News Content and Form

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News Content and Form

Implications for Memory and Audience Evaluations

This experiment examines the effect of tabloid and standard packaging styles on calm and arousing news stories. The goal of this line of research is to investigate the combined influence of form and content on information processing and viewer evaluations of television news. Results indicate that the bells and whistles of tabloid production features enhance memory for calm news items but overburden the information processing system when applied to arousing news content. The evaluative measures produced data that show formal features have an influence on the meaning viewers derive from news content and that they rate news packaged in the tabloid format as less objective and believable than stories without these dramatic features.

Keywords: *limited capacity; information processing; arousal; television news; sensationalism; formal features; structural features; memory; cognition; physiology; recognition; credibility; tabloid*

In perhaps the most biting criticism of journalism in contemporary times, Carl Bernstein (1992) of Watergate fame wrote, "We have been moving away from real journalism toward the creation of a sleazoid info-tainment culture. . . . In this new culture of journalistic titillation, we teach our readers and our viewers that the trivial is significant and that the lurid and loopy are more important than real news" (p. 23). Jim Lehrer from the PBS *NewsHour* expressed the same level of concern about the entertaining packaging and content of news: "We don't want somebody to get up from watching our program and say, 'Oh, my god, that was fun tonight.' We're not in the circus

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business. We're not in the sitcom business. We're in the information business" (Mendoza, 1995).

Underlying these common criticisms of journalism is the distinction between content and form. There is apprehension about the *content* of news: too much emphasis on compelling and dramatic stories (crime, accidents, disaster) that lack serious news content (politics, economics, healthcare, education). The argument goes that what arouses generally does not serve the mission of journalism to inform the public. This high-minded position that news should contain information that is important for the masses has been criticized and described as elitist. In fact, the substance of news content has been a prominent part of public debate for almost 200 years (Bird, 1992; Shaw & Slater, 1985; Stevens, 1985). In addition, there is concern about the fast pace and special effects increasingly used to package the news. These form-giving features add a sensational quality to television reports. Attention-grabbing production features are viewed as inappropriate for news packaging, suspected of blurring the line between information and entertainment, and they are thought to exaggerate factual content.

Journalism critics have, at least since the Penny Press of the 1830s, been worried about sensationalism as an approach threatening to dominate the practice of journalism. The consequences of arousing content and form for the well being of journalism cannot be resolved here. Perhaps this is not a matter to be resolved but rather one destined for perennial public debate. Academic inquiry into the effect of lurid reporting on the audience is perhaps a more manageable goal and could shed some light on the soundness of critical concerns. The effect of arousing content and formal features on news consumers also has scholarly relevance for theories of information processing, which extends beyond the concern of journalism critics.

The vast majority of systematic research on arousing television news has focused on matters related to content—not form. Several studies have documented the prevalence of sensational news topics in broadcasts (e.g., Hofstetter & Dozier, 1986; Patterson, 2000; Slattery & Hakanen, 1994) and the effects of arousing content on viewer memory for news (Brosius, 1993; Graber, 1994; Lang, Newhagen, & Reeves, 1996; Mundorf, Drew, Zillmann, & Weaver, 1990; Newhagen, 1998; Newhagen & Reeves, 1992). There is also a relatively small but growing body of scholarly research on matters related to the packaging or formal features in broadcast news. Several scholars have argued (Fiske, 1987; Grabe, 1996; Kepplinger, 1982) that camera and editing techniques, as the form-giving components of news packaging, might be the bearers of meaning in the same way that the content of messages convey meaning. Packaging style could therefore influence viewer evaluations of news, including how credible, objective, or sensational it is perceived to be.

Indeed, experimental studies reveal that formal features have an effect on how the audience evaluates television news content (Edwardson, Kent, Engstrom, & Hofmann, 1992; Grabe, Zhou, Lang, & Bolls, 2000; Lang, 1998). These studies also reveal another important insight: The formal dimensions of television news have an effect on the information processing of news content.

What remains unresolved is how the interaction, or combined effect, of content and form affects viewer evaluations and memory for arousing news. Put simply, the question whether, and how, formal features transform content needs research attention. For example, is it possible that the news audience would evaluate visually compelling content as less credible or objective when it is packaged in a tabloid production style? At the same time, could the bells and whistles of production be employed to improve interest and memory for relatively boring public affairs stories? Beyond the theoretical interest in information processing, these questions address issues related to journalistic performance. The study reported here tackles directly the independent and interaction effects of formal dimensions (tabloid versus standard) and news content (arousing versus calm) on viewer evaluations and memory for television news.

To investigate the effects of two independent variables, content and form, on cognitive and evaluative responses to television news stories, two versions of 12 news stories were produced. The standard version of stories was packaged without flamboyant production features, resembling what critics might view as respectable form. The tabloid version employed production features associated with sensational news magazine programs (Grabe, Zhou, & Barnett, 2001). The verbal, visual, and factual content were exactly the same for both versions. The other independent variable, content, had two levels, arousing and calm. This variable represents the distinction that journalism critics make between generally sensational or arousing news (focusing on violence and catastrophe) and calmer, less sensational public affairs news (politics, economics, healthcare, and education), important for an informed citizenry in a democratic society but often viewed as quite boring.

Form, Content, and Information Processing

This article takes a limited capacity information processing approach to studying how viewers process television news (Lang, 2000). This theory defines the viewer as an information processor, the television medium as an ongoing stream of audio and video information, and the message content as the topic, genre, and information contained in a message. Television viewing is regarded as a process that involves the allocation of a limited pool of

cognitive resources required for viewers to make sense of a message. Processing a message includes (but is not limited to) the parallel cognitive subprocesses (or tasks) of encoding, storage, and retrieval.

Comprehension of television messages involves the continuous and simultaneous operation of these subprocesses. New information from the message is continuously attended to, encoded into short-term or working memory, processed, and stored. Previously held information (required to understand the message) is concurrently retrieved, associated with the new information, and stored again. Information encoded earlier in the message is stored as later information is encoded.

Because it is not possible for viewers to encode and store all the information in a typical television message, the viewer continuously selects information in the message for encoding, processing, and storage. The amount of information that can be attended to, encoded, and stored has an upper bound limited by the availability of the viewer's processing resources. From this perspective, television viewing, although it "feels" simple, is in fact a complex and difficult cognitive task. The level of success with which a television message is encoded, stored, and eventually retrieved is determined by the resources required and allocated to the various subprocesses involved in viewing. The viewer, as well as the content and form of messages, affect how resources are allocated to process the message.

