supposed to describe. Decreasing the space between the subhead and the paragraph makes it clearer that the two items are related, and, because the subhead is larger and in bold face type, it
becomes clearer that the subhead has importance, adding to the principle of hierarchy. Proximity is enhanced as well because the items are physically closer. Finally, the advertisement was moved farther down on the page. This decreases the space around the advertisement, giving it less hierarchal importance. Also, as Harrower (2002) said, the elements that are less important should be placed lower on the page. Finally, the side slug “Related content” was moved closer to the links it was supposed to represent, again reducing space and aiding in proximity.

Using the elements of color and pattern, the same slug had its background changed to match the color and background of the “Utilities” and “Search” cells. Having this repeating pattern aids both the principle of unity and the principle of repetition.

For lines, a simple line was added between the end of the story and the contact information for the writer. This line matches the one at the top of the page and creates the appearance of another module in the page. Matching modules enhances the page’s balance well, and matching lines enhances unity. The design principal of repetition was not applicable because the stories in this experiment used only one page.

The middle page maintained the straight quote marks and apostrophes. The body type was changed to sans serif. The headline size was decreased to 13 px but left aligned to the left. The line height and margins were unchanged. The icons were left at a consistent size. The navigation bar retained its two colors and was left in normal weight instead of being in boldface type. The background remained white. The advertisement was at the top of the story but did not break up the text. The shaded gutters were removed. The subheads were left equidistant from the paragraphs. Also, there were fewer
subheads on the middle page than on the better page. Finally, the body size was left the same, so participants were not forced to scroll horizontally.

Manipulating this many variables in a rather untraditional way confounds the variables and gives the researcher less control over the experiment. Another disadvantage is that the amount of manipulation decreases the internal validity of the experiment. However, by conducting the experiment in this manner, the manipulation is strong and more realistic as to the actual construction of a Web site. It also improves external validity because real stories would use a combination of these principles.

**Measures**

The dependent measure was perceived credibility of the news story. Many studies have used several different indicators when measuring perceived credibility of a media message (Gaziano & McGrath 1986; Meyer 1988). These studies indicate that credibility is a multidimensional construct (Eastin 2001). This study will use the same measures that were used in the Meyer (1988) study as well as indicators that Eastin (2001) used in his study on the credibility assessments of online health information: fairness, bias, depth, accuracy, and trustworthiness, believability and factualness. All are valid and reliable attributes used to measure perceived credibility of a message (Gaziano & McGrath 1986; Johnson & Kaye 1998; Meyer 1988). As with Eastin’s (2001) study, the indicators in this study will be measured with Likert-type items with scores ranging from 1 to 5 (see Appendix B). The independent variable the design.
CHAPTER 4
RESULTS

Of the 87 participants, 26% were male, 74% were female, and the mean age was 21 years. Participants ranged in age from 18 to 37. Of these, 72% were Caucasian, 9% were African American, 2% were Asian, and 10% were Latino.

The participants agreed with the researcher and design experts used in this study. Participants rated the site design significantly different \( x^2 (87) = 15.60, p = .048 \) when asked to compare it to other news sites they visited. Crosstab analysis revealed that when participants who viewed the poor site were asked if the site they viewed was better designed than Web pages of online news sites that they visit on their own, 55% disagreed or strongly disagreed. Of the participants who saw the mid-level design, 24% disagreed, 70% had no opinion, and only 6% agreed. While 24% of those who saw the best design also disagreed with the site, 51% had no opinion and 17% agreed with the statement.

After calculating the totals based on the six-item Likert-type scale, a One-way ANOVA was used to test the experimental hypothesis. Scores for each item ranged from 1 (lowest credibility) to 5 (most credible) with a highest score of 30 (most credible) and a lowest score of 6 (least credible). There were no missing data (Table 1).

