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News Storytelling Through Images: Examining the Effects of Narratives and Visuals in News Coverage of Issues

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This study examined the effects of narratives and visuals in the news coverage of the issue of growing genetically modified organisms (GMOs) in the agriculture industry. A 2 (evidence type: narrative vs. nonnarrative) × 2 (presentation format: visual vs. nonvisual) between-subjects online experiment was conducted whereby participants read different versions of the manipulated news reports. Results suggested that narratives had significant main effects on transportation and sympathy. Visuals significantly increased transportation and sympathy for those exposed to the nonnarrative message. Follow-up analyses revealed a significant serial mediation between evidence type and issue attitudes via transportation and sympathy. Sympathy was a significant mediator of the effect of presentation format on issue attitudes. The results suggest that news narratives can persuade through transportation and sympathy when conveying information about sensitive topics.

Keywords: narratives, visuals, transportation, sympathy, news

Narratives are the oldest form of communication, and people have long used them to make sense of the surrounding social environment in order to comprehend complex issues or events. In recent years, a growing body of research has studied the impact of narratives in a variety of contexts. Generally speaking, it has been found that narratives or stories, when compared with nonnarrative communication, can be effective in changing attitudes and opinions. These findings are particularly evident in research on news and health messages (e.g., Kim, Bigman, Leader, Lerman, & Cappella, 2012; Oliver, Dillard, Bae, & Tamul, 2012; Shen, Sheer, & Li, 2015).

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Narratives are potentially more effective than other messages for a variety of reasons. They are structurally different from rhetorical arguments or other informational messages in that they use characters and plots to relay individuals' real or plausible experiences. Numerous studies have found that the vivid representation of information in narratives, along with their realism and plausibility, can transport audiences into the storyline (Shen et al., 2015). Transported individuals are more likely to emotionally connect with the main character, and this immersive process can eventually influence their attitudes (Green & Brock, 2000; Green & Clark, 2012). Researchers in the past have also highlighted the role of affect (e.g., sympathy) in attitude change as people tend to become cognizant of the feelings of the characters in a story (e.g., Escalas & Stern, 2003; Oatley, 1999a).

Although several studies have examined the impact of news narratives on attitudes and behavioral intentions, they have typically relied on textual messages to study their effects (e.g., Oliver et al., 2012; Shen, Ahern, & Baker, 2014). A possible explanation is that text messages are easier to manipulate in experimental studies than other information presentation formats. Within the context of advertising and health promotions, however, a few studies have indeed compared the effects of visual versus verbal narratives and have produced mixed findings. Lien and Chen (2013), for example, found that verbal narrative ads were more effective than their visual counterparts. Ooms, Jansen, and Hoeks (2019) investigated the persuasive effects of narrative versus nonnarrative visual health warnings. They concluded that narrative visual messages were more successful in generating transportation, identification, and other affective reactions than were verbal narratives. In light of these inconclusive findings, in conjunction with the fact that little is known about their impact on news reports, additional research on the effects of visuals in narratives is needed. This is especially important because most of today's information is increasingly accompanied by visuals in the form of either photos or videos, especially in digital media. This is even more pronounced for messages that appear on social media or mobile devices, where visuals are often employed to attract the audience's attention (Duggan, 2013).

The purpose of the present study is therefore to examine the combined effects of narratives and visuals when individuals read news stories about a controversial issue. In particular, we aim to investigate whether information presented as narrative evidence, along with relevant images, may influence readers' issue-related attitudes. Furthermore, we explore the extent to which visual narratives affect transportation, identification, and sympathy. In the next section, we first review the literature on narratives and visual images and discuss the study's research hypotheses and questions. We then present the details of an experiment whereby subjects read narrative and nonnarrative news stories about an environmental issue (genetically modified organism [GMO] farming) that included either visuals or no visuals. Findings from the experiment and their implications are discussed at the end.

Conceptual Background

Narratives and Message Effects

Narratives are stories that people tell and share. Hinyard and Kreuter (2007) defined narratives as "any cohesive and coherent story with an identifiable beginning, middle, and end that provides information about scene, characters, and conflict; raises unanswered questions or unresolved conflict; and provides resolution" (Hinyard & Kreuter, 2007, p. 778). The use of narratives has been investigated by scholars

across different disciplines, such as marketing (Escalas, 2004), advertising (Mattila, 2000), health communication (Dillard & Main, 2013; Volkman & Parrott, 2012), political ads (Vafeiadis, Li, & Shen, 2018), and news (Maier, Slovic, & Mayorga, 2017; Shen et al., 2014). Journalists have routinely used narratives in covering events and issues. Scholars have argued that by complementing traditional journalism and offering to readers richer news experiences, narratives can "provide a meaningful context to news events and situations" (Van Krieken & Sanders, 2017, p. 1365). Evidence has been accumulating in the literature showing that narrative news stories are more effective than other types of news reporting. For example, a recent study examined readers' reactions to mass violence in Africa when exposed to four different journalistic elements that are used in news coverage: story personification, statistical information, mobilizing information, and photographs (Maier et al., 2017). These scholars found that story-based news evoked stronger concerns, sympathy, and readers' interest toward distant suffering, and eventually triggered higher donation intentions than did nonstories. Similarly, in a study of smokers, Kim et al. (2012) demonstrated that individuals who read a narrative news article containing health information about smoking cessation were more likely to quit smoking than those who read a nonnarrative article.