The viewer controls some aspects of the allocation of processing resources by making decisions about whether to watch, how carefully to watch, and how hard to concentrate during viewing. These decisions are based on characteristics of the content and the viewer, including how interesting the topic is, how relevant the information is to the viewer, or simply whether the viewer wants to remember the information. This voluntary or controlled allocation of processing resources is a relatively long-term process occurring over minutes or hours. Similarly, characteristics of the viewer such as familiarity with the topic or the emotional response to a topic partly determine the amount of resources required to make sense of and to store the message.

Formal features, or the packaging of a message, control the automatic allocation of processing resources by inducing orienting responses (ORs) in viewers. These ORs are automatic, reflexive, attentional responses to changes in the environment or to stimuli that people have learned signal important information. In television, formal features such as editing, movement, flashes of light, and sound elicit ORs (Lang, 1990; Lang, Geiger, Strickwerda, & Sumner, 1993; Thorson & Lang, 1992). The tabloid packaging features manipulated in the study reported here are likely to bring about automatic allocation of resources. These involuntary responses are relatively short-lived, occurring over seconds. The content of messages can also evoke both automatic and

controlled allocation of processing resources. Aspects of content like complexity of the message and salience to the viewer can elicit controlled allocation of processing resources (Thorson & Lang, 1992). Other dimensions of content, such as the presence of arousing content, also generate automatic allocation of resources (Lang, Dhillon, & Dong, 1995; Lang et al., 1996; Newhagen & Reeves, 1992). The arousing visual content featured in half the stimuli stories of the study reported here should prompt automatic resource allocation.

The limited capacity model suggests that when the demand on resource allocation exceeds the available reserve, overload occurs. Messages that overload the information processing system will therefore not be as thoroughly encoded, stored, or retrieved as those that do not overload the system. Conversely, the information processing system can be underengaged. When messages fail to sufficiently engage controlled or automatic allocation of resources, information processing will suffer.

In summary, the limited capacity model makes the following general predictions: (a) The viewer allocates an overall level of processing resources to complete viewing tasks based on goals and interests; (b) viewer goals influence the proportion of resources allocated to the various subprocesses, such as storage and retrieval; (c) form and content features of the message elicit orienting behavior and the automatic allocation of resources to encoding; (d) content and formal attributes can elicit arousal, which results in the automatic allocation of resources to encoding and to storage; and (e) when there are insufficient resources assigned to carry out all the subprocesses, some aspect(s) of processing will be performed less effectively.

The model posits three subprocesses (encoding, storage, retrieval) and two mechanisms (orienting behavior, resource allocation) involved in information processing. These processes and mechanisms are measured as follows: (a) Encoding is measured using recognition memory (Lang et al., 1995), including response latency (Lang, Zhou, Schwartz, Bolls, & Potter, 2000), accuracy (Lang, Bolls, Potter, & Kawahara, 1999; Lang, Potter, & Bolls, 1999), and signal detection analysis (Grabe et al., 2000; Lang et al., 2000); (b) storage is measured using cued recall techniques (Lang, Bolls, et al., 1999; Lang et al., 1995); (c) post viewing retrieval is measured using free recall techniques (Lang, Bolls, et al., 1999; Lang et al., 1995); (d) orienting responses are measured using phasic heart rate (Lang, 1990; Lang, Geiger, et al., 1993; Thorson & Lang, 1992); (e) resource allocation is measured using secondary task reaction time measures and tonic heart rate (Lang & Basil, 1998; Lang, Bolls, et al., 1999; Lang et al., 1995); and finally, (f) emotional responses are measured using self-report and skin conductance measures (Lang, Bolls, et al., 1999).

Based on this theory, the study reported here yields two sets of hypotheses, one set to test the allocation of resources, the other to test the encoding, storage, and retrieval of information.

The addition of tabloid formal features to news stories should affect viewer attention to news stories. Specifically, the features are likely to elicit orienting responses and increased resources allocation, thus increasing automatic attention to the messages. This leads to the first hypothesis:

Hypothesis 1: Heart rate will be slower during tabloid versions than standard versions of news stories.

Similarly, arousing content has been shown to increase automatic attention and resource allocation to the processing of television messages (Lang, Bolls, et al., 1999; Lang et al., 1995; Newhagen & Reeves, 1992). The following can therefore be predicted:

Hypothesis 2: Heart rate will be slower during compelling stories than calm stories.

In addition, previous research has shown that adding production features to a message, and thus increasing the pacing of a story, increases feelings of arousal and activation of the sympathetic nervous system (Lang, Bolls, et al., 1999; Lang et al., 2000). Similarly, arousing content has been shown to increase both self-reported and physiological arousal (Lang, Bolls, et al., 1999; Lang et al., 1995). This leads to the following prediction:

Hypothesis 3: Self-reported arousal and frequency of spontaneous skin conductance responses will be higher for tabloid versions of news stories than standard versions of news stories.

Hypothesis 4: Self-reported arousal and frequency of spontaneous skin conductance responses will be higher for stories with arousing content than stories with calm content.

From a limited capacity perspective, when production features are added to message packaging, the automatic allocation of resources to process a message should increase as long as viewers are not overloaded. Because both content and form have been hypothesized to increase processing resources allocated to the message, the following predictions about recognition memory are made:

Hypothesis 5: Viewers will have more accurate and faster recognition for information presented during tabloid versions of news stories than standard versions of news stories.

Hypothesis 6: Viewers will have more accurate and faster recognition for information presented in compelling than calm news stories.

Limited capacity theory also predicts that arousing messages should be stored better than calm messages except in cases where the viewer is overloaded. Because both tabloid versions and arousing stories are expected to be more arousing than standard versions and nonarousing content, the following is predicted:

Hypothesis 7: Viewers will have higher free recall for tabloid and arousing news stories than standard and nonarousing news stories.

Although research suggests that arousing messages are remembered better than nonarousing messages, detailed information contained in arousing content is often remembered less accurately than when present in relatively calm messages. In fact, several studies report increased attention and memory associated with arousing stories (Gurevitch & Levy, 1986; Lang, Bolls, et al., 1999; Lang et al., 1995; Lang et al., 1996). Yet, because arousing content requires considerable cognitive effort to process, it may increase memory for the message in general but not for its details (Lang, Bolls, et al., 1999; Lang et al., 1996). Moreover, long-term memory for specific compelling visual images might be good, but memory for factual information featured in stories with arousing visual images has been shown to be poor (Brosius, 1993; Newhagen & Reeves, 1992). The following is therefore predicted:

Hypothesis 8: Viewers will have less accurate delayed cued recall of information contained in arousing news stories and tabloid versions of news stories than nonarousing and standard versions.