<table>
<thead>
<tr>
<th>Table 4-1. Credibility Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
</tr>
<tr>
<td>----</td>
</tr>
<tr>
<td>Poor</td>
</tr>
<tr>
<td>Medium</td>
</tr>
<tr>
<td>Best</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>
The experimental hypothesis, “News stories on well-designed Web pages will be perceived as significantly more credible than the same stories on more poorly designed Web pages,” predicted a significant interaction between Web page design and participants’ perceived credibility of the news stories. This relationship was not supported \[F (87) = 2.80, p > .05\] (Table 2), so the null hypothesis that “There will be no significant difference in the perceived credibility of news stories placed on well-designed Web pages and news stories placed on more poorly designed Web pages” was not rejected.

Table 4-2. Analysis of Variance

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>DF</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>34.851</td>
<td>2</td>
<td>2.779</td>
<td>.068</td>
</tr>
<tr>
<td>Within Groups</td>
<td>526.75</td>
<td>84</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>561.60</td>
<td>86</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The interval-level scale measuring credibility ratings then was split on the median into “Low Credibility” and “High Credibility.” Using this scale, crosstabs revealed a significant difference \[x^2(87) = 5.85, p = .05\] in perceived credibility among the three design types.

The mean credibility score for the poorly designed site was 19.2(SD 2.25). The mean credibility for the middle site was 20.3(SD 2.9). And the mean credibility score for the site with the best design was 20.8 (SD 2.3).

An Independent Samples T-Test revealed that there was a significant difference \[t (87)=-2.54, p = .007\] (Test statistic \(t\) corresponding to the \(p\) value) in the perceived credibility from the poorly designed site to the best designed site (Table 3). There was no significant difference \((t (87)=-.701, p > .05)\) in perceived credibility score between the medium site and the best site, nor was there a significant difference \((t (87)=-1.516, p >\)
.05) in perceived credibility score between the poorly designed site and the medium site (Tables 4 and 5).

Table 4-3. Independent T-Test Best-Poor

<table>
<thead>
<tr>
<th>Sitenum</th>
<th>Mean</th>
<th>STD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newscale</td>
<td>Poor</td>
<td>19.275</td>
</tr>
<tr>
<td></td>
<td>Best</td>
<td>20.793</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>F</th>
<th>t</th>
<th>DF</th>
<th>Sig. (1-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>.118</td>
<td>-2.536</td>
<td>56</td>
<td>.07</td>
</tr>
</tbody>
</table>

Table 4-4. Independent T-Test Poor-Medium

<table>
<thead>
<tr>
<th>Sitenum</th>
<th>Mean</th>
<th>STD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newscale</td>
<td>Poor</td>
<td>19.2759</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>20.3103</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>F</th>
<th>t</th>
<th>DF</th>
<th>Sig. (1-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>.294</td>
<td>-1.516</td>
<td>56</td>
<td>.0675</td>
</tr>
</tbody>
</table>

Table 4-5. Independent T-Test Medium-Best

<table>
<thead>
<tr>
<th>Sitenum</th>
<th>Mean</th>
<th>STD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newscale</td>
<td>Medium</td>
<td>20.310</td>
</tr>
<tr>
<td></td>
<td>Best</td>
<td>20.793</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>F</th>
<th>t</th>
<th>DF</th>
<th>Sig. (1-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>.092</td>
<td>-.701</td>
<td>56</td>
<td>.243</td>
</tr>
</tbody>
</table>

An ANCOVA analysis then was used to search for relationships among covariants. There was no significant relationship between ratings of credibility of any of the sites and the number of design courses participants had taken. However, there was a significant relationship [F (87) = 2.88, p = .47] between the credibility rating and the amount of personal experience the participant had with owing or building a Web site. Also, how much participants reported paying attention to the news significantly affected [F (87) = 3.82, p > .027] the credibility score of the story they viewed. Other covariants, including age, gender, major and race had no significant effect on the credibility score.
CHAPTER 5
DISCUSSION

The experiment’s outcome failed to reject the null hypothesis that “There will be no significant difference in the perceived credibility of news stories placed on well-designed Web pages and news stories placed on more poorly designed Web pages.” However, support was found that indicates that design may influence credibility.