In general, researchers have concluded that, compared with nonnarratives, narratives can be highly effective in changing attitudes. This is because narratives rely on the experiences of real or fictional characters to communicate information (Bilandzic & Busselle, 2013). As such, their persuasive intention is masked, making the embedded messages hard to dispute. In comparison, nonnarratives such as rhetorical arguments are often perceived as persuasive attempts and are thus more likely to encounter resistance by recipients (Dal Cin, Zanna, & Fong, 2004). Research has shown that when the persuasive intent of a message is explicit, it can lead to heightened scrutiny, and this can subsequently trigger reactance, resistance, and counterarguing (Bilandzic & Busselle, 2013).

The structure of narratives is built around two main premises: chronology and causality (Escalas, 2004). Stories are often organized in terms of temporally sequential events or episodes that gradually unfold over time (Bruner, 1986, 1990; Green, 2006). These narrative structural features urge readers to respond to stories both cognitively and affectively. Prior studies have identified several psychological mechanisms through which narratives operate, such as transportation, identification, and sympathy (see Maier et al., 2017).

Transportation into a narrative world is defined as a natural convergence of one's "attention, imagery, and feelings focused on story events" (Green, 2006, p. 164). When transported into narratives, audiences are more likely to respond to messages positively and are less likely to engage in reactance or counterarguing (Moyer-Gusé & Nabi, 2010). Mazzocco, Green, Sasota, and Jones (2010) provided evidence that individuals were more transported into narrative messages than rhetorical ones, and this led to changes in attitudes and behaviors on topics such as tolerance toward homosexuals and affirmative action. Another study found that transportation into the storyline triggered attitudinal and behavioral changes among viewers of the television drama *Desperate Housewives*, after watching one of the characters struggle with non-Hodgkin's lymphoma (Murphy, Frank, Moran, & Patnoe-Woodley, 2011). Specifically, transported viewers reported higher levels of knowledge, social support, and information-seeking intentions toward cancer. Banerjee and Greene (2012) also highlighted the significance of transportation into narrative persuasion by indicating that the cognitive and affective reactions they evoked could urge individuals to adopt anticocaine attitudes.

In addition to transportation, prior research has demonstrated that identification is a critical factor in determining narrative effectiveness. Identification refers to the process wherein an individual temporarily forgets his or her role and readily adopts the character's perspective and construal of events (e.g., Cohen, 2001; Moyer-Gusé, 2008). Cohen (2001) defined identification as "a process that culminates in a cognitive and emotional state in which the audience member is aware not of him- or herself as an audience member, but rather imagines being one of the characters in the text" (p. 252). Green and Donahue (2009) argued that identification might affect people's attitudes because the "implications of events experienced by that character may carry special weight" (p. 274). It appears that identification increases the vicarious experiencing of the protagonist's goals, plans, and emotional state (Oatley, 1994). Research has demonstrated that identifying with a character can evoke favorable attitudes toward social (Igartua & Vega Casanova, 2016) and health behaviors (Moyer-Gusé, Chung, & Jain, 2011).

When readers identify with a narrative, they tend to become emotionally involved and develop sympathetic feelings toward the characters (Oatley, 1999b). According to Escalas and Stern (2003), sympathy is an emotionally relevant reaction that individuals exhibit when exposed to narratives and is essentially "one's feeling of sorrow or concern" (p. 567). In a study of narrative effects on behavioral intentions, Bae (2008) showed that viewing a narrative-based reality show influenced people's sympathetic responses, which in turn increased issue involvement and other behavioral outcomes. Likewise, studies comparing narrative and statistical messages indicated that individuals were more prone to becoming sympathetic toward a message that featured an identifiable victim than stories containing statistical information (Small, Loewenstein, & Slovic, 2007), and narrative stories could also trigger higher prosocial behaviors such as donations (Kogut & Ritov, 2005).

Impact of Narrative News on Issue Attitudes

Scholars have examined the psychological effects of narrative news on individuals' responses to them and their subsequent attitudes toward issues. A study about the environmental consequences associated with shale gas drilling found that narrative news entailed both cognitive and affective implications for individuals (Shen et al., 2014). Particularly, it was demonstrated that narratives emphasizing negative consequences of issues had significant long-term effects on recipients' attitudes and could elicit positive responses. Similarly, another study investigating news delivery formats found that narrative news stories evoked more favorable emotions than nonnarrative news stories (Oliver et al., 2012). Research has shown that one's identification with the story character, along with the vividness of the information contained in narrative messages, can increase one's intentions to seek information about colorectal cancer screenings (Dillard & Main, 2013). Juthe, Zaharchuk, and Wang (2015) demonstrated that personal narratives, especially when they involved celebrities, could trigger information-seeking behaviors. In addition to issue attitudes, this study also measured information-seeking intentions as a dependent variable designed to assess individuals' continued interest in or involvement with a topic. Using these two dependent variables allows us to get a more comprehensive understanding of the overall effectiveness of visual news narratives. Consistent with findings from prior studies (Dillard & Main, 2013; Murphy et al., 2011), we expected that narrative news reports about social issues will have a significant impact on readers' issue attitudes and information-seeking intentions. We thus propose the following hypotheses.

