Framing the News: How an Article's Headline and Content Valence Shape Readers' Understanding and Impressions

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ABSTRACT
Media outlets often use "clickbait" or misleading headlines to increase engagement, but these strategies may distort reader understanding. Although prior research shows that negative information is more likely to capture attention and spread online, most studies have focused on the dissemination of news on social media rather than on readers' cognitive processing. Fewer studies have examined how headline features, such as emotional valence and congruence with article content, influence judgments, comprehension, and behavioral intentions. Across two experiments, we investigated how headline valence and headline–article congruence influenced readers' impressions and comprehension. In Study 1, college students read an article with a positive, negative, or neutral headline and rated their impressions of the article. In Study 2, participants read articles written in a positive or negative tone, paired with either congruent or incongruent headlines, and completed the same impression measures plus comprehension questions. Study 2 also included a replication of Study 1 as well as an independent replication sample for the unique Study 2 analysis using a national sample obtained using Prolific. Across both studies, headline valence did not significantly affect participants' impressions. However, congruency between the headline and article did influence comprehension in one sample. Together, these findings suggest that the relationship between headline framing and news comprehension is complex and may depend on headline–article alignment as well as contextual and individual factors.

KEYWORDS
Headlines; News Articles; Valence; Comprehension; Negativity Bias; Clickbait; Reader Impressions; Article Tone

INTRODUCTION

With the rise of technology, people can now easily access news and information with just the click of a button. Recent research indicates that 86% of U.S. adults obtain news through a smartphone, computer, or tablet.[1] While this accessibility allows for greater public engagement with current events, it has also intensified competition among media outlets. As a potential response to this competition, many online news platforms have introduced new methods of attracting audiences, including clickbait headlines designed to grab the reader's attention.[2] Previous research has demonstrated that headlines play a critical role in guiding readers' attention and influencing their decisions about which articles to read.[3] The limited background information that is provided by these clickbait headlines urges readers to pursue corresponding articles to provide context.[4] Unfortunately, emerging evidence suggests that strategies such as using clickbait headlines may undermine public understanding by distorting how readers process information.[5] Additionally, strategic use of epistemic language in headlines could undermine public trust or interest in the news.[6] Therefore, more research is needed to uncover which headline characteristics are related to how one cognitively and emotionally interacts with news content.

The influence of news headlines stems from the fact that it is typically the first element of an article that is encoded and is often interpreted through the lens of the reader's prior knowledge.[7] In other words, the extent to which a headline activates relevant background knowledge can shape how new information is integrated with preexisting knowledge, ultimately affecting what information the reader retains.[8,9] For instance, Surber and Schroeder[9] found that headings improved recall of high-importance information, particularly for individuals with greater prior knowledge of the topic.

While headlines help activate the necessary mental schema for understanding an article, the way a headline is framed also plays an important role in shaping comprehension and overall interest in the content, especially when considering the emotional valence of the language used. Readers tend to fixate more on[10] and have higher discrimination for[11] negatively valenced text compared to neutral or positive content. Furthermore, readers show a stronger preference for negative headlines and additionally skew the negativity of the headline when sharing the information.[12] This negativity bias appears consistent across modalities, such as

reading versus listening to the news.[13] Moreover, the effect of negative language on processing speed may vary depending on individual differences.[14,15] For instance, Lei *et al.*[15] found that individuals with a high need for affect and strong narrative absorption read positive words more slowly when engaged with a nonfiction story about a missing person, suggesting that emotional predispositions may also influence how headline valence affects information processing.

From a theoretical perspective, negative stimuli are thought to attract more attention due to their evolutionary significance.[16] This phenomenon, known as the negativity bias, suggests that negative information may signal potential threats, leading to heightened attention as a survival mechanism. However, some researchers argue that emotional arousal, rather than valence alone, may play a more important role in capturing attention.[17] Emotional arousal refers to an increased physiological and psychological state in response to a stimulus, which naturally enhances alertness and focus. As a result, some studies indicate that individuals are more likely to attend to and remember stimuli that are highly emotionally arousing, regardless of whether they are positive or negative in valence.[18,19]

Given that negative or emotionally arousing information tends to be preferentially processed, it is reasonable to predict that such content would influence both memory and comprehension. Research supports this prediction, showing that negatively charged emotional content often narrows attentional focus to the most salient aspects of an event (e.g., blood at a crime scene), thereby enhancing memory for those details.[20] This effect, known as "emotional memory narrowing," has been observed across a variety of contexts, including natural disasters,[21] childhood abuse and maltreatment,[22] and physical injuries.[23] However, this focused attention comes at a cost: while memory for emotionally negative features may be strengthened, memory for neutral or positive aspects of the experience may be diminished or even impaired.[20] The ability to use negative text to capture attention and improve reader retention provides an incentive for news outlets to use negativity to drive engagement, despite the potential ramifications for how such negativity bias could influence society more broadly.

For example, Mujica and Bachmann[24] studied how exposure to different levels of melodramatization in news stories affected participants' recall and understanding. Their results showed that non-melodramatic versions of news reports resulted in better understanding of the causes and effects described, regardless of the topic. The authors suggest that highly dramatic content may trigger strong emotional responses that, when negative, hinder understanding. Although their study did not directly manipulate headlines, headlines often set the emotional valence and shape how a story is initially interpreted. When headlines carry a negative valence, they may prompt readers to approach the content less analytically, reducing their ability to differentiate and integrate information, ultimately impairing comprehension.[25]

Though the purpose of a headline is to summarize the main idea of an article and help readers choose which articles to read,[26] there are many instances where the headline and the article's content are incongruent. These misleading headlines are usually associated with fake news and contribute to the spread of misinformation online. In a study by Carcioppolo *et al.*,[5] participants who read an article with an accurate headline had higher recognition and comprehension scores than those reading a clickbait question headline (e.g., Does green tea extract cause liver damage?") and a clickbait exaggerated headline (e.g., "White wine has a scary link to skin cancer."). The study also showed that reading corrected information within an article was not enough to counteract the negative effects of a misleading headline. In a similar study, Ecker *et al.*[26] found that even when misleading headlines are corrected within the article, the initial misinformation often continues to influence readers' understanding.

The Current Study

While existing research has investigated the preference for negative information in news reading, current approaches have primarily focused on the dissemination process itself.[12] This has been driven by the rise of digital social media platforms, where reposting and sharing news articles have become a dominant form of engagement. Although the dissemination process helps us to understand social behavior, like the spread of information in online environments, more research is needed to better understand the information-processing aspect of news consumption.