In a study of editing pace and arousing visual content, Lang et al. (1999) found that delayed recall was the worst for two conditions: arousing content edited in a fast video editing pace and nonarousing content cut in a slow pace. They argue that the combination of arousing content and a fast editing pace overloads information processing resources, whereas unarousing content presented in a slow pace does not fully engage automatic encoding mechanisms. These two conditions therefore resulted in poor storage and retrieval of information. For optimal memory, automatic attention and processing mechanisms must be engaged but not to the point of overload. In the context of news, this suggests a message content by production format interaction:

highly arousing content packaged in a standard format and nonarousing content packaged with more vigor will produce the most favorable combinations for information retrieval. The following is thus predicted:

Hypothesis 9: There will be a content by form interaction for cued recall such that memory for calm content will improve if it is presented in a tabloid packaging style whereas memory for arousing content will decline if it is presented in tabloid format.

Form, Content, and Viewer Evaluations of News

Although critics remain skeptical and concerned about the news audience's ability to distinguish between "proper" and sensational journalism (Bernstein, 1992; Kurtz, 1993), there is some evidence that the public is able to reliably distinguish between the two. A study conducted by Austin and Dong (1994) reveals that readers associate proper journalistic attributes (e.g., accuracy and objectivity) with a newspaper's reputation. Readers evaluated stories that were embedded in a reputable (*The New York Times*), a disreputable (*Star*), and a fictitious newspaper. Stories that were featured with the tabloid newspaper nameplate were rated as more biased and less accurate than those that appeared with the fictitious or reputable nameplates. This study provides evidence of the effect of context—not form or content—on viewer evaluations of news credibility. An early study by Tannenbaum and Lynch (1960) found that newspaper readers associated inaccuracy, irresponsibility, "foolishness," and unacceptable information with sensational tabloid reporting. These two studies suggest that the audience has developed a sense of what tabloid news is and that viewers hold a negative view of this journalistic practice. Grabe et al. (2000) showed that television news viewers use news packaging techniques as a guide to distinguish between tabloid and standard formats. Television news stories packaged in a tabloid style were evaluated as less informative and believable than the same stories without tabloid production bells and whistles. It appears that viewers rely, at least partially, on formal features as a heuristic to make judgments about news content (see Newhagen & Nass, 1989) and that viewers both recognize and distrust tabloid journalism. Packaging style might also have varying influence on viewer evaluations of calm and arousing stories. For example, a tabloid packaging style coupled with arousing message content might result in a double dose of skepticism. Tabloid packaging can therefore be expected to have an adverse effect on the believability, objectivity, and informativeness of arousing stories. This leads to the following hypotheses:

Hypothesis 10: Viewers will perceive tabloid and arousing stories to be less believable, less objective, and less informative than standard and calm stories.

Hypothesis 11: There will be a Content × Form interaction for evaluations of believability, objectivity, and informativeness such that a tabloid packaging style will have a more adverse effect on believability, objectivity, and informativeness for calm compared to arousing stories.

Viewers seem to be adept at detecting tabloid news packaging styles and weary of lending much credibility to the format. Yet, journalism critics express concern that production features that arouse interest and emotion might amplify content elements to the degree that viewer perceptions and comprehension of news events are exaggerated. If this is the case, the packaging of news should be treated as central to journalistic objectivity in the same ways that content has traditionally been scrutinized for fairness. This leads to the next hypothesis:

Hypothesis 12: Viewers will be more likely to exaggerate the severity of specific actions and situations in tabloid stories compared to standard stories.

As discussed above, research has established that arousing television messages elicit more attention than calm messages (Lang et al., 1996; Newhagen & Reeves, 1992; Zillmann, 1982) and viewers have better recognition memory for arousing messages compared to calm messages (Gurevitch & Levy, 1986; Lang et al., 1995). Yet, not much is known about viewer evaluations of arousing and calm news. Newhagen (1998), Newhagen and Reeves (1992), and Shoemaker (1996) argue that negatively compelling television news images resemble a nonmediated survival threat to the degree that the biological systems of viewers automatically prepare for premium performance, hence the increase in physiological and emotional arousal, attention, and memory associated with negatively compelling messages. The question remains whether viewers' increased attention to arousing compared to calm news mirrors their self-reported interest in arousing news. The bells and whistles of the tabloid production style, also called the infotainment approach to news, might indeed enhance viewer interest in news stories. This leads to a final hypothesis:

Hypothesis 13: Viewers will evaluate arousing and tabloid stories as more interesting than calm and standard stories.

Method

In this study, tabloid and standard versions of 12 news stories were used as stimuli. The researchers selected the 12 stories such that six of these stories were about arousing topics and contained arousing visual content and the other six stories focused on calm news topics and featured less arousing video content. The scripts, and thus the narrative information, were held constant across the two production styles for each story. Five particular production techniques (music, sound effects, slow motion, flash frames, and the obtrusiveness of reporter voice tone) were manipulated to create the distinction between the tabloid and the standard versions.[2] Participants in this experiment viewed all 12 news stories, half in tabloid and half in a standard format. While participants viewed the news stories, heart rate and skin conductance were measured to assess moment-to-moment changes in attention and arousal. Immediately after viewing each story, the participants responded to a series of semantic differential scales to assess emotional and evaluative responses to the stories. After viewing all 12 stories and performing a short distractor task, participants completed a forced-choice recognition test to assess recognition memory. Delayed recall was measured 48 hours after participation via telephone.

Design

The design of this study is a 2 (Content) × 2 (Form) × 3 (Stories) × 6 (Order of Presentation) mixed factorial design. Order of Presentation is the only between-subjects factor and represents the six different orders of presentation of the 12 new stories. Content is a within-subjects factor and has two levels, arousing and calm. The story factor is made up of the six stories in each content category. The Self Assessment Mannequin (SAM) measure for viewer's self-reported arousal was used as a manipulation check of the content factor. There was a main effect for content, $F(1,38) = 257.79, p < .001, e^2 = .85$. Arousing stories ($M = 5.75$, $SD = 1.47$) were indeed considered more arousing than calm stories ($M = 2.76, SD = 1.50$). Form, also a within-subjects factor, has two levels represented by the packaging styles: standard or tabloid.

Each participant saw six stories produced in the tabloid format (half arousing and half calm) and six produced as standard stories (half arousing and half calm). Thus, across orders of presentation, all 12 stories were seen half the time in a standard style and half the time in a tabloid style. During analyses, the story factor represents the first, second, and third story seen in

each form by content category. Across the six orders, six different stories appeared in each of these positions. All 12 stories appeared once in either the first or last position to control for primacy and recency effects.

Participants

Forty-five adults participated in this study. Participants were recruited from local churches and the Toastmasters organization and were either paid for their participation or donations were made to the church's youth fund. Ten participants were between ages 25 and 34, 12 between 35 and 44, and 23 were older than 44. There were 23 male and 22 female participants.