H1: *Individuals exposed to narrative news articles will report higher levels of transportation, identification, and sympathy than those exposed to nonnarrative news articles.*

H2: *Individuals exposed to narrative news articles will develop stronger issue attitudes and higher information-seeking intentions than those exposed to nonnarrative news articles.*

Effects of Visual Images

Considerable research has highlighted the importance of visuals in enhancing message effectiveness. Pictures can influence human judgments given that they are frequently weighed more heavily than textual information during the decision-making process (e.g., Costley & Brucks, 1992; Edell & Staelin, 1983; Miniard, Bhatla, Lord, Dickson, & Unnava, 1991). Along these lines, Scott (1994) suggested that visuals should not be perceived as complementary to verbal information. Instead, she suggested that visuals could persuade by raising questions, introducing metaphors, and posing arguments. For example, within the elaboration likelihood model, visuals are considered as peripheral cues that can attract individuals' attention and motivate them to more thoroughly process the message (Petty, Unnava, & Strathman, 1991). Prior research in advertising has suggested that appealing visual cues can result in more positive evaluations of brands (Pieters & Wedel, 2004).

Two streams of research have examined the role of visual versus textual messages. One line of research focuses on how visuals influence attitudes and judgments, whereas the other investigates their impact on memory (Kim & Lennon, 2008). A notable difference between the two approaches is that the latter supports the notion that images are superior to verbal messages in information recognition and retrieval from memory. According to Lang (2000), information is most likely to be selected and encoded into individuals' working memory when it is relevant to our goals or when it is novel, unexpected, or representative of change in the environment. Visuals in a news article represent a change from the textual information, and thus can be perceived as salient. As a result, visuals, by drawing people's attention, are more likely to be encoded and later retrieved from one's memory. A study by Starch (1966) indicated that an advertisement containing a picture was more memorable than an advertisement without a picture. This finding may be interpreted via the lens of the dual coding theory that illustrates why pictures are better recalled and recognized than words (Paivio, 1991). In sum, the picture superiority effect is believed to occur because of the mental representations that images can evoke (Kim & Lennon, 2008).

Another plausible explanation regarding visual effectiveness maintains that it is difficult to counterargue against images. Mazzocco and Brock (2006) suggested that pictures are influential because they could be encoded both analogically and symbolically and thereby would be more memorable. In addition, pictures can impart experiences that may resonate with the audience's feelings and can explain fictional or extraordinary phenomena or situations as being plausible (Schank & Abelson, 1995). Studies have also demonstrated that affect-laden pictures can generate spontaneous positive or negative cognitive responses that can ultimately influence one's attitude toward products and brands (Basu, 1987; Sujan, 1985). In a study investigating the emotional and visual elements in advertisements, Mitchell (1986) found that participants who saw ads with affect-laden images could make inferences about the advertised product by primarily relying on the conveyed pictorial cues. The same scholar also found that the visual cues of an

ad could generate or change beliefs and attitudes about the advertised product and brand. Particularly, positively evaluated images elicited more favorable attitudes toward the product and the brand, whereas the opposite held for negatively evaluated images. Similarly, Smith and Joffe (2009) concluded that visuals could evoke emotions and thereby were an effective tool for socially constructing and concretizing risk information. This happens because images can visually disentangle complex textual arguments and ultimately galvanize public attention and engagement in environmental issues such as deforestation or ozone depletion (Litfin, 1994).

Scholars in the past have found that the use of visuals in the news coverage of issues can influence readers' attitudes and perceptions of these issues. For example, Gibson and Zillmann (2000) demonstrated that incorporating visuals into news stories captured readers' attention toward an issue and influenced their perceptions. Similarly, another study found that adding photos in news articles, especially images featuring victimization and human suffering, drew readers' attention toward an issue and enhanced the newsworthiness of information; this eventually resulted in more scrutiny than similar articles devoid of visuals (Zillmann, Knobloch, & Yu, 2001). Another group of researchers investigated visual framing effects in news articles from four different European newspapers and news magazines about the Gaza conflict. They found that photos focusing on the human element engendered stronger affective reactions and resulted in higher evaluations in terms of its communicative quality than textual articles (Brantner, Lobinger, & Wetzstein, 2011).