While Ecker *et al.*[26] demonstrated that factually misleading headlines continue to influence comprehension even when corrected in the article text, less is known about how emotionally incongruent headlines, in which the emotional tone differs from the article content while facts remain consistent, affect information processing. The present research addresses this gap by examining whether emotional valence incongruence between headlines and articles influences comprehension and reader impressions. Like prior research on headline effects, we selected article topics relevant to our participant population (i.e., U.S. college students), as well as the population more broadly, to maintain ecological validity and engagement.

The present research aimed to address these gaps through two experiments. Study 1 sought to confirm the negativity bias by investigating how the emotional valence of a news headline (positive, negative, or neutral) influences readers' judgments and behavioral intentions, such as interest in the article, perceived informativeness, and willingness to share. We hypothesized that

participants in the negative valence group would report significantly higher levels of interest, perceived informativeness, and likelihood of sharing the article than those in the neutral or positive valence groups, consistent with prior findings that negative information is more captivating.[12] Additionally, we hypothesized that participants in the negative valence group would rate the article as more biased, as negatively framed headlines may be perceived as more opinionated or emotionally charged than neutral or positive ones.

Study 2 focused on the impact of headline–article congruency on reading comprehension. Participants read an article preceded by a headline that was either congruent (i.e., aligned in valence and content) or incongruent (i.e., contradictory or misleading relative to the article's content). We hypothesized that the negative headline groups would have higher reading comprehension than the positive headline groups. We also hypothesized that participants exposed to congruent headlines would demonstrate significantly better comprehension of the article than those exposed to incongruent headlines, based on the idea that congruency facilitates smoother cognitive integration and reduces confusion or misdirection caused by misleading cues,[26] and that this difference would be larger for the negative headline group.

METHODS AND PROCEDURES

STUDY 1

Participants

All 116 participants were sourced from a university in the south-eastern U.S. using the school's research recruitment system (SONA, 2025). Of these participants, 89 (76.7%) identified as female, 23 (19.8%) identified as male, 2 (1.7%) identified as gender non-binary, 1 (0.9%) identified as transgender male, and 1 (0.9%) identified as genderfluid. Racial demographics included 58 (50.0%) Caucasian/White, 39 (33.6%) African American/Black, 10 (8.6%) Hispanic/Latin, 6 (5.2%) Asian American, 1 (0.9%) Native American, and 2 (1.7%) other. The age of participants was between 16 and 45 *(M* = 19.23, *SD* = 3.09). Participant political ideology included 34 (29.3%) conservatives, 55 (47.4%) moderates, and 26 (22.4%) liberals. When asked how often they pay attention to the news, 21 (18.1%) said daily, 53 (45.7%) said weekly, 30 (25.9%) said monthly, and 12 (10.3%) said yearly. When asked where they get most of their news, 26 (22.4%) said online news outlets, 80 (69.0%) said social media, and 10 (8.6%) said television stations. When asked about their familiarity with the topic of censorship, 9 (7.8%) said they were very unfamiliar, 6 (5.2%) said they were unfamiliar, 45 (38.8%) said they were neither unfamiliar nor familiar, 41 (35.3%) said they were familiar, and 15 (12.9%) said they were very familiar. Before completing the analysis, one participant was excluded due to having taken more than 80 minutes to complete the 10–15-minute study.

Materials

The independent variable manipulation involved two experimental groups and one control group. All content focused on censorship, a highly debated issue in today's political climate that has received extensive coverage across various online media outlets.[27] The experimental groups included a positive valence group, where the headline "Censorship, and The Balancing of Protected Rights with Wanting to Improve Information Security" included the two distinct positively valenced words "protected" and "improve", and a negative valence group, where the headline "Censorship, and the Potential Slaughter of Rights Versus Avoiding the Hurt of Unsecured Information" included the two distinct negatively valenced words "slaughter" and "hurt". Similarly, the control group headline "Censorship, and Sentiments Towards People's Rights While Considering the Privacy and Availability of Information" included the two neutral words "sentiments" and "availability." The valence of the selected words was determined using the Affective Norms for English Words (ANEW) by Bradley and Lang.[28] Along with the headline, participants were presented with the same article on the topic of censorship, which was developed by generative AI using a prompt for a non-biased news article on censorship (Grammarly, 2024) and was 222 words in length.

To measure the dependent variables, four items were developed to measure the participants' interest in the article, the likelihood that they would share the article, how informative they felt the article was, and how biased they felt the article was. Each item was measured on a 6-point scale, with 1 being (not very) and 6 being (very), and the item measuring perceived bias was reverse-coded. Participants responded to a manipulation check question asking them to rate the headline's language valence on a scale of 1 (negative) to 9 (positive), along with standard demographic questions (i.e., age, race, gender). Finally, they answered the additional descriptive questions to better understand the population composition. The first question asked how often they pay attention to the news, either every day, weekly, monthly, or yearly. The second question asked where they get their news from—online news outlets, social media, television stations, or printed media. The third asked whether they identified their political ideology as conservative, moderate, or liberal. The last question asked how familiar they were with the topic of censorship on a scale of 1 (very unfamiliar) to 5 (very familiar).

Procedure

This research was approved by the institution's IRB as an exempt study. Because some individuals attend college prior to the age of 18, minors who wished to participate in exempt studies are required to submit a signed parental consent form to the

department prior to participating in any exempt studies. Participants self-selected to participate in the online study using the school's research recruitment system and were initially presented with an informed consent document. After reading and indicating consent, participants were then randomly assigned to one of the two experimental groups or the control group. Regardless of their group, they were presented with instructions to read the following article carefully, with the phrase "starting with the title" underlined, bolded, and in a larger text. Depending on their assigned group, these instructions were followed by the headline corresponding to their assigned condition. All three groups were provided with the same AI-generated article on censorship. Because the reading rate of college students can range from 100-400 words per minute (Wake Forest University, n.d.), participants had to spend a minimum of three minutes reading the headline and article before moving on with the study to account for a potential slower rate of reading and distractions present in an online environment. They then responded to all survey items for the dependent variables, the manipulation check question, and other demographic questions. Participants were then debriefed on the experiment.