Stimulus Materials

The stimuli for this experiment included 12 stories produced from raw video material obtained from WISH-TV, the local CBS affiliate in Indianapolis. The duration of stories ranged from 57 to 79 seconds. Half the stories contained arousing visual material and accordingly dealt with arousing topics that journalism critics often refer to as inconsequential and/or sensational. These arousing stories reported on a drive-by shooting, a tornado, a fire, a KKK rally, a flag burning, and an abortion protest. Visual scenes included a police crime scene, people mourning at a funeral, several tornadoes approaching, people seeking shelter from a tornado under a bridge, fire fighters falling from a roof of a house, an unconscious baby being pulled from the burning house, Black Panther and KKK members beating each other at a rally, angry civil rights protesters burning an American flag, and abortion protesters blocking the entry to a clinic and holding graphic images of aborted fetuses. The other six stories were about public affairs issues, which journalism critics generally view as important in their information value for an informed citizenry but which the audience typically sees as calm. These nonarousing stories were about layoffs at Boeing production plants, a lawsuit about the patent for manufacturing Prozac, repairs on a city's water drainage system, healthcare for city workers, changes in a standardized high school exam, and a technological innovation that will make steel production more efficient. The visual material for nonarousing stories featured generic video material (e.g., people, manufacturing plant buildings, machinery, traffic) with no arousing video images.

Each news story was produced in both tabloid and standard style. The content was held constant except for five structural features (music, sound effects, slow motion, the use of flash frames as transitions between shots, and an obtrusive reporter voice tone) that were added to the tabloid versions. A

previous content analysis found that these techniques were the defining characteristics of the tabloid approach to news production (Grabe et al., 2001). Accordingly, the tabloid versions of the news stories in this experiment were marked by the appearance of these techniques and the standard versions were marked by their absence. The tabloid and standard versions of these 12 news stories were then organized into six different orders. In any particular order the same story appeared only once, either in the tabloid version or in the standard version.

The standard version of each story was first produced on an AVID nonlinear digital editing system. Then, flashes, slow motion, recordings of the obtrusive voice narration, sound effects, and music were added to create the tabloid version. In the light of the Grabe et al. (2001) content analysis results, approximately 12 seconds of slow motion were added to tabloid versions of the stories. Sound effects were added about every 83 seconds. Flashes were inserted approximately once every 30 seconds. Music was applied throughout 82% of the tabloid story content. Because each story had its unique properties, these intervals were used as general guidelines rather than immutable rules. The actual length of the intervals in the application of those techniques sometimes varied slightly due to stylistic considerations.

Dependent Variables

Arousal. Arousal was measured by the frequency of nonspecific skin conductance responses in each message, a common indicator of activation in the sympathetic nervous system (Hopkins & Fletcher, 1994). Skin conductance data were collected 20 times per second and skin conductance responses greater than .10 micro siemens were scored and counted.

Attention. Cardiac deceleration, an indication of activation in the parasympathetic nervous system, was used to measure attention allocated to the news stories (Lang et al., 1996). Heart rate data were averaged over 5-second intervals. For some analyses, the heart rate data were transformed into change scores by subtracting the average heart rate in the last second before onset from each 5-second time period. This was done for each story. Analysis of the heart rate data includes time as a within-subjects factor. This factor is made up of the 15 5-second averages for each story.

Recognition measures. The recognition test was made up of 96 audio snippets, each exactly 2 seconds long and separated by 3 seconds of audio mute and video black. Half of the snippets were taken from the stimuli and half were distracter foils. After hearing each snippet, the participants used a

joystick to indicate, through a yes or no response, whether they had heard that information before or not. The computer was used to assess the accuracy of their responses and the time it took the participants to make the responses.

Delayed recall. Forty-eight hours after the experiment, participants were contacted by phone and asked to name the topics of the 12 news stories they had seen. In addition, one cued recall question was asked for each news story. These cued recall questions were designed to test comprehension of news content that has the potential to contribute to an informed citizenry rather than testing memory for trivial information contained in the stories.[3]

Evaluative measures. Every news story was rated on the three SAM scales (P. J. Lang, Greenwald, Bradley, & Hamm, 1993). These 9-point pictorial scales measure three distinct emotional dimensions: arousal, valence, and dominance. In addition, participants rated the informativeness, believability, and comprehensibility of the story, their level of interest in it, and the objectivity of the reporter on 10-point semantic differential scales. Two story-specific items gauged viewer perceptions of the intensity and severity of situations or actions in the story content. These included 10-point semantic differential items.[4] Participants also provided demographic information about themselves (age, race, gender) and their television news viewing habits for local and national newscasts as well as news magazine programs.

Procedure

Participants were run through the experiment individually. Each participant was asked to read and sign an informed consent form, which stated the purpose of the experiment and informed the participants of the use of electrodes for collecting physiological data during the experiment. Participants were seated in a comfortable chair approximately 5 feet from a 29-inch television monitor. Five Beckman AG/AGCL standard electrodes were attached to the participants' forearms and nondominant hand. Two of these electrodes were used to collect skin conductance; the other three were used to collect heart rate. The participants were asked to remain still during the experiment and avoid putting pressure on the electrode wires.

A booklet including evaluative scales was placed on a clipboard and given to the participants before the experiment. The experimenter briefly explained how the scales should be used to rate responses and then asked if the participants had any questions. When the participants were ready, the experiment started.

During viewing, physiological data were collected. Participants rated each story after viewing it. After all 12 stories were viewed and rated, the electrodes were removed. Participants then completed the recognition test and were debriefed and thanked for their participation. They were then paid and left the experiment room. Forty-eight hours after the experiment, participants were telephoned to collect delayed recall data. Up to 10 follow-up calls were made to reach participants.

Results

Hypothesis 1: Tabloid stories will increase attention.

This hypothesis predicted that viewers would pay more attention to stories produced using tabloid production features compared to those using standard production features. The prediction is for slower heart rate, over time, during tabloid stories compared to standard stories. This prediction is tested by the Form × Time interaction on the heart rate change scores, $F(14,434) = 2.99$, $p < .000$, $e^2 = .07$; as predicted, heart rate decreases much more initially and stays lower during tabloid stories compared to standard stories.

Hypothesis 2: Arousing content will increase attention.

This hypothesis predicted that viewers would pay more attention to arousing content compared to slower content. Again, the prediction is for heart rate to be slower during arousing messages than it is during calm messages. The hypothesis is tested by the content main effect. The main effect for content was significant, $F(1,31) = 8.63$, $p < .006$, $e^2 = .16$. Heart rate is consistently slower during arousing messages than it is during calm messages, as shown in Figure 2.