Past research has employed different methods to investigate the influence of visuals in narrative messages, producing mixed findings. Mendelson and Darling-Wolf (2009), for example, conducted focus group interviews to examine the effects of visual narratives on perceptions of a culture and found that the use of pictures detracted participants' attention from the textual information. Similarly, Lien and Chen (2013) indicated that verbal narrative ads had stronger effects on attitudes and transportation than visual ones. These authors suggested that processing visuals in ads could be resource consuming, thus compromising their effectiveness. Conversely, Tian and associates (2014) investigated the effects of multimodal narratives on attitudes, beliefs, and behaviors and demonstrated that graphic narratives were more effective in terms of persuasive outcomes (e.g., attitudes toward the message and intentions to adopt the recommended behavior) than either video or text narratives. Furthermore, they suggested that text narrative processing affected persuasion through transportation, whereas graphic narrative processing was influenced by both transportation and narrative comprehension.

In view of the aforesaid inconclusive evidence, the present study attempts to test the effects of visual and textual narratives on attitudes and behavioral intentions. To better understand the underlying psychological process through which narratives persuade, prior studies have examined not only their direct effects, but also the impact of relevant mediating variables that can provide more insights about this process (Bilandzic & Busselle, 2013). Hence, we also intend to examine the role of key narrative mediators in explaining these effects. Such mediating variables often include transportation, identification, sympathy, and counterarguing, as well as other affective and cognitive measures. Because not all these mediators are applicable to all situations, studies often focus on a subset of them (Braddock & Dillard, 2016). Furthermore, examining both the indirect and direct effects of various mediators can provide a more nuanced understanding of their role in the persuasion process (Oliver et al., 2012; Shen et al., 2014). Thus, the present study aims to shed light on the combined effects of visuals and narratives in news articles, the

psychological mechanisms through which they operate, and how they influence one's issue attitudes and intentions to seek additional information. On the basis of the foregoing discussion about the effects of visuals in narratives, we ask the following research questions.

RQ1: Will the use of visuals in narrative news articles have a significant effect on transportation, identification, and sympathy, as well as on issue attitudes and information-seeking intentions?

RQ2: Will there be interaction effects between evidence type (narrative vs. nonnarrative) and presentation format (visual vs. nonvisual) on transportation, identification, sympathy, issue attitudes, and information-seeking intentions?

RQ3: Will transportation, identification, and sympathy mediate the effects of evidence type and presentation format on persuasive outcomes as measured by issue attitudes and information-seeking intentions?

Methods

Design and Participants

To test the hypotheses and explore the research questions, we conducted a 2 × 2 between-subjects experiment. The two factors were evidence type (narrative vs. nonnarrative) and presentation format (visual vs. nonvisual). A total of 124 undergraduate students (M_{age} = 20) were recruited from a major public university. Among the participants, 74.8% were female (*N* = 98), and 75.6% were Caucasian (*N* = 99). Participants received extra credit in exchange for their participation in the study. A study by the Pew Research Center on news consumption reported that 42% of Americans between the ages of 18 and 29 prefer reading news, compared with older individuals, who prefer to watch the news (Mitchell, 2016). The same study found that 81% of younger adults tend to get their news in a digital format rather than a print one. Given the changing patterns of news consumption that characterize younger generations (see Oliver et al., 2012), a student sample size was deemed as appropriate for this study.

Procedures

We conducted an online experiment via Qualtrics. We sent participants an e-mail link inviting them to participate in the study. After providing consent, they were randomly assigned to one of the four experimental conditions. The stimuli consisted of different versions of online news stories about the health and environmental implications of GMO agriculture in Latin America. This issue was chosen because of its timeliness, given that GMO has received extensive media coverage by major news organizations such as *The New York Times* and *The Washington Post* (Bittman, 2016; Chang, 2017; Dewey, 2017). Some have argued that GMO crops can be a critical productive tool in modern agriculture (Daniels, 2017), whereas others have suggested that GMO agriculture could cause significant damage to one's health and the environment (McKinney, 2018). After respondents read the story, they were asked to answer a series of questions assessing their attitudes toward the news story, as well as their overall attitudes toward GMO and intentions to seek additional information. It took participants approximately 20 minutes to complete the experiment.

Manipulations

Evidence type was manipulated by presenting the news report in a narrative or nonnarrative format. Following prior research, we constructed the narrative messages with a mix of characters, plots, and causal relationships (Knobloch, Patzig, Mende, & Hastall, 2004). The narrative story focused on a family whose lives and health have been adversely impacted by GMO farming. The story begins by describing how the life of a local farmer took a dramatic turn after he started using agrochemicals for dousing the crops ("For five years, Guerra was routinely exposed to chemicals as he pumped pesticides into the tanks of crop-dusters"). Next, it narrates the harmful health effects of agrochemicals on the featured farmer and his family; both of his children have faced acute health problems since birth ("Their daughter Camila, 4, was born with multiple organ problems and is severely disabled"). The story concluded by highlighting the generic negative impact that agrochemicals have on the local community. The health and environmental impact of GMO farming in Argentina as described in the news article has been adopted from real-life stories as reported in international news media such as *National Geographic*, BBC, and the Associated Press (Associated Press, 2013; Dukehart, 2015; Pressly, 2014).