STUDY 2

Participants – Original Sample

For Study 2, although an effort was made to collect data in person to encourage participant attention, due to constraints on data collection only during course sessions, data from 85 participants were collected in person, while data from 58 participants were collected online. All 143 participants were recruited from the same university used for Study 1. Of the 143 participants recruited, 112 (78.3%) identified as female, 27 (18.9%) identified as male, and 4 (2.8%) identified as gender non-binary. Racial demographics included 63 (44.1%) African American/Black, 60 (42.0%) Caucasian/White, 13 (9.1%) Hispanic/Latinx, 5 (3.5%) Asian American, and 1 Native American (0.7%). The ages of participants reported were between 16 and 53 years (M = 20.41, SD = 4.67). The reported political ideology for participants included 35 (24.5%) conservatives, 75 (52.4%) moderates, and 33 liberals (23.1%). When asked how often they pay attention to the news, 19 (13.3%) said daily, 68 (47.6%) said weekly, 42 (29.4%) said monthly, 3 (2.1%) said yearly, and 11 (7.7%) said never. When asked where they get most of their news, 27 (18.9%) said online news outlets, 98 (68.5%) said social media, 12 (8.4%) said television stations, and 6 (4.2%) said other. When asked about their familiarity with the topic of censorship, 13 (9.1%) said they were very unfamiliar, 19 (13.3%) said they were unfamiliar, 58 (40.6%) said they were neither unfamiliar nor familiar, 39 (27.3%) said they were familiar, and 14 (9.8%) said they were very familiar.

Participants – Replication Sample

To replicate the findings of Study 2, a secondary sample was obtained using Prolific from a sample of individuals who identified as college students in the U.S. All 191 participants completed the study online. Of the 191 participants recruited, 81 (42.4%) identified as female, 97 (50.8%) identified as male, 4 (2.1%) transgender male, 1 (.5%) transgender female, 7 (3.7%) identified as gender non-binary, and 1 (.5%) opted not to disclose. Racial demographics included 39 (20.4%) African American/Black, 105 (55%) Caucasian/White, 22 (11.5%) Hispanic/Latinx, 22 (11.5%) Asian American, and 3 indicated other (1.6%). The ages of participants reported were between 18 and 45 years (M = 28.50, SD = 7.28). The reported political ideology for participants included 31 (16.2%) conservatives, 55 (28.8%) moderates, and 105 liberals (55.0%). When asked how often they pay attention to the news, 72 (37.7%) said daily, 96 (50.3%) said weekly, 22 (11.5%) said monthly, and 1 (0.5%) said never. When asked where they get most of their news, 70 (36.6%) said online news outlets, 110 (57.6%) said social media, 9 (4.7%) said television stations, and 2 (1.0%) said other. When asked about their familiarity with the topic of censorship, 1 (.5%) said they were very unfamiliar, 10 (5.2%) said they were unfamiliar, 29 (15.2%) said they were neither unfamiliar nor familiar, 105 (55.0%) said they were familiar, and 46 (24.1%) said they were very familiar.

Materials

Study 2 employed a 2x2 factorial design, manipulating both the valence of the headline (positive or negative) and the valence of the article (congruent or incongruent with headline). Participants were assigned to one of four experimental conditions: positive headline congruent with article valence, positive headline incongruent with article valence, negative headline congruent with article valence, and negative headline incongruent with article valence. Generative AI (Copilot, 2025) assisted in the development of two headlines with opposing valences: a positive valence (i.e., Censorship: Protecting Users from Harm) and a negative valence (i.e., Censorship: A Threat to Freedom Disguised as Security). The article headlines were revised from the original ones used in the first study to make them more appealing to the reader. The same AI tool was used to develop corresponding article text in both positive and negative valence, and was further edited by two researchers. Edits made involved making sure that differences in language valence occurred at the same relative locations in both articles and to similar degrees in order to ensure manipulation was consistent between the different articles.

To ensure successful valence manipulation, we validated the article text using Linguistic Inquiry and Word Count (LIWC; Tausczik & Pennebaker[30]). LIWC analysis revealed that the negative-valence article had a negative emotion score of 5.02, substantially higher than the typical average of 1.38 for formal written language. Similarly, the positive-valence article produced a positive emotion score of 4.11, compared to the typical average of 2.33 for formal language. To control for potential confounds

related to article length, both versions of the article, including their respective headlines, were matched for length, with each totaling 227 words. Furthermore, to address inattention issues related to headline valence exposure from Study 1, Study 2 included a manipulation check that involved presenting participants with the article headline on a separate page and asking them to type it into a response box. On the following page, they were again presented with the headline that was now paired with the article's text. Afterwards, participants were asked to rate the valence of the article headline on a Likert-type scale ranging from 1 to 9, with 1 being *negative* and 9 being *positive*.

Along with questions that gauged interest in the article content, one's political ideology, and standard demographics (i.e., age, race, gender) that were included in Study 1, Study 2 also included five additional questions to measure the dependent variable of reading comprehension. Each reading comprehension question was multiple choice and involved information that could be found in the provided text. A total score of the number of comprehension questions answered accurately was calculated for each participant.

Procedure

This research was approved by the institution's IRB as an exempt study. Because some individuals attend college prior to the age of 18, minors who wished to participate in exempt studies are required to submit a signed parental consent form to the department prior to participating in any exempt studies. Participants for the original sample self-selected into the study using the school's research recruitment system. Participants that signed up for in-person appointment came to the lab at a participant-selected time to take part in the in-person study that was facilitated using Qualtrics software (Qualtrics, 2025). Each session typically consisted of no more than 5 participants. While others signed up for an online option and completed the study in an area of convenience. For the replication sample, participants self-selected into the study using Prolific, an international research recruitment platform. Participants who signed up on Prolific were immediately redirected to Qualtrics to complete the study online.

For all participants, an informed consent document was presented to each participant providing them with basic information about the study. After indicating their consent, each participant was randomly assigned to one of the four experimental conditions. To ensure participants were correctly exposed to the stimulus, they were presented with the headline for the group they were assigned to (i.e., positive or negative valence), as well as asked to type out this headline in a box below. The headline was then presented again on the following page along with the article text associated with their assigned group (i.e., congruent or incongruent). Participants could only proceed with the study after a minimum of two minutes. This time was reduced from Study 1 since the in-person nature of the study should have allowed for fewer distractions, and even at a slower rate of reading (i.e., 100 words/minute), only 2.27 minutes would be needed to sufficiently read the article. After reading the article, participants were asked to answer reading comprehension questions related to the article's content, followed by a question asking them to rate the headline's valence. Along with this, they were presented with questions to gauge the reader's interest in the article as well as questions to observe demographic data (i.e., age, gender, race, political ideology). Finally, participants were debriefed on the experiment.