Hypothesis 3: Tabloid stories will be more arousing.

This hypothesis predicted that tabloid news stories would be more arousing than standard news stories. The prediction is for increased skin conductance during arousing stories compared to calm stories. The main effect for form on the frequency of spontaneous skin conductance responses was significant, $F(1,42) = 4.26$, $p < .045$, $e^2 = .07$. On average, there were 3.15 ($SD = 3.56$) spontaneous skin conductance responses during tabloid news stories compared to 2.79 ($SD = 2.56$) during standard news stories. There is also a

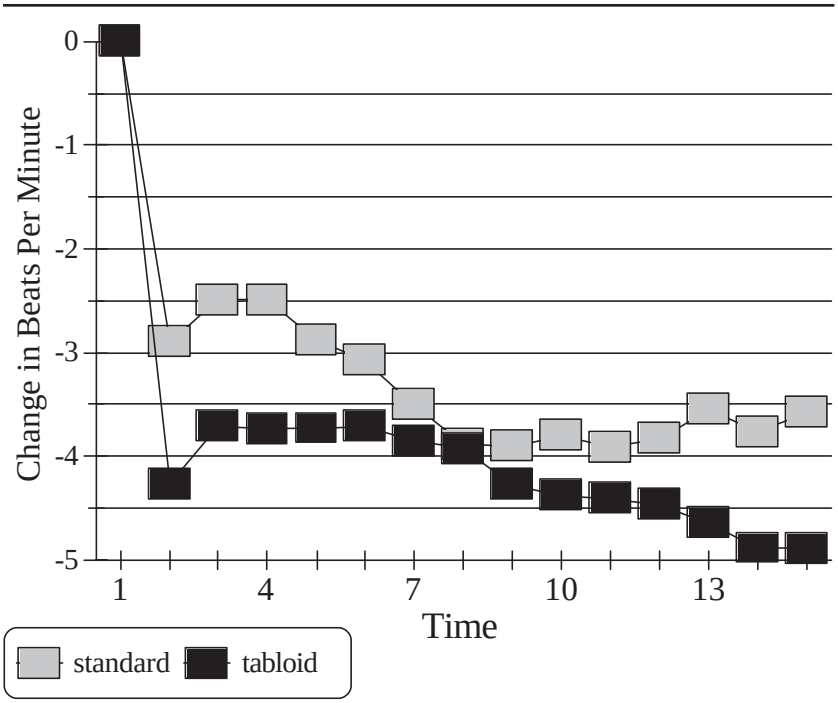

Figure 1. Heart Rate for Standard and Tabloid Stories

significant main effect for form, $F(1,38) = 13.31, p < .001, e^2 = .13$, on the self-reported arousal data. Tabloid stories ($M = 4.40, SD = 1.57$) were more arousing than standard stories ($M = 4.11, SD = 1.28$).

Hypothesis 4: Arousing content will increase physiological arousal.

This hypothesis predicted that viewers would experience more arousal during arousing stories compared to calm stories. The prediction is for an increased frequency of spontaneous skin conductance responses and greater self-reported arousal for arousing stories compared to calm stories. The main effect for content on the SCR data was significant, $F(1,42) = 10.73, p < .002$, $e^2 = .18$. On average, there were 3.39 ($SD = 3.37$) spontaneous skin conductance responses during arousing content compared to 2.54 ($SD = 3.17$) spontaneous skin conductance responses during nonarousing content. Although not predicted, there was a significant Form × Content interaction, $F(1,38) = 7.58, p < .009, e^2 = .10$, for self-reported arousal, which is shown in Figure 3.

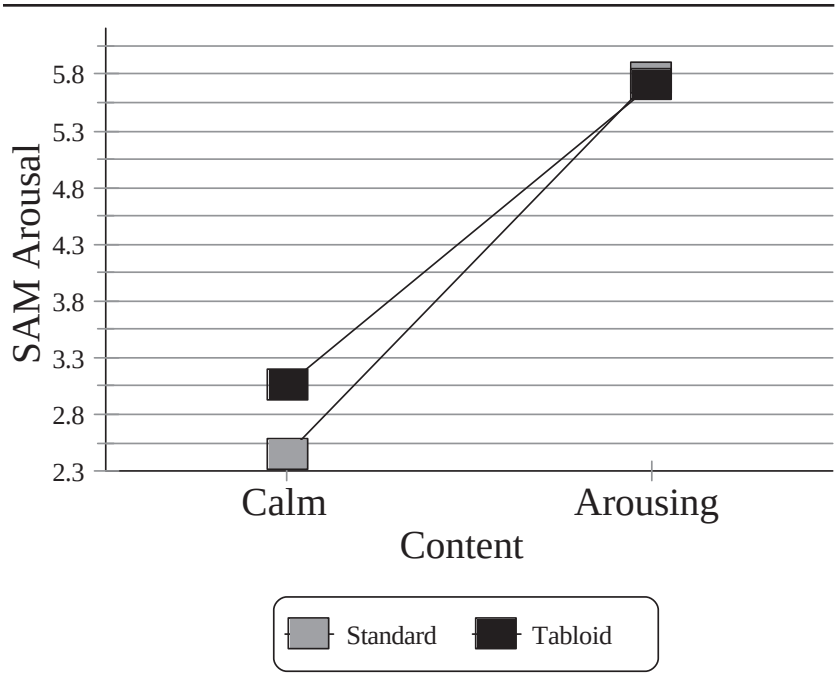

Figure 2. Heart Rate for Arousing and Calm Stories
Note. SAM = Self Assessment Mannequin.

Viewers self-reported calm stories produced with tabloid structural features as more arousing than standard calm stories. The addition of tabloid structural features had no effect on self-reported arousal in response to arousing stories.

Hypotheses 5 and 6: Tabloid stories and arousing content will be recognized better.