The nonnarrative message focused on the same health effects of agrochemicals, but used factual and general background information about GMO farming. In particular, the article provided statistics regarding the use of agrochemicals in the farming industry (e.g., "Overall, Argentine farmers apply an estimated 4.3 pounds of agrochemical concentrate per acre, more than twice what the U.S. farmers use") and their health impact on the local population (e.g., "Now doctors are warning that uncontrolled use could be the cause of growing health problems and birth disorders among the 12 million people who live in the nation's vast farm belt"). To make the narrative and nonnarrative messages comparable, both messages covered the same aspect of the issue.

It should be pointed out that the opening and concluding paragraphs in the two evidence type conditions were the same. In particular, the opening paragraphs provided information about the current status of GMO use in the Argentine agricultural industry (e.g., "Today, Argentina's entire soy crop and nearly all its corn and cotton are genetically modified"), whereas the concluding ones focused on the health implications associated with their use ("The economic benefits of GM crops have come at the expense of health for many families"). As mentioned earlier, the remaining evidence that was included in the news report was presented in either a narrative or nonnarrative format. The length of the news articles was held constant across experimental conditions, with each containing approximately 551–555 words.

In terms of the presentation format manipulation, visual images for the news stories were collected from actual news articles on similar topics. The visual news articles were accompanied by images that reflected the respective storyline. In the visual narrative condition, next to the adjacent paragraph describing the harmful health implications of GMO on the featured farmer and his children, images of the protagonists were incorporated. Conversely, the informational condition included a chart of herbicide use in Argentina, as well as stock photos of individuals and farming equipment. The texts in the nonvisual conditions were similar to the visual conditions.

Finally, the messages were presented as online news stories and consisted of 12 separate slides, similar to the news slideshow format that media outlets such as *The New York Times* and CNN have used.

Measurement

Transportation was measured with a 12-item self-reported scale adopted from Green and Brock (2000). Participants answered each item on a scale from 1 (*not at all*) to 7 (*very much*) (Cronbach's α = .94, M = 3.86, SD = 1.28). Example items included, "I was emotionally involved in the story while viewing it," and "I could picture myself in the scene of the events described in the article."

Identification was measured with five items (Cronbach's α = .88, M = 4.16, SD = .74) that were adopted from Cohen (2001) and Tar-Or and Cohen (2010). Similar to past research (Tar-Or & Cohen, 2010), items relevant to the study were used and slightly modified to fit its context. These items were: "While reading, I felt I could really get inside the individuals' heads," "While reading, I could see the emotions that individuals in it portrayed," "While reading, I felt I knew exactly what the individuals were going through," "I was able to understand the events in the article in a manner similar to how the individuals in the article understood them," and "I think I have a good understanding of the individuals in the article."

Sympathy was measured using a three-item scale (Cronbach's α = .95, M = 5.60, SD = 1.36) about the extent to which respondents were concerned about, compassionate toward, and sympathetic toward the individuals affected by GMO, ranging from 1 (*not at all*) to 7 (*very much*) (Shen, Ahern, & Han, 2017).

Respondents' issue attitudes were measured on a 6-point scale using two items (Cronbach's α = .94, M = 5.60, SD = 1.36) asking respondents to indicate the extent to which GMO in agriculture is good or bad, and if they are supportive or against it.

Information-seeking intentions were assessed by a single item asking participants to indicate, on a scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*), the extent to which they plan to seek more information about genetic engineering in agriculture.

Results

Before testing the hypotheses and exploring the research questions, the validity of the narratives' manipulation was checked. We asked subjects to indicate the extent to which they agreed that "the article relied on story" and whether "the article focused on a family's story." The two items were averaged to form a single index. An independent t test showed that the narrative messages (M = 5.66, SD = 1.06) were more likely to be perceived as focusing on a story, as compared with the informational messages (M = 3.11, SD = 1.36), $t(118) = 11.80$, $p < .001$. This confirmed that the manipulation was successful.

Means and standard deviations of the dependent and mediating variables across the experimental conditions are presented in Table 1.

Table 1. Means and Standard Deviations of Dependent Variables by Conditions.

	Narrative		Nonnarrative	
Dependent Variables	Visual *n* = 19	Nonvisual *n* = 31	Visual *n* = 28	Nonvisual *n* = 21
Identification	3.82 (1.07)	4.14 (1.30)	3.88 (1.30)	3.57 (1.15)
Transportation	4.30 (.75)	4.28 (.65)	4.31 (.64)	3.83 (.78)
Sympathy	5.59 (1.05)	5.80 (1.24)	5.94 (1.25)	5.22 (1.21)
GMO attitudes	2.08 (.96)	2.52 (1.46)	2.36 (1.43)	2.57 (1.14)
Information-seeking intentions	4.32 (1.80)	3.94 (1.57)	4.36 (1.42)	3.43 (1.40)

Note. Numbers are means, and those in the parentheses are standard deviations.