RESULTS

STUDY 1

Manipulation Check

To have passed the manipulation check, those who received the negatively valenced headline had to indicate a rating between 1-3, those who received the neutral headline had to indicate a rating between 4-6, and those who received the positively valenced headline had to indicate a rating between 7-9. Only 47 of the participants (40.5% of the 116 participants) correctly identified the headline as the intended valence, and thus all others were excluded from subsequent analyses due to possible lack of attention.

Of these 47 participants, 41 (87.2%) identified as female, 5 (10.6%) identified as male, and 1 (2.1%) identified as gender non-binary. Racial demographics included 29 (61.7%) Caucasian/White, 15 (31.9%) African American/Black, 2 (4.3%) Asian American, and 1 (2.1%) Hispanic/Latin. The age of participants was between 16 and 45 (M = 19.59, SD = 4.32). Participant political ideology included 16 (34.0%) conservatives, 21 (44.7%) moderates, and 9 (19.2%) liberals. When asked how often they pay attention to the news, 7 (14.9%) said daily, 22 (46.8%) said weekly, 13 (27.7%) said monthly, and 5 (10.6%) said yearly. When asked where they get most of their news, 13 (27.7%) said online news outlets, 28 (59.6%) said social media, and 6 (12.8%) said television stations. When asked about their familiarity with the topic of censorship, 5 (10.6%) said they were very unfamiliar, 2 (4.3%) said they were unfamiliar, 16 (34.0%) said they were neither unfamiliar nor familiar, 18 (38.3%) said they were familiar, and 6 (12.8%) said they were very familiar.

An analysis of variance (ANOVA) was conducted to examine the relationship between the headline valence rating and the IV condition of participants. There was a significant difference in ratings of headline valence between the positive headline (M =

5.53, *SD* = 1.18), neutral headline (*M* = 5.00, *SD* = 1.19), and negative headline (*M* = 4.71, *SD* = 1.51), *F*(2,111) = 3.85, *MSE* = 1.69, $p = .024$, $\eta_{lp}^2 = .065$. Pairwise comparison indicated that positive headlines were rated as more positive compared to negative headlines ($p = .007$), while neither was different in rating compared to the neutral headline ($p = .080$, $p = .333$, respectively).

Potential Confounds

To account for a potential confounding variable and determine if covariates were needed for our analysis, we examined whether the participants' familiarity with censorship, political ideology, and frequency with which they attend to the news differed across assigned IV conditions while excluding those who failed the manipulation check. There was a marginally significant difference in familiarity with censorship between IV conditions, *F*(2,44) = 3.20, *MSE* = 1.13, $p = .05$, $\eta_p^2 = .13$. However, there was no significant difference across the IV conditions for political ideology [*F*(2,43) = .35, *MSE* = .55, $p = .707$, $\eta_p^2 = .02$] or frequency with which they attend to the news [*F*(2,44) = .08, *MSE* = .78, $p = .924$, $\eta_p^2 = .004$]. Therefore, given our limited sample size and that familiarity with censorship was only marginally significant, none of these variables were included as covariates in our analysis.

Hypothesis Testing

A between-group ANOVA was conducted with only the participants who passed the manipulation check to examine the impact of headline valence condition (i.e., positive, neutral, negative) on participant impressions (i.e., interest, shareability, bias, informative) of the article. Contrary to the research hypothesis, how interesting participants found the article in the negative valence headline group was not significantly different from the neutral valence headline group or the positive valence headline group, *F*(2,44) = 1.66, *MSE* = 1.44, $p = .202$, $\eta_p^2 = .07$. Contrary to the research hypothesis, the likelihood that participants would share the article in the negative valence headline group was not significantly different from the neutral valence headline group or the positive valence headline group, *F*(2,44) = .59, *MSE* = 1.40, $p = .560$, $\eta_p^2 = .03$. Contrary to the research hypothesis, how informative participants found the article in the negative valence headline group was not significantly different from the neutral valence headline group or the positive valence headline group, *F*(2,44) = .63, *MSE* = 1.48, $p = .538$, $\eta_p^2 = .03$. Contrary to the research hypothesis, how biased participants felt the article was in the negative valence headline group was not significantly different from the neutral valence headline group or the positive valence headline group, *F*(2,44) = .35, *MSE* = 1.83, $p = .706$, $\eta_p^2 = .02$. See **Table 1** for univariate statistics.

	Positive Headline		***Negative Headline***		***Neutral Headline***	
Variable	***M***	***SD***	***M***	***SD***	***M***	***SD***
Interest	3.25	1.67	3.71	1.11	2.84	1.08
Share	2.00	1.20	1.43	0.79	1.94	1.24
Informative	4.38	1.48	3.86	0.90	3.84	1.22
Bias	3.13	1.46	2.57	1.40	2.75	1.32

Note: M and *SD* represent mean and standard deviation, respectively

Table 1. Study 1: Impact of Headline Valence (positive, negative, neutral) on Participant Impressions

STUDY 2: ORIGINAL SAMPLE RESULTS

Manipulation Check

To have passed the manipulation check, those who received the negatively valenced headline had to indicate a rating between 1-3 and those who received the positively valenced headline had to indicate a rating between 7-9. We assumed in-person data collection and requesting participants to type the article title prior to reading the article would increase attention. However, only 37 participants (25.9% of the 143 participants) correctly identified the headline as the intended valence. Rates of accuracy were similar among those who participated in the study in person, with only 23 of the participants (27.1% of the 85 participants) correctly identified the headline as the intended valence. An ANOVA was conducted to examine the relationship between the headline valence rating and the IV condition of participants. Although participants were not rating the article headline within the anticipated range (i.e., 1-3 for negative valence, 7-9 for positive valence), there was a significant difference between the ratings of the two headlines, such that the negative headline (*M* = 4.44, *SD* = 1.62) was rated as more negatively valenced that the positive headline (*M* = 5.29, *SD* = 1.23), *F*(1,139) = 12.28, *MSE* = 2.07, $p < .001$, $\eta_p^2 = .08$. There was also a significant difference in ratings of headline valence when accounting for the article valence, such that the negative headline with congruent text (*M* = 4.15, *SD* = 1.58) was rated as more negatively valenced than both the positive headline with congruent article text (*M* = 5.35, *SD* = 1.43; $p < .001$) and the positive headline with incongruent article text (*M* = 5.22, *SD* = 1.02; $p = .002$), *F*(3,137) = 4.97, *MSE* = 2.06, $p = .003$, $\eta_p^2 = .10$. There were no significant differences between the other groups. Because the inability to pass the manipulation check no longer appears to be due to inattention, considering the changes made between Study 1 and Study 2, the rating of the headline valence was included as a covariate in subsequent analyses instead of excluding those who failed the manipulation check.