These hypotheses predicted that recognition memory would be fastest and most accurate for tabloid stories and stories containing arousing content. There was a significant main effect for content on the accuracy data, $F(1,42) = 6.57, p < .014, e^2 = .13$; average recognition was 70% ($SD = 14\%$) during arousing stories compared to 65% ($SD = 15\%$) during calm stories. The main effect for form on the recognition accuracy was not significant. On the other hand, the main effect for form on recognition latency was significant, $F(1,37) = 3.44$, $p < .072, e^2 = .07$, as was the main effect for content, $F(1,37) = 19.31, p < .000$, $e^2 = .30$. Viewers were significantly faster responding to tabloid (2630.20 msec, $SD = 256.07$) and arousing content (2643.89 msec, $SD = 261.25$) targets

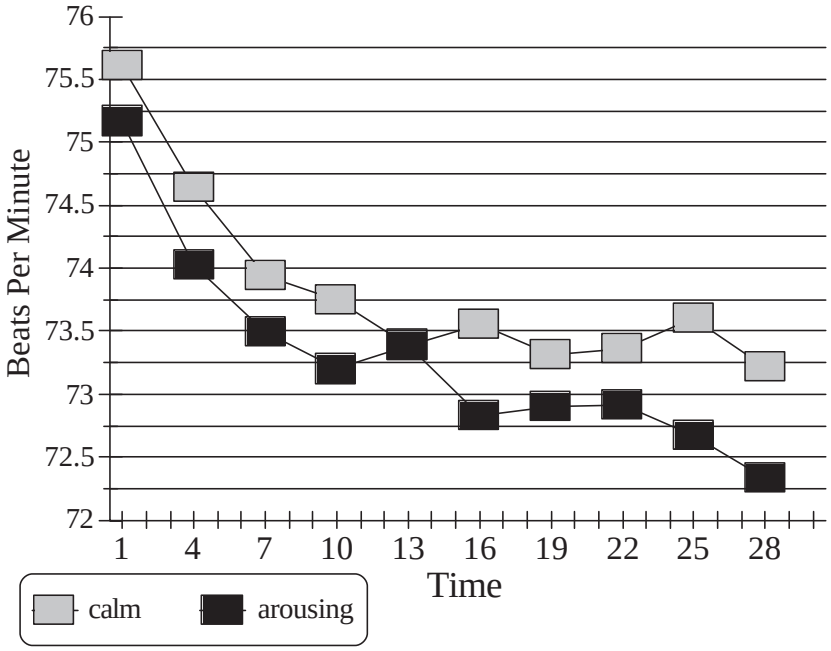

Figure 3. Interaction of Form and Content on Self Assessment Mannequin (SAM) Arousal Measure

Note. SAM arousal scale ranges from 1 (*calm*) to 9 (*arousing*).

than to standard (2690.21, *SD* = 275.28) and nonarousing (2676.53, *SD* = 270.12) targets.

Hypothesis 7: Tabloid stories an4d arousing content will be freely recalled better.

This hypothesis predicted that viewers would freely recall more of the topics in arousing and tabloid stories than standard and nonarousing stories. There was a significant main effect for content only. As predicted, viewers recalled more arousing stories ($M = 2.47, SD = .1.39$) than calm stories ($M = 1.82, SD = 1.30$), $F(1,39) = 10.32, p < .003, e^2 = .22$.

Hypothesis 8: Tabloid stories and arousing content will be recalled less accurately.

This hypothesis predicted that both arousing content and tabloid packaging would lead to decreases in accuracy of cued recall for facts presented in

the news stories. There was a significant main effect for content only, $F(1,39) = 10.75, p < .002, e^2 = .18$. Viewers were less accurate in their cued recall of factual details featured in arousing stories ($M = 1.76, SD = .67$) than calm stories ($M = 2.12, SD = .57$). The main effect for form approached significance, $F(1,39) = 3.41, p < .072, e^2 = .05$, but in the opposite direction of what was hypothesized. In fact, detailed information may have been slightly better remembered from tabloid stories ($M = 2.04$, $SD = .53$) than standard stories ($M = 1.83$, $SD = .72$).[5]

Hypothesis 9: Tabloid packaging will improve accuracy for calm but not for arousing stories.

This hypothesis predicted that tabloid packaging would improve the accuracy of cued recall for calm stories but decrease accuracy for arousing stories. The predicted Form × Content interaction was significant, $F(1,39) = 4.00, p < .05, e^2 = .05$. As Figure 4 shows, tabloid packaging increased the accuracy of cued recall for calm messages but had little effect on the accuracy of cued recall for arousing messages. It is also clear from Figure 4 that the main effect for form on memory, reported in Hypothesis 8, is driven by calm tabloid stories, whereas the main effect for content is not dependent on packaging style. Caution must therefore be taken while interpreting the two main effects for delayed cued memory. The accuracy of delayed cued recall for facts in a story is about the same for arousing stories (regardless of packaging) and for calm stories with standard packaging. However, accuracy of delayed cued recall of facts in calm stories is much better for calm stories produced using tabloid packaging. The interaction effect therefore sheds light on why findings for Hypothesis 8 are in the opposite direction of what was predicted.

Hypothesis 10: Tabloid stories will be perceived to be less journalistically sound.

This hypothesis predicted that viewers would find tabloid and arousing news stories to be less believable, objective, and informative than standard and calm news. The main effect of form on viewers' ratings of believability approached significance, $F(1,38) = 3.12, p < .08, e^2 = .04$, and the means were in the predicted direction with viewers rating standard stories more believable ($M = 8.80, SD = .81$) than tabloid stories ($M = 8.63, SD = 1.07$). The main effect of form on reporter objectivity was significant, $F(1,38) = 53.14, p < .000, e^2 = .52$. The reporter was rated as more subjective during tabloid stories ($M = 6.33, SD = 2.12$) than during standard stories ($M = 4.69, SD = 2.19$). The main effect for form on ratings of informativeness was not significant.

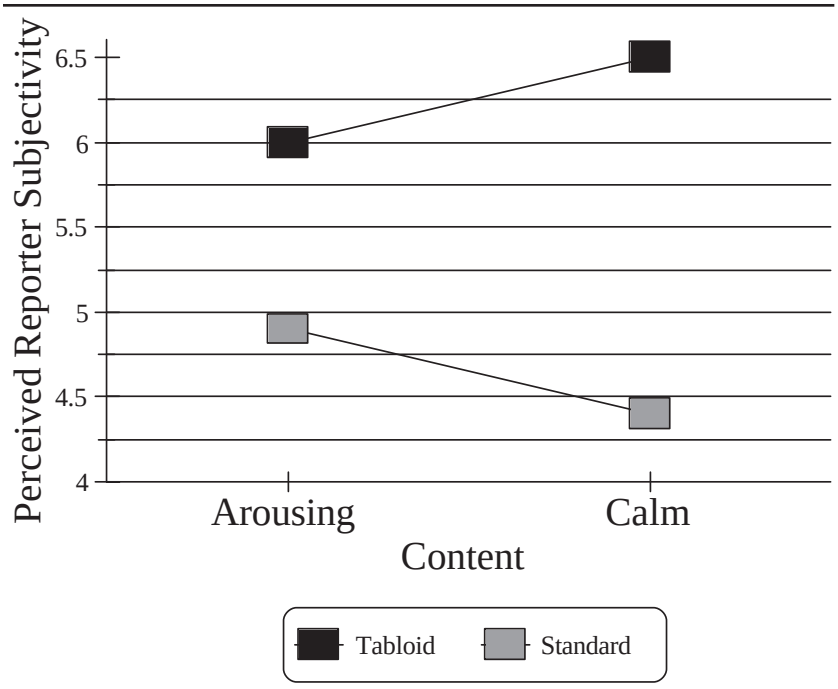

Figure 4. Interaction of Form and Content on Delayed Cued Recall
Note. The perceived reporter subjectivity scale ranges from 1 (*detached*) to 10 (*involved*).

The main effect of content on informativeness was significant, $F(1,38) = 3.41, p < .072, e^2 = .05$. Viewers rated calm stories as significantly more informative ($M = 7.50, SD = 1.19$) than arousing stories ($M = 7.27, SD = 1.56$). However, the main effects of content on believability and objectivity were not significant.

Hypothesis 11: Tabloid production will decrease perceptions of journalistic soundness more for calm stories than for arousing stories.

This hypothesis is tested by the Content × Form interaction for evaluations of believability, objectivity, and informativeness of stories that was predicted. Only the measure of journalistic objectivity produced a significant interaction, $F(1,38) = 15.44, p < .000, e^2 = .25$. Figure 5 shows that the tabloid packaging style sharply increased ratings of reporter subjectivity from arousing to calm stories. The prediction that the tabloid packaging style will have a more adverse effect on objectivity for calm compared to arousing stories was supported.

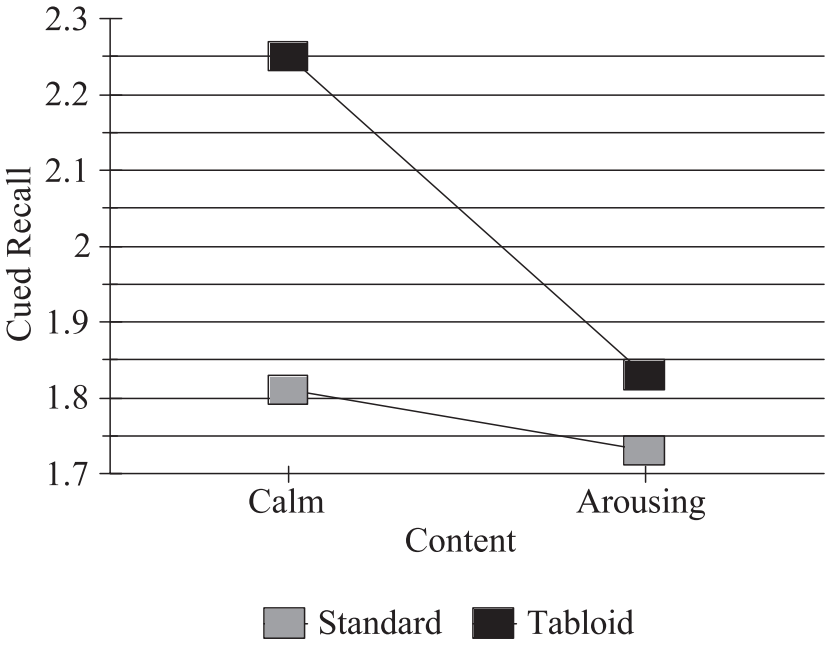

Figure 5. Interaction of Form and Content on Perceived Subjectivity
Note. Cued recall ranges from a minimum of 0 to a maximum of 3.

Hypothesis 12: Tabloid production will increase perceptions of threat.

This hypothesis predicted that viewers would exaggerate the severity of specific actions and situations in tabloid stories and arousing stories compared to standard or calm stories. The main effects of both form, $F(1,39) = 9.87, p < .003, e^2 = .12$, and content, $F(1,39) = 12.69, p < .001, e^2 = .22$, were significant. Viewers rated actions and situations in tabloid stories as significantly more threatening ($M = 7.96, SD = .72$) than standard stories ($M = 7.64$, $SD = .95$). They also rated arousing stories ($M = 7.99$, $SD = .76$) as more threatening than calm stories ($M = 7.61$, $SD = .80$).

Hypothesis 13: Tabloid and arousing stories will be more interesting.

This hypothesis predicted that people would rate arousing and tabloid stories to be more interesting than calm and standard stories. Only the main effect for content on the ratings for interest in the stories was significant, $F(1,38) = 25.87$, $p < .000$, $e^2 = .34$. Viewers rated arousing stories as more interesting ($M = 7.62$, $SD = 1.22$) than calm stories ($M = 6.28$, $SD = 1.78$).

Conclusion

In summary, the findings of this study show, consistent with existing research, that arousing news content and tabloid packaging both cause increases in arousal and attention. Further, as predicted, these changes in arousal and attention are associated with predictable changes in recognition, cued recall, and free recall. The evaluative measures of this study show that viewers recognize the tabloid format when they see it and distrust news presented in this sensational style. Finally, viewers exaggerate the importance of news presented with sensational formal features. These results generally support the limited capacity theory of message processing and provide valuable information about how tabloid form influences information processing.

These results suggest that tabloid production has several interesting effects on information processing. First, it increases attention. However, this increase in resources allocated to the message can help or hinder the viewer's ability to remember the information in the message. Specifically, the bells and whistles of tabloid packaging do increase the amount of cognitive resources allocated to processing the message. During calm content, when sufficient resources are available to respond to these formal calls for resources, this results in increases in both encoding (measured as recognition) and storage (measured as cued recall). On the other hand, when stories are arousing, the resources demanded by arousing content coupled with the additional resources required by tabloid packaging appear to overload processing. Thus, although encoding remains high, storage suffers as demonstrated by the decreased cued recall scores. This result corroborates the suggestion that memory for calm media content could be enhanced if packaged in a dynamic production pace but damaged when content is arousing (Lang et al., 1999).

The gainful effects of tabloid packaging when it is applied to calm news have important implications for broadcast journalism professionals. The delayed cued recall questions for this study were designed to measure comprehension of useful information rather than recall of superficial facts contained in the news. For example, rather than testing if participants could recall the color of the roof of a house on fire, we asked questions related to the main point of the story: How could the fire have been prevented? As reported here, the results suggest that tabloid packaging styles enhance the storage of facts associated with calm content but has negative consequences for storage of facts when applied to news that is already arousing. It therefore appears that television news practitioners would do well to take a discriminating approach to news packaging, basing their editing decisions on how arousing

individual story content is rather than following a set production style that defines the overall news style for the show. At a bare bones level, this means that the PBS *NewsHour* might consider stepping up its bland production style when it comes to in-depth coverage of weighty public affairs issues. This also means that in the commercial news arena, wholesale hype of local news that ranges from tornadoes to city council meetings, a practice that does not differentiate between different news contents, does not serve the higher democratic goal of informing the public.

Delayed recall results also deserve close scrutiny. Participants were asked to recall news stories without any prompting after a period of 48 hours, a test that enables an assessment of information retrieval. Packaging style did not influence memory for news stories, but stories with arousing content were recalled better than stories with calm content. Contrast for a moment these free recall findings with the cued recall results. The central difference between the two memory measures involves giving participants assistance in bringing memory traces to the surface and the depth of information that participants are expected to recall. In cued recall tests, participants received a small hint for each story (e.g., "In the story about the fire . . . ") to help stimulate stored memory and then were asked to give an open-ended answer (" . . . how could the tragedy have been prevented?"), which prompts the comprehension level for detailed facts featured in the stories. The free recall measures, on the other hand, offered no cue to stimulate memory but required retrieval of relatively general information: the story topic of each story. Participants recalled that they saw the arousing news stories more frequently than they recalled seeing the calm news stories. But, they remembered more of the specific factual information contained in the calm news stories than in the arousing news stories.

Arousing media content has been shown to require a considerable amount of resources for processing (Lang, Bolls, et al., 1999; Lang et al., 1996). The overall message is encoded, stored, and retrieved with a high rate of success. Yet, because arousing messages impose a considerable burden on the information processing system, the factual details contained in the message are often not encoded and stored very well. Although dynamic formal features (such as the tabloid ones used in this study) theoretically prompt the same automatic allocation of processing resources that arousing content has been shown to do, attention-grabbing packaging seems to enhance memory for details rather than generalities, particularly in calm news.

The evaluative measures used in this study confirm that viewers are quite competent detecting sensationalism and view news stories packaged in such a style with skepticism. In fact, although the content (both the script and visual material) of the tabloid and standard versions of stories was exactly

the same, viewers rated the tabloid versions as less objective and believable. It is interesting that tabloid production features were particularly damaging to the objectivity of calm stories. While watching arousing stories, perhaps because they are already highly charged, viewers did not seem to note the sensational packaging as much as with stories that were calm in content.

This study also provides evidence that formal features might indeed affect the meaning of message content, thereby altering the essence of supposed news "facts." The seriousness of situations, potency of actions, and intensity of emotions were amplified across all tabloid versions of stories. Thus, form has been shown to transform content. This finding has important implications for fairness in television journalism. Indeed, when viewers perceive a clash between the KKK and Black panthers as more intense due to production style, or suspects are viewed as more guilty of a crime when the message is packaged using tabloid features, journalism critics have reason to raise concern about prejudicial news information, designed to arouse rather than inform. Most alarming, although participants are distrustful of stories packaged in the tabloid format, they are not able to tune out the embellishment that results from it. This study's findings present a dilemma: Tabloid production features help to make news facts more memorable but their inherent showiness dramatizes news to the point of exaggerating facts. The tradeoff between improved memory and journalistic misrepresentation is certainly an issue that demands further academic inquiry and debate in public forums.

Notes

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2. Music is often used in tabloid news to enhance the mood of scenes that have potential to be emotionally charged. Sound effects refer to the addition of sound other than ambient sound, voiceover narration, and music. Examples include the sound of a gavel, a ticking clock, police sirens, and so on. Unlike natural sound, sound effects are created and controlled by the producer during postproduction editing. Slow motion extends the duration of visual scenes, making movement appear slower than normal. Flash frame transitions between video shots mimic a camera flash and make up 5 to 10 frames of white video inserted between two shots. An obtrusive tone of voice dramatizes news whereas an unobtrusive voice tone presents information in a factual manner. For the sake of dramatization and heightening of emotional effect, tabloid reporters often inappropriately emphasize words to the extent that misplaced emphasis has become a habit.

3. The specific questions were as follows:

In the story about the fire, how could the tragedy have been prevented?

In the story about the shooting at the apartment complex, who is suspected of the violence?
In the story about the tornado, what was suggested to be the cause of the severe weather?
In the story about the abortion protest, approximately how many people were not able to keep their appointments at the clinic?
In the story about the KKK rally, who was the group of African American protestors?
In the story about the flag burning, what was given as the reason for the flag burning?
In the story about the layoffs of Boeing workers, what was the cause for the layoffs?
In the story about the legal battle between Eli Lilly and generic drug makers, what was the reason for the battle?
In the story about the work on the city's water draining system, where were local traffic diverted to?
In the story about the steel mill, what is the practical outcome of the new technology for steel casting?
In the story about the I-STEP exam, what happens if a student does not pass the I-STEP exam before their graduation date?
In the story about healthcare, why were there changes in the healthcare plan?

4. The specific questions were as follows:
How serious is Boeing's financial trouble?
How significant is the number of workers that Boeing will lay off?
How effective were the police in dealing with the protesters?
How passionate were the protestors about the anti-abortion cause?
How drastic were the changes in health insurance benefits?
How concerned are city employees about the changes in health insurance?
In how much danger were the firefighters?
How responsible is the children's mother for the situation?
How tough was the legal battle between Eli Lilly and generic drug makers?
How important are exclusive rights to Prozac for the financial welfare of Eli Lilly?
How angry were the people who burned the American flag?
How prominent was police presence at the scene of the flag burning?
How effective were the police in dealing with the conflict?
How intense was the clash between the KKK and the protestors?
How much impact will the new technology have on the productivity of steel casting?
How vital is this development to the financial welfare of the Crawfordsville steel mill?
How guilty are the men who were arrested for murder?
How threatening is gang violence in the Blackburn Terrace Apartment neighborhood?
How demanding is the I-STEP exam on students?
How much support are schools offering in helping students prepare for the I-STEP exam?
How serious were the traffic problems that resulted from closing streets off?
How disruptive was the work on the water draining system to the lives of local residents?
How much damage did the weather system cause?
In how much danger were people when the tornadoes touched down?

5. This analysis has about 80% power for this size effect. This study would have had about 90% power with 60 participants.

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***Maria Elizabeth Grabe**, Ph.D., Temple University, is an associate professor in the School of Journalism at Indiana University. Her research focuses on the content and effects of electronic media. She has recently published work in* Journalism & Mass Communication Quarterly, Communication Research, Human Communication Research, Journal of Broadcasting & Electronic Media, *and* Critical Studies in Media Communication.

***Annie Lang**, Ph.D., University of Wisconsin–Madison, is a professor in the Department of Telecommunications at Indiana University. Her research focuses on emotional, cognitive, and physiological responses to media messages. She has recently published work in* Journal of Communication, Journal of Broadcasting & Electronic Media, Communication Research, *and* Media Psychology.

***Xiaoquan Zhao**, M.A., Indiana University, is a doctoral candidate in the Annenberg School for Communication at the University of Pennsylvania. His research interests include media content and effects, health communication, and message design for media campaigns.*