The correlations between all the independent and dependent variables are included in Table 2. H1 proposes that narrative news articles will have a main effect on transportation, identification, and sympathy. To test the hypothesis, a two-way multivariate analysis of covariance (MANCOVAs) was conducted with evidence type and message format as the independent variables, and age and gender as control variables. Transportation, identification, and sympathy were entered as the dependent variables. Results showed that evidence type had a significant main effect on transportation, $F(1, 111) = 8.58$, $p < .01$, partial $\eta^2 = .07$, and sympathy, $F(1, 111) = 4.20$, $p < .05$, partial $\eta^2 = .03$, but a nonsignificant effect on identification, $F(1, 111) = 3.17$, $p = .08$, partial $\eta^2 = .03$. Specifically, follow-up univariate analysis of variance indicated that after reading the narrative messages, participants reported higher levels of transportation ($M_{narratives} = 4.32$, $SD = .63$ vs. $M_{\text{non-narratives}} = 4.00$, $SD = .79$) and sympathy ($M_{narratives} = 5.83$, $SD = 1.09$, vs. $M_{\text{non-narratives}} = 5.39$, $SD = 1.54$) than those reading the nonnarrative messages. These results suggested that narrative news stories had significant main effects on participants' transportation into the story and the sympathy they showed toward the characters. H1 therefore received partial support.

Table 2. Correlations Among Dependent Variables.

	1	2	3	4	5
1. Transportation	1				
2. Identification	.67**	1			
3. Sympathy	.58**	.38**	1		
4. Issue Attitudes	−.17	−.04	−.42**	1	
5. Information-seeking intentions	.33**	.26**	.41**	−.33**	1

** $p < .01$.

H2 explored whether narrative news articles would elicit stronger attitudes toward GMO and higher information-seeking intentions about the issue. MANCOVA results indicated that narrative news articles did not have a significant effect on issue attitudes, $F(1, 94) = .71$, $p = .34$, and information-seeking intentions, $F(1, 94) = .92$, $p = .36$. H2 was not supported.

RQ1 asked whether news articles featuring visuals would trigger higher levels of transportation, identification, sympathy, issue attitudes, and information-seeking intentions than news articles with no visuals. MANCOVA results revealed that visuals had significant main effects only on transportation, $F(1, 111)$

= 4.99, $p < .05$, partial $\eta^2 = .05$; sympathy, $F(1, 111) = 5.48$, $p < .05$, partial $\eta^2 = .04$; and information-seeking intentions, $F(1, 94) = 4.41$, $p < .05$, partial $\eta^2 = .05$. Follow-up univariate analysis of variance suggested that those exposed to the visual news reports experienced more transportation ($M_{visual} = 4.27$, $SD = .63$ vs. $M_{non\text{-}visual} = 4.05$, $SD = .82$), developed more sympathy ($M_{visual} = 5.86$, $SD = 1.09$ vs. $M_{non\text{-}visual} = 5.35$, $SD = 1.54$), and expressed higher information-seeking intentions ($M_{visual} = 4.31$, $SD = 1.57$ vs. $M_{non\text{-}visual} = 3.73$, $SD = 1.51$) than those who received the text-only articles. However, visuals did not have a significant main effect on identification and issue attitudes.

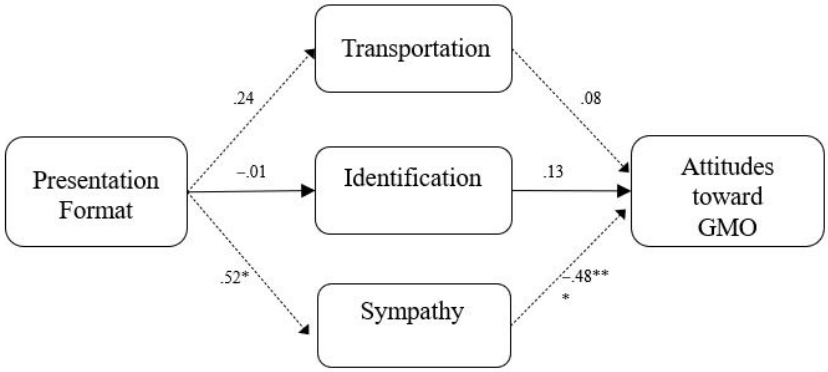
RQ2 asked whether there will be interaction effects between visuals and narratives. The MANCOVA results showed that there were significant interaction effects on sympathy, $F(1, 111) = 5.99$, $p < .05$, partial $\eta^2 = .05$, but nonsignificant effects on transportation, $F(1, 111) = 3.43$, $p = .06$, partial $\eta^2 = .03$; identification, $F(1, 111) = 1.83$, $p = .18$, partial $\eta^2 = .02$; issue attitudes, $F(1, 94) = .43$, $p = .51$, partial $\eta^2 = .01$; and information-seeking intentions, $F(1, 94) = .42$, $p = .52$, partial $\eta^2 = .01$. Further analyses suggest that those who read visual nonnarrative messages reported more sympathy, $M = 5.89$ vs. $M = 4.76$, and more transportation, $M = 4.24$ vs. $M = 3.71$, than those reading the textual nonnarrative news reports. Among participants who read the narrative news articles, it was found that the use of visuals did not significantly affect the level of sympathy and transportation they experienced.