Potential Confounds

To account for a potential confounding variable and determine if covariates were needed for our analysis, we examined whether the participants' familiarity with censorship, political ideology, and the frequency with which they attend to the news differed across the assigned IV conditions. There was no significant difference across IV conditions for familiarity with censorship, [$F(3,139) = .90$, $MSE = 1.15$, $p = .445$, $\eta_p^2 = .02$], political ideology [$F(3,139) = .53$, $MSE = .48$, $p = .660$, $\eta_p^2 = .01$] or frequency with which they attend to the news [$F(3,139) = 1.38$, $MSE = 1.48$, $p = .253$, $\eta_p^2 = .03$]. Therefore, none of these variables were included as covariates.

Hypotheses on Impressions on Article Content (Study 1 Replication)

To readdress the hypothesis of Study 1, a between-group ANCOVA (i.e., analysis of covariance) was conducted to examine the impact of headline valence condition (i.e., positive, negative) on participant impressions (i.e., interest, shareability, bias, informative) of the article, while controlling for participant ratings on headline valence. Contrary to the research hypothesis, how interesting participants found the article in the negative valence headline group was not significantly different from the positive valence headline group, $F(1,138) = .01$, $MSE = 1.52$, $p = .931$, $\eta_p^2 < .001$. Contrary to the research hypothesis, the likelihood that participants would share the article in the negative valence headline group was not significantly different from the positive valence headline group, $F(1,138) = .28$, $MSE = 1.79$, $p = .595$, $\eta_p^2 = .002$. Contrary to the research hypothesis, how informative participants found the article in the negative valence headline group was not significantly different from the positive valence headline group, $F(1,138) = .06$, $MSE = 1.05$, $p = .804$, $\eta_p^2 < .001$. Contrary to the research hypothesis, how biased participants felt the article was in the negative valence headline group was not significantly different from the positive valence headline group, $F(1,138) = .02$, $MSE = 1.70$, $p = .904$, $\eta_p^2 < .001$. See **Table 2** for univariate statistics.

	Positive Headline		***Negative Headline***	
Variable	***M***	***SD***	***M***	***SD***
Interest	3.19	1.31	3.08	1.18
Share	2.59	1.45	2.32	1.25
Informative	4.24	1.03	4.18	1.05
Bias	2.73	1.22	2.80	1.40

Note: M and *SD* represent mean and standard deviation, respectively

Table 2. Study 2: Impact of Headline Valence (positive, negative) on Participant Impressions

Additionally, because the changes to Study 2 procedures did not eliminate the issue of valence ratings matching anticipated valence, we reran the analyses for Study 1 to include the entire sample, while controlling for participant ratings on headline valence to directly compare the results to Study 2. How interesting participants found the article in the negative valence headline group was not significantly different from the neutral valence headline group or the positive valence headline group, $F(2,111) = .12$, $MSE = 1.62$, $p = .884$, $\eta_p^2 = .002$. The likelihood that participants would share the article in the negative valence headline group was not significantly different from the neutral valence headline group or the positive valence headline group, $F(2, 111) = 1.31$, $MSE = 1.39$, $p = .273$, $\eta_p^2 = .02$. How informative participants found the article in the negative valence headline group was not significantly different from the neutral valence headline group or the positive valence headline group, $F(2, 111) = .71$, $MSE = 1.59$, $p = .494$, $\eta_p^2 = .01$. How biased participants felt the article was in the negative valence headline group was not significantly different from the neutral valence headline group or the positive valence headline group, $F(2, 111) = .85$, $MSE = 1.56$, $p = .430$, $\eta_p^2 = .02$. All findings were consistent with Study 2 results but were also contrary to hypotheses. Univariate statistics are presented in **Table 3.**

	Positive Headline		***Negative Headline***		***Neutral Headline***	
Variable	***M***	***SD***	***M***	***SD***	***M***	***SD***
Interest	2.95	1.21	3.05	1.45	2.95	1.12
Share	1.95	1.00	1.97	1.30	2.26	1.33
Informative	3.74	1.37	3.76	1.26	3.97	1.22
Bias	2.56	1.19	2.62	1.16	2.90	1.37

Note: M and *SD* represent mean and standard deviation, respectively

Table 3. Study 1: Impact of Headline Valence (positive, negative, neutral) on Participant Impressions including all participants

Hypotheses on Reading Comprehension

An 2x2 between-groups ANCOVA was conducted to examine the effects of headline valence and article valence on reading comprehension, while controlling for participants' perceived headline valence, which was entered as a covariate. Contrary to what was hypothesized, the results indicated that the main effect of headline was not significant, $F(1,135) = .02$, $MSE = 1.57$, $p = .902$, $\eta_p^2 < .001$. There was also no significant main effect of article valence, $F(1,135) = 1.57$, $MSE = 1.57$, $p = 0.211$, $\eta_p^2 = 0.01$.

However, there was a significant interaction between headline valence and article valence, $F(1,135) = 4.39$, $MSE = 1.57$, $p = .038$, $\eta_p^2 = 0.03$. Contrary to what was hypothesized, and as shown in **Figure 1**, follow-up simple effects tests revealed that when the headline was negative, there was no significant difference in reading comprehension ($p = 0.555$), but that when the headline was positive, reading comprehension improved when article text was incongruent (i.e., negatively valenced) compared to when it was congruent [$F(1,135) = 5.59$, $MSE = 1.57$, $p = 0.019$, $\eta_p^2 = 0.04$].

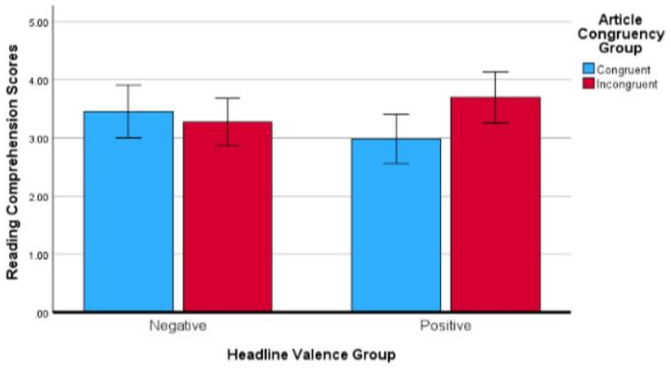

Figure 1. Study 2: Participants' Mean Comprehension Score (y-axis) for Valence Congruency Groups (x-axis). Please note, error bars represent +/- 2 standard error of each condition mean. 'Congruent' signifies the headline valence matched the valence of the article while 'incongruent' signifies the headline valence did not match the valence of the article. Covariate in the model (i.e., participant rating of headline valence) are evaluated at the mean of 4.86.