These results were surprising because they run counter to what the literature predicted. According to the literature, design that is professional is superior to an amateurish design. The panel of three design experts had confirmed that there were significant differences in the quality levels of the design used. Yet among these respondents, there were no significant difference in perceived credibility between adjacent design levels. That is, the poorly designed site received credibility ratings that were not significantly different from those of the mid-level design, and the mid-level design’s perceived credibility did not differ significantly from the ratings of the best-designed site. However, there was a significant difference in the perceived credibility of the worst designed page compared to the best designed page.

The results of this experiment are important. Media organizations hire full-time Web designers and, in some cases, Web design teams to construct the most professional-looking Web sites possible. The findings of this study would suggest that this emphasis may be worth that effort. In fact, this study would suggest that if a media organization wants an increase in the perceived credibility of its online news stories, it must adhere to virtually all of the design principles and elements of good Web design because when only
some of the principles and elements were followed, there was no significant increase in
the credibility score. (On the other hand, following some elements and principles
produced a design that was not rated significantly worse than the best design).

Experience in Web design had a significant effect on the credibility score, which is
what the literature predicted and partially answers question: Will the page design have
more affect on the perceived credibility of a news story for participants with previous
experience in areas of design or the Internet? While participants with backgrounds in
Web design scored the sites’ perceived credibility significantly different, according to
their design level, Internet use and the amount of design classes taken had no significant
affect on how these participants rated the perceived credibility.

The most surprising finding of the study was that students did acknowledge a
hierarchy in the level of design of the pages. Those who saw the poor design rated it
significantly poorer than the other two, and those who saw the mid-level site design rated
it poorer than the best designed site. Despite this, there was only a slight difference in the
perceived credibility of the stories, and that existed only between the best designed site
and the poorly designed site.

It is impossible to design a perfect study, and this one is no exception. First, the
demographics were less than ideal. All participants were college students, which is not
representative of the Web browsing population. However, the largest group of online
users is the people within this study’s age range (Pew Research Foundation, 2001).
Ideally, a larger variety of participants would be used as well. All were students in the
College of Journalism and Communications.
Another significant flaw in the study may have been having too few participants, leading to a lack of statistical power. Although the credibility ratings of adjacent page designs did not differ significantly, the means for each type of page followed the expected trend. That is, the poorest page received the lowest credibility ratings. The middle page received the next-highest credibility ratings, and the best-designed page received the best credibility ratings. Had more participants been used, the study might have had enough statistical power to detect differences.

Also as the experiments were in a lab environment, participants might have been more likely to concentrate more closely on the story they were reading as opposed to when they read online news stories at home or in a more relaxed environment. The possibility of stronger central processing follows along the lines of the Elaboration Likelihood Model. Placing the participants in a laboratory environment could have induced them to use more central processing (the content of the story) as opposed to peripheral processing (the design of the story). The ELM predicts that people who do central processing pay less attention to peripheral cues (Petty & Cacioppo, 1988). In this study, that would mean that design might have less effect than under normal conditions. Finally, manipulating as many aspects as this study did gives the researcher less control over the experiment. Another disadvantage is that the amount of manipulation decreases the internal validity of the experiment. However, by conducting the experiment in this manner, the manipulation is strong and more realistic as to the actual construction of a Web site, enhancing external validity.

In a real-world situation, then, design still may have a strong effect on the perceived credibility of news stories. Peripheral cues may be stronger in this context,
which means readers would place more emphasis on such things. This further leads to speculation that a newspaper without established credibility, say from its name, might benefit more from having a pristine design. Newspapers with such credibility attached to their names would not benefit as much from design.

It is the researcher’s contention that the reasoning beyond this study was not flawed. Instead the method was flawed in that it placed participants in a context in which they had incentive to pay close attention to the content of the stories, which is not always present in a real-world context. Perhaps if this same design was used as part of a separate experiment and participants did not realize they would have to answer questions following the reading, the study would yield the expected results.