To test the mediation paths as proposed by RQ3, Hayes's (2013) PROCESS Macro Model 4 with 95% bias-corrected confidence intervals using 5,000 bootstrap resamples was used. Specifically, the mediation analyses tested the indirect effects between evidence type on the dependent variables through the narrative mediators. The data did not reveal any significant indirect effects for the narrative mediators on either attitudes toward GMO or information-seeking intentions (Table 3).

Table 3. Indirect Effects of Evidence Type via Mediators.

Mediators	Effect (*b*)	*SE*	Indirect Effect 95% Confidence Intervals	
Dependent Variable: Attitudes toward GMO			LL	UL
Transportation	.01	.10	−.19	.23
Identification	.06	.08	−.06	.27
Sympathy	−.22	.13	−.49	.01
Dependent Variable: Information-seeking intentions				
Transportation	.05	.07	−.11	.20
Identification	.03	.06	−.05	.19
Sympathy	.05	.11	−.15	.31

To probe the mediating role of the narrative mediators on the relationship between presentation format and the dependent variables, the same PROCESS Model 4 with 95% bias-corrected confidence intervals using 5,000 bootstrap resamples was used. The analysis showed that sympathy mediated the relationship between presentation format and issue attitudes ($b = −.25$, $SE = .13$, 95% *CI*: −.51 to −.02) (Figure 1).



*p < .05, **p .01, ***p < .001

Figure 1. Mediation model (PROCESS, Model 4) of presentation format on attitudes toward GMO through sympathy. The model reports unstandardized regression coefficients.

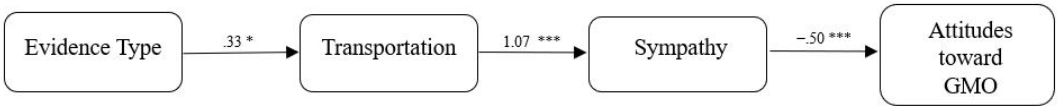
No significant mediating effects of sympathy on information-seeking intentions were detected. Furthermore, the analysis did not find any significant indirect effects of transportation and identification on either issue attitudes or information-seeking intentions (Table 4).

Table 4. Indirect Effects of Presentation Format via Mediators.

Mediators	Effect (*b*)	*SE*	Indirect Effect 95% Confidence Intervals	
Dependent Variable: Attitudes toward GMO			LL	UL
Transportation	.02	.08	−.16	.17
Identification	−.001	.05	−.11	.09
Sympathy	−.25*	.13	−.51	−.02
Dependent Variable: Information-seeking intentions				
Transportation	.03	.09	−.09	.26
Identification	−.01	.05	−.13	.09
Sympathy	.12	.11	−.08	.35

*p < .05.

Because our statistical tests indicated that narrative news stories had significant direct effects on transportation and sympathy, further analysis probed whether the mediators operated in sequence. In doing so, a serial mediation analysis was conducted using PROCESS Model 6, with 5,000 bootstrap resamples. Results showed a significant serial mediation (b = −.17, SE = .08, 95% CI: −.36 to −.03), indicating that transportation and sympathy mediated the relationship between evidence type and attitudes toward GMO (Figure 2). No sequential indirect effects were found for information-seeking intentions.



*p < .05, ** p < .01, ***p < .001

Figure 2. Mediation model (PROCESS, Model 6) of evidence type on attitudes toward GMO through transportation and sympathy. The model reports unstandardized regression coefficients.

In sum, consistent with previous studies, the results showed that a narrative news article about GMO generated more transportation and sympathy than a nonnarrative news article. Nevertheless, narratives did not directly predict issue attitudes toward GMO unless operating through the mediators of transportation and sympathy. Furthermore, the addition of visual images, regardless of evidence type, had a significant impact on participants' sympathy toward the story protagonist because it increased their intentions to seek more information about GMO farming. Messages featuring visuals elicited greater sympathetic feelings and more transportation than those with no visuals. The mediation analyses showed that visual messages induced more sympathy, and this led to more negative attitudes toward GMO, whereas narrative messages followed a more complex persuasion process that took place through both transportation and sympathy. Overall, our results demonstrated that narratives and visuals persuaded through different psychological mechanisms. It appears that adding visuals to both narrative and nonnarrative news reports had a distinct impact on issue attitudes and behavioral intentions.

Discussion

A large body of research has examined how individuals perceive and evaluate information when it is conveyed in a narrative format. Despite the growing evidence about narrative persuasion, less is known about the influence of visuals in processing narrative information. The purpose of this study was to examine the overall impact of narrative messages and that of visual images in narrative news articles about GMO farming.

We conducted an experiment in which participants read narrative or nonnarrative news reports accompanied by visuals or not. The results indicated that narrative messages had a significant impact on transportation and sympathy, a finding consistent with prior research about the psychological effects of narrative messages (e.g., Maier et al., 2017; Mazzocco et al., 2010; Shen et al., 2014).