Post-Hoc Analysis of Political Ideology

Although opinions on the article and political ideology did not vary across valence conditions, these variables may still be related to reading comprehension, such that only those with an interest in the article or of a particular political ideology had reading comprehension impacted by valence. Therefore, both were examined for their relationship with reading comprehension, controlling for participants' perceived headline valence. Bivariate correlations indicated that reading comprehension was positively associated with interest in the article [$r(137) = .24$, $p = .005$] and article informativeness [$r(137) = .28$, $p = .001$]. However, reading comprehension was not associated with likelihood to share the article [$r(137) = -.01$, $p = .886$] or ratings of article bias [$r(137) = -.02$, $p = .816$]. A between-groups ANCOVA revealed that political ideology was not associated with reading comprehension, $F(2, 136) = 1.94$, $MSE = 1.58$, $p = .147$, $\eta_p^2 = .03$. Given our small sample size, the potential moderating effect of political ideology on the relationship between valence, congruency, and reading comprehension was not explored.

STUDY 2: REPLICATION SAMPLE RESULTS

Manipulation Check

An ANOVA was conducted to examine the relationship between the headline valence rating and the IV condition of participants. There was a significant difference between the ratings of the two headlines, such that the negative headline ($M = 4.13$, $SD = 1.49$) was rated as more negatively valenced than the positive headline ($M = 5.01$, $SD = 1.50$), $F(1,188) = 16.64$, $MSE = 2.23$, $p < .001$, $\eta_p^2 = .08$. There was also a significant difference in ratings of headline valence when accounting for the article valence, such that the negative headline with congruent text ($M = 3.96$, $SD = 1.68$) was rated as more negatively valenced than both the positive headline with congruent article text ($M = 5.14$, $SD = 1.10$; $p < .001$) and the positive headline with incongruent article text ($M = 4.89$, $SD = 1.82$; $p = .003$), $F(3,187) = 6.36$, $MSE = 2.23$, $p < .001$, $\eta_p^2 = .09$. There was also a significant difference such that negative headline with incongruent text ($M = 4.30$, $SD = 1.27$) was rating as more negatively valenced than the positive headline with congruent article text ($M = 5.14$, $SD = 1.10$; $p = .006$). There were no other significant differences between the groups. Because the inability to pass the manipulation check no longer appears to be due to inattention, considering the changes made between Study 1 and Study 2, the rating of the headline valence was included as a covariate in subsequent analyses instead of excluding those who failed the manipulation check.

Potential Confounds

To account for a potential confounding variable and determine if covariates were needed for our analysis, we examined whether the participants' familiarity with censorship, political ideology, and the frequency with which they attend to the news differed across the assigned IV conditions. There was no significant difference across IV conditions for familiarity with censorship, [$F(3,187) = .18$, $MSE = .66$, $p = .907$, $\eta_p^2 = .003$], political ideology [$F(3,187) = .47$, $MSE = .57$, $p = .703$, $\eta_p^2 = .008$] or frequency with which they attend to the news [$F(3,187) = 1.37$, $MSE = .48$, $p = .255$, $\eta_p^2 = .02$]. Therefore, none of these variables were included as covariates.

Hypotheses on Impressions on Article Content (Study 1 Replication)

To readdress the hypothesis of Study 1, a between-group ANCOVA (i.e., analysis of covariance) was conducted to examine the impact of headline valence condition (i.e., positive, negative) on participant impressions (i.e., interest, shareability, bias, informative) of the article, while controlling for participant ratings on headline valence. Contrary to the research hypothesis, how interesting participants found the article in the negative valence headline group was not significantly different from the positive valence headline group, $F(1,187) = 1.18$, $MSE = 1.41$, $p = .280$, $\eta_p^2 = .006$. Contrary to the research hypothesis, the likelihood that participants would share the article in the negative valence headline group was not significantly different from the positive valence headline group, $F(1,187) = .04$, $MSE = 2.04$, $p = .838$, $\eta_p^2 < .001$. Contrary to the research hypothesis, how informative participants found the article in the negative valence headline group was not significantly different from the positive valence headline group, $F(1,187) = .11$, $MSE = 1.03$, $p = .740$, $\eta_p^2 = .001$. Contrary to the research hypothesis, how biased participants felt the article was in the negative valence headline group was not significantly different from the positive valence headline group, $F(1,187) = .72$, $MSE = 1.35$, $p = .396$, $\eta_p^2 = .004$. See **Table 4** for univariate statistics.

	Positive Headline		***Negative Headline***	
Variable	***M***	***SD***	***M***	***SD***
Interest	3.96	1.28	4.05	1.11
Share	3.16	1.38	3.07	1.50
Informative	4.43	1.05	4.37	1.01
Bias	2.71	1.22	2.77	1.21

Note: M and *SD* represent mean and standard deviation, respectively

Table 4. Prolific Sample: Impact of Headline Valence (positive, negative) on Participant Impressions

Hypotheses on Reading Comprehension

An 2x2 between-groups ANCOVA was conducted to examine the effects of headline valence and article valence on reading comprehension, while controlling for participants' perceived headline valence, which was entered as a covariate. Contrary to what was hypothesized, the results indicated that the main effect of headline was not significant, $F(1,184) = 2.13$, $MSE = 1.52$, $p = .146$, $\eta_p^2 = .01$. There was also no significant main effect of article valence, $F(1,184) = .01$, $MSE = 1.52$, $p = .938$, $\eta_p^2 < .001$. Lastly, contrary to what was hypothesized, there was no significant interaction between headline valence and article valence, $F(1,184) = .13$, $MSE = 1.52$, $p = .719$, $\eta_p^2 = .001$, see **Figure 2.**

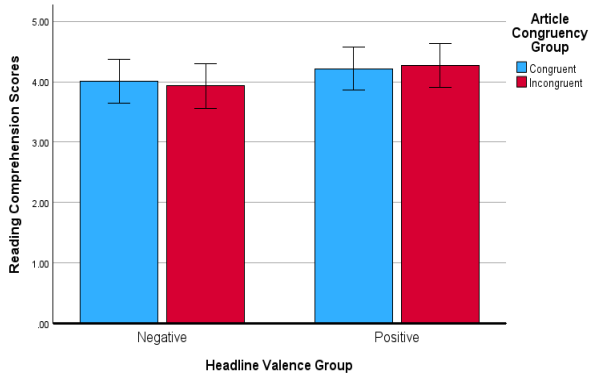

Figure 2. Prolific Sample: Participants' Mean Comprehension Score for Valence Congruency Groups. Please note, error bars represent +/- 2 standard error of each condition mean. 'Congruent' signifies the headline valence matched the valence of the article while 'incongruent' signifies the headline valence did not match the valence of the article. Covariate in the model (i.e., participant rating of headline valence) are evaluated at the mean of 4.57.

