Article

360° Journalism and Empathy: Psychological Processes and Communication Outcomes

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Abstract: This study (N = 199) examined the impact of a 360° news coverage of the Iraqi war on cognitive and emotional empathy, and the mechanisms through which an audience's empathic responses are enhanced, as well as the role of empathy in impacting perceptions of news credibility. We build on earlier studies on immersive journalism to provide a nuanced investigation on different dimensions of empathy and their impact on perceptions of news credibility. The findings demonstrated that, when compared to online news, 360° news led to greater spatial presence, cognitive and positive emotional empathy, as well as higher levels of perceived news credibility. Spatial presence mediated the relationship between news modality and empathy, while the impact of 360° news on empathy was contingent upon individual differences in dispositional empathy. The results are discussed in the context of immersive journalism theory and practice.

Keywords: immersive journalism; empathy; spatial presence; news credibility

1. Introduction

Immersive journalism has been enthusiastically embraced as a promising storytelling technique that could bring faraway places and conflicts closer to domestic audiences and provide a vital public service by encouraging empathy (e.g., De la Peña et al. 2010; Dominguez-Martin 2015; Constine 2015; Silverstein 2015; Davies 2016). Scholars and professionals have assumed that technological advances in storytelling, such as immersive video and head-mounted devices, could change a user's feelings and attitudes toward news. The user, it was claimed, would better understand the pain and suffering of people affected by conflicts and identify with those in need (e.g., Silverstein 2015) if they consumed news stories through immersive experiences. Some even claimed that immersive storytelling could serve as 'the ultimate empathy machine', producing 'visceral emotional reactions' among audiences (Milk 2015).

360° journalism, one commonly used form of immersive journalism, uses special cameras to create a 360° video that captures an omnidirectional, spherical view of the environment, and allows audiences to be transported to the scene of the news story through a head-mounted virtual reality (VR) device that allows them to use natural head movements to freely look around the scene (Van Damme et al. 2019). Viewers of 360° journalism pieces are surrounded by three-dimensional images (Van Damme et al. 2019) that create the illusion of being present at the moment of the unfolding news event. With 360° news, audiences are exposed to firsthand experiences and contextual details of the events, rather than reading a secondhand account from the journalist, as is characteristic of traditional journalism (Slater and Sanchez-Vives 2016). This sense of being present in the moment when consuming news stories via 360° journalism has been posited to heighten emotional responses to news stories (De la Peña et al. 2010), relative to traditional news formats.

Journalism scholars and practitioners have been particularly interested in the potential of immersive journalism being used to engender empathy in audiences. Despite the enthusiasm, however, the evidence on whether 360° journalism is effective in generating empathy and how it compares against other news modalities is lacking and anecdotal at best. Only recently have scholars begun to propose conceptual frameworks (Aitamurto 2019; Jones 2017; Hardee and McMahan 2017) and scientifically test the processes and outcomes of 360° journalism (e.g., Pjesivac et al. 2022; Sundar et al. 2017; Van Damme et al. 2019; Vettehen et al. 2019). The findings on the impact of 360° journalism on audience empathy have been limited and contradictory. Some scholars inferred empathy as an uncontested outcome of new technologies (e.g., Pavlik and Bridges 2013), while others found opposing effects (compare Sundar et al. 2017 against Steinfeld 2020). This has led Sánchez Laws (2017, 2020) to call for more careful interpretations of the role of empathy in immersive storytelling, and Hassan (2020) negating the potential of immersive technologies to serve as "empathy machines", claiming that such rhetoric has been purely "part of a wider ideology of digitality that is antithetical to actual human needs and potentials" (p. 204).

This study attempts to address these critical gaps in the literature by reexamining the theoretical boundaries of co-occurring emotional and cognitive responses to news stories delivered through emerging digital modalities. First, we parsed out and identified the impact of 360° journalism on different dimensions of empathy to add clarity and predictive accuracy to the causal relationship between 360° journalism and its outcomes. Rather than treat empathy as a monolithic variable, the impact of 360° journalism was examined and compared against online news for both cognitive and emotional empathy. We further accounted for moderating and mediating factors of the effects of 360° journalism on different dimensions of empathy by investigating the individual differences in empathy as a dispositional trait. Finally, to better understand the processes of audience responses to immersive journalism, we tested the mediating role of spatial presence in forming empathy, and the role that empathy plays in forming perceptions of news credibility.

2. Immersing Audiences in News Stories through 360° Journalism

Immersive journalism includes both 360° video news stories (real visuals filmed in the physical world) and computer-generated experiences (computer-constructed virtual world), with the most important difference between 360° videos and computer-generated immersive worlds being the integration of interactive features. In computer-generated virtual reality, participants are typically able to actively partake in events in the virtual world, manipulating objects and interacting with