It appears that when individuals read narrative news health stories, they tend to sympathize with the characters in the story, and this can eventually influence their attitudinal reactions toward the covered topic. Interestingly, although narrative news stories did not have direct effects on one's attitudes (e.g., issue attitudes) and behavioral intentions (e.g., information seeking), the mediation analyses showed that narrative persuasiveness was enhanced through transportation and sympathy. This finding extends Maier and colleagues' (2017) prior research by indicating that arousing one's sympathetic feelings toward the story-protagonist is critical in the persuasion process, yet transportation precedes affective reactions. In

other words, people first have to be transported into the storyline to develop sympathy for the featured individual, and then they adopt story-consistent attitudes. Our findings further the extant literature about the role of sympathy, which has been mainly examined in the context of inducing prosocial behaviors such as donations (e.g., Kogut & Ritov, 2005; Small & Loewenstein, 2003; Small & Verrochi, 2009). Furthering past research, it was demonstrated that sympathy can also affect one's attitudes toward controversial issues such as GMOs. Again, it should be noted that eliciting sympathy is contingent on whether individuals are transported into a story, thus emphasizing the need to create narratives with a strong storyline.

The results provide preliminary evidence about the impact of visuals in digital storytelling. Interestingly, the addition of visuals in narrative messages did not evoke more positive evaluations of the message in comparison with textual narratives, thus suggesting that underlying narrative mechanisms such as transportation and sympathy suffice and can influence one's attitudes independently without any visual support. This has important practical implications because it provides insights for journalists and editors alike about the significance of crafting powerful news stories. It appears that even in the digital era, in which visuals are salient, creating news with a strong storyline can cognitively and affectively influence readers.

Our findings also provide insights into the overall role of visuals; it was empirically demonstrated that adding visuals to messages elicited more sympathetic feelings and transportation as compared with nonvisual stories. Hence, this suggests that for journalists, regardless of whether a news article employs a narrative format, incorporating relevant visuals can have a powerful impact on readers. As the mediation tests showed, visuals can also evoke more sympathy, and this can influence one's attitudes toward an issue. Taken together, these results are particularly important for journalists who deliberate what the best delivery format is for informing and educating their audiences about complex or controversial social and political issues in the era of information overload. In addition to the influence of visuals in prompting attitudinal modifications, our data indicated that individuals who were exposed to news stories featuring visuals expressed stronger information-seeking behavioral intentions. These results corroborated similar findings from Gibson and Zillmann (2000), who found that news reports with visuals affected readers' information-acquisition behaviors. They also supported the postulation by Niederdeppe, Bu, Borah, Kindig, and Robert (2008), who proposed that incorporating evocative visuals in stories can affect behaviors.

In sum, these results suggest that adding visual images had some significant effects on the impact of nonnarratives. Specifically, visuals can affect issue attitudes, information-seeking intentions, and sympathy. In addition, it should be stated that sympathy was the only variable significantly affected by both visual images and narratives, and this warrants further scholarly research about its overall impact in narrative persuasion. In conclusion, this study contributes new evidence about the impact of narrative on news stories covering a controversial topic: that of using agrochemicals in the agriculture industry. On the whole, it appears that narratives and visuals operated through different mechanisms. Our data suggested that narrative persuasion is an elaborate psychological process that is contingent on one's transportation and sympathy with the story character. As demonstrated, transportation and sympathy rendered narrative messages more convincing by influencing a person's attitudes toward GMO farming. In the absence of these mechanisms, it appears that narrative effects are obviated. On the contrary, visuals had a more direct impact on individuals' information-seeking intention, regardless of evidence type. Also, it seems that visuals can elicit more sympathy, which in turn can influence issue attitudes. Although some interesting findings

are reported in terms of the distinct processes that affect narrative and visual persuasion, more research is needed at the intersection of visual narratives and their mediators, given that this study is exploratory.

Several limitations need to be noted. First, the study used a small sample of college students as participants and focused on a single issue in the news articles. Hence, future work should extend this line of research by examining the role of visual narratives in the news coverage of other controversial social and political issues to enhance the generalizability of these findings. A more representative sample can enhance the external validity of the findings. Furthermore, the reading environment of the study was also artificial, given that participants did not have the opportunity to choose a topic to read about. Another limitation is that the news stories tested only one specific message; perhaps a news story that provided different evidence would have triggered different reactions. Finally, it should be reported that only one item was used to measure information-seeking intentions.

Despite these limitations, our study provides insights about narrative and visual persuasion that can serve as springboard for future research. For example, future studies may explain the impact of visuals and narratives by measuring additional variables, such as cognitive responses and reactance, to provide a more holistic understanding of how narratives and visuals might work together in affecting individuals. Also, researchers can examine visual narratives by using other news topics and interrogating the applicability of our results in other domains, such as health communication. Overall, this study provides invaluable practical implications for journalists in connecting with news consumers by showing the different processes through which narrative and visual messages persuade.

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