Post-Hoc Analysis of Political Ideology

Although opinions on the article and political ideology did not vary across valence conditions, these variables may still be related to reading comprehension, such that only those with an interest in the article or of a particular political ideology had reading comprehension impacted by valence. Therefore, both were examined for their relationship with reading comprehension, controlling for participants' perceived headline valence. Bivariate correlations indicated that reading comprehension was positively associated with article informativeness [$r(187) = .15$, $p = .043$]. However, reading comprehension was not associated with interest in the article [$r(187) = .13$, $p = .068$], likelihood to share the article [$r(187) = -.03$, $p = .676$] or ratings of article bias [$r(187) = -.01$, $p = .918$]. A between-groups ANOVA revealed that political ideology was not associated with reading comprehension, $F(2, 186) = 2.39$, $MSE = 1.49$, $p = .094$, $\eta_p^2 = .03$. Given our small sample size, the potential moderating effect of political ideology on the relationship between valence, congruency, and reading comprehension was not explored.

DISCUSSION

STUDY 1

The goal of this study was to observe how headline valence impacted reader impressions on a neutral article. Results from this study indicated that there was no significant difference in audience impressions of an article between varying headline valence groups. This contradicts what was hypothesized as well as previous literature that indicated there to be a preference towards negatively valenced headlines[12].

Previous research suggests a medium effect size (Cohen's F = 0.25) would have been expected[10, 12] and that a sample size closer to 158 would have been needed to achieve power of 0.80 at p = 0.05. Therefore, a major limitation of this study was the high rate at which participants failed the manipulation check (i.e., incorrectly identifying the valence of the headline). Despite the headline being in a bold and larger font, 59.5% were inaccurate in their identification of the headline valence, and as such, were excluded from the study, which significantly reduced the study's power. Therefore, our sample size was likely not sufficient to test our hypothesis. Additional data was not collected for Study 1 due to the study occurring as part of a class project and was thus constrained by the semester timeline. Therefore, to improve the sample size in a follow-up project during the following semester, we sought to change the procedures to increase the saliency of the article headline in Study 2, thus hopefully eliminating the need to exclude a large portion of participants. As such, the procedure was adjusted to require participants to engage with the article's headline, and study participation occurred in person rather than online.

Additionally, the neutral condition was excluded in Study 2 to investigate the impact of congruency between the headline and article content on reading comprehension, given that "clickbait" headlines may be more extreme than the content itself to initially hook readers. Therefore, a comparison of negative to positive valence seemed warranted. Eliminating the neutral valence condition also allows us to maintain greater power while accommodating the addition of more conditions. In Study 1, participants were assigned to one of three conditions (i.e., positive, negative, neutral headline valence), while Study 2 included four conditions (i.e., positive congruent, positive incongruent, negative congruent, and negative incongruent). This focus on congruency was informed by prior findings indicating that when the headline and article are paired congruently, reading comprehension scores tend to be higher.[5, 26] A power analysis for Study 2, assuming a medium effect size (Cohen's F = .25), indicates 179 is needed to test the interaction effect and 128 to test a bivariate relationship with power of .80 at p = .05.

STUDY 2

Results of Study 2 examining reader impressions of the article were consistent with Study 1, showing no impact of headline valence on reader impressions. This finding contrasts with our hypothesis and previous literature indicating a preference towards negative headlines.[12] One possible explanation for the contradictory results is that, unlike Study 1, participants were not all exposed to a single neutral article. Instead, they were presented with either a positive or a negative article. Therefore, a negative stimulus was presented to participants even when the impact of a positive headline was meant to be observed (e.g., the positive incongruent group), possibly mitigating any differences in impressions resulting from positive language in the headline. Additionally, issues with the manipulation check continued in Study 2. Due to such a large number of participants rating the headlines within a more neutral valence range (i.e., 4-6), it cannot be determined if headline valence can truly be classified as positive and negative, even though the negative headline was reported by participants to be more negatively valenced than the positive headline. Attention to the headline was likely not the main reason for headline valence ratings, as participants in study 2 were asked to read their assigned headline and then type it into a text box. Pilot testing headlines may be useful for future research to ensure an ideal level of valence, rather than relying on expected valence of individual words selected from the Affective Norms for English Words.[28]

It is also possible that the topic of censorship was simply not good for this study on valence. Adults under 50 appear to be more moderate as a population in their opinions on censorship when compared to adults over 50.[31] The difference could possibly hint towards less investment in this topic in younger generations. It may be advantageous to use a more widely talked about and divisive topic. For example, the topic of abortion may serve as a stronger candidate for future research, as young people tend to be more opinionated towards one side of the argument than any other age group, which is contrary to censorship.[32]

Results from the original Study 2 sample, concerning the valence effect on reading comprehension, did not align with our hypotheses either. Findings indicated that headline valence alone did not impact reading comprehension, but the mismatch between headline and article valence did. This effect was most evident when a positive headline was paired with a negative article. The result that the group with positive headlines and incongruent valence had the highest reading comprehension scores was contrary to the expectation that the negative headline with congruent valence would lead to the best scores. However, these results do not eliminate the possibility of negativity bias, as participants in the positive headline incongruent group still encountered a negative article, despite the headline's positivity. Although these findings differ from previous research, it may be because earlier studies focused on the mismatch between factual and misleading headlines rather than word valence.[5, 26] In this

study, all groups received factual information, with the only difference being the language used to describe it. As mentioned earlier, there might be little interest in censorship, and instead of confusing participants with contradictory information, using conflicting language around the same core facts may actually increase attention. However, the replication of Study 2 with a larger sample size indicated there was no longer a significant effect of pairing a positive headline with a negative article. Initial Study 2 findings could have been a type I error as the sample size was underpowered. However, there were also differences between the demographics of the initial study and its replication that could have impacted the difference in findings. A slightly older average age, less familiarity with censorship, frequency that participants attended to the news, and a larger portion of liberal participants in the replication could have contributed to the different findings. More specifically, since the replication sample seemed to indicate less familiarity with censorship, it's possible that they lacked preconceived notions of censorship and therefore placed greater effort on attending to the news article content. Additionally, less preconceived notions could mean a lack of already existing biases that the headline and article valences could act on. Less familiarity with the topic and its relation to lower potential for preexisting biases could lower variability in participant investment as well as perception in the text.