The findings are encouraging in that they suggest that design can influence readers’ perception of the credibility of a news story, which gives reason to further explore the topic to find out why this could be the case and how strong the influence is.

Future Research

Future research should focus on breaking down the components of Web design. Instead of taking the elements and using them as a whole, future research should try to isolate these elements and principles. For example, color scheme may significantly affect the perceived credibility with all other elements held constant. Maybe typography would alter the perceived credibility, or size or shape. Future research should focus on isolating these variables. This would help to determine if anything about design significantly affects the perceived credibility or if content is the main criterion by which readers judge a story’s credibility. Future researchers should concern themselves with measuring the central processing that goes into reading such stories in a laboratory setting. The research needs to be able to account for the differing contexts of reading a news story in a
laboratory and reading a news story in the comfort of one’s home. Finally, these results call for more research on the ELM. If a researcher could measure how strongly the participants were using central processing, as opposed to peripheral cues such as the design, support for the model could be bolstered and, perhaps, a reason could be found to explain the results of this study.

**Conclusion**

The Internet is still a new medium, and the research examining the Internet in terms of its place in the mainstream media also is in its infancy. However, as the Internet becomes more popular and widely used, the need to understand this new medium will become increasingly important. This study examined one of the most crucial aspects of any news medium: credibility. More research must be done to uncover what increases or decreases perceived credibility among news audiences. The sooner this is understood, the sooner the news media can harness this information and use it to better inform its publics.
The Internet is still a new medium, and the research examining the Internet in terms of its place in the mainstream media also is in its infancy. However, as the Internet becomes more popular and widely used, the need to understand this new medium will become increasingly important. This study examined one of the most crucial aspects of any news medium: credibility. More research must be done to uncover what enhances or debilitates its perceived credibility by its audience. The sooner this is understood, the sooner the news media can harness this information and use it to better inform its publics.
APPENDIX A
INSTRUCTIONS TO SUBJECTS

These stories have been taken from the startribune.com on February 4, 2004, and April 27, 2004. Please read the following story. Do not click on any of the links, change any computer settings or resize the screen. After reading both stories, please follow the link to the questionnaire. Fill out the questionnaire completely and press the submit button. After finishing the story, please raise your hand, indicating you are finished.
1. How accurate did you find the information presented in the news stories?

Not at all accurate
Not very accurate
Somewhat accurate
Accurate
Very accurate

2. How much bias did you perceive in this news stories?

No bias
Little bias
Some bias
A lot of bias
Complete bias

3. How believable was the information covered in the news stories?

Not at all believable
Slightly believable
Somewhat believable
Very believable
Completely believable

4. How trustworthy was the information covered in the news stories?

Not at all trustworthy
Slightly trustworthy
Somewhat trustworthy
Very trustworthy
Completely trustworthy

5. How fair was the information covered in the stories?

Not at all fair
Slightly fair
Somewhat fair
Very fair
Completely fair
6. The depth of the stories was satisfactory.

Strongly disagree
Disagree
No opinion
Agree
Strongly agree

What number was on your card?

1
2
3

7. The site I viewed was better designed than Web pages of online news sites that I visit.

Strongly disagree
Disagree
No opinion
Agree
Strongly agree

8. How much attention do you pay to online news?

A lot
Quite a bit
Some
Very little
None

9. How much experience do you have in Web design?

A lot
Quite a bit
Some
Very little
None

10. Please briefly summarize the topic of the first story

11. Please briefly summarize the topic of the second story
12. How many courses have you taken that have dealt with design or layout?

Demographics:

13. Your Gender:

Male
Female

14. Ethnicity:

African America
Asian
Latino/Hispanic
Caucasian
Other:

15. Age:

16. Major:

17. What country and state are you from?

18. Have you ever read a story from the Minneapolis Star-Tribune, online or in the newspaper, before now?

Yes
No
LIST OF REFERENCES


BIOGRAPHICAL SKETCH

Cody Swann started school at the University of Florida in 2000. He finished his Bachelor of Science in Mass Communication in 2002, and his Master of Science in Mass Communication in 2004.