GENERAL DISCUSSION

The present set of studies examined the effects of headline valence on reader impressions, behavioral intentions, and reading comprehension. Study 1 primarily tested how headlines influence reader impressions and behavioral intentions, while Study 2 sought to replicate and extend these findings to reading comprehension. Although neither study demonstrated a significant impact of headline valence on reader impressions, contrary to the hypotheses, we believe our findings have important implications for future research.

First, the consistent null effects across both studies may indicate that perceptions of online news and behavioral intentions with online media are highly individualized. For example, Janét *et al.*[33] found that headlines did not predict engagement scores (e.g., likelihood of sharing, reading, commenting on, or ignoring a news article). Instead, individuals' scientific curiosity and political views were stronger predictors. This implies that the negativity bias in media engagement may not apply to all types of content or could be influenced by other factors.

Past research suggests that emotionally charged stimuli capture attention more strongly than neutral stimuli.[34] This effect has also been demonstrated in neuroscience research, showing that emotional (both positive and negative) material elicits greater neural activation than neutral material, thereby enhancing cognitive processing and memory.[35] Although our theoretical framework was grounded in negativity bias, this broader literature highlights the possibility that emotional arousal, rather than valence-specific effects, may influence interest in news headlines. Thus, future research should directly examine whether general emotionality, independent of positive or negative valence, drives headline engagement.

Second, it is well established that exposure to a relevant headline before reading can activate background knowledge and support comprehension.[8] In Study 2, we initially observed higher comprehension when a positive headline was preceded by a negative article; however, this effect did not replicate in a secondary sample, suggesting that the relationship is not straightforward. These results partially align with Lagerwerf *et al.*,[36] who observed that incongruity between headlines and accompanying photos enhanced information processing. Despite methodological differences between their study and ours, both sets of findings suggest that moderate incongruity may induce cognitive dissonance that heightens attention and encourages deeper processing. Still, the interaction effect found with one sample may not be driven solely by emotional valence. Because the headlines in our study differed semantically (i.e., emphasizing freedom and security versus protection and harm), they may have activated different conceptual frames and knowledge schemas independent of emotional tone. These differences might have impacted understanding and congruency effects, potentially confounding efforts to isolate valence-specific influences. Future research should therefore more carefully control headline stimuli so that they vary primarily in emotional valence while holding other features constant, including conceptual content, emotional intensity, arousal level, and clickbait quality. Such efforts are especially important given that these findings also did not replicate within our secondary sample.

The current study had several strengths and limitations. The study uniquely contributed to previous literature by implementing word valence manipulation into the observation of headline and article congruency. In this area of study, previous literature had focused on contradictory information rather than on contradictory ways of presenting that information. Another strength was that the current study replicated the findings of the headline valence's impact on readers' opinions of the article, showing consistency between Study 1 and Study 2 in this respect.

However, it is important to note that some samples were underpowered, which may have contributed to the non-significant findings. Study 1 required 158 participants to achieve 80% power for a medium-sized effect. Due to time constraints during the semester, as this study was a class project, we were only able to recruit 116 participants. A power analysis for Study 2, for a medium effect size, required 179 participants to test the interaction effect and 128 to test a bivariate relationship with 80% power.

Although our replication sample included 191 participants, the original sample for Study 2 included only 143 participants, which is sufficient for the bivariate main effect analyses but not for testing the interaction effect. Given that the interaction effect was significant only with the smaller sample, those results should be interpreted with caution. The power issue, stemming from small sample sizes, was a limitation that may have produced null effects and prevented additional analyses from being conducted.

Another limitation was the lack of validated measures. Participants were specifically asked to indicate their political ideology rather than complete a questionnaire to better assess their affiliation. Due to time constraints and the unique aspects of this study, it was difficult to find a validated measure of reader interest in an article. Additionally, single-item dependent variable measures were created to capture factors indicative of interest, though they may not have accurately gauged the reader's interest as intended. Validity for single-item measures is typically more difficult and time-consuming to establish, as common methods used for multiple-item measures, such as confirming internal consistency, are not applicable. Similarly, the lack of multiple items may prevent a measure from capturing the full scope of more complex topics and lead to further inconsistency in the measurements. However, the simplicity of a single item can be beneficial, as it may be more straightforward for the participant when measuring a simple construct, provided the proper steps for validation are taken.[38] A multiple-item approach to address the lack of validated measures could be more beneficial, as it would allow for a more comprehensive measurement of reader interest. In future studies, this could be addressed by using a general reader interest measure with the specific article in the study.

CONCLUSIONS

The findings have broader implications beyond those observed in this study. Current events and topics are constantly reported in the news and can significantly impact people's lives. How individuals perceive and understand certain information may be influenced by how it is presented to them. Misunderstandings caused by the way information is presented could lead people to support perspectives they might not have if they had a clearer understanding. However, results from this study do not suggest that these misunderstandings could arise from the use of language valence, as valence does not appear to shape opinions and perceptions on important issues. Although concerns exist about news sources' use of valenced language to increase engagement and profit, the likelihood that it affects readers' perceptions appears slim. However, there is still importance for trustworthy news outlets to be careful about how they might mislead readers. Still, efforts to mislead the audience may manifest in various forms. Therefore, readers should be aware of how they might be misled and consult a variety of sources to obtain the most accurate understanding of a topic.

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DATA AVAILABITY

The materials and anonymized data for both studies are publicly available on the Open Science Framework (OSF): *https://osf.io/yh94x*

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PRESS SUMMARY

News headlines are designed to grab attention, but when they don't match the article's content, they can alter how readers understand and remember the story. We tested how positive, negative, and misleading headlines influence people's impressions and comprehension of news articles. Across two studies, we found that whether a headline sounded positive or negative did not significantly impact readers' impressions. However, when headlines did not match the article's tone, readers' comprehension was affected in one sample, suggesting that misleading or incongruent headlines may influence how people process news. These findings highlight the complexity of headline effects and the importance of careful headline framing to support an accurate understanding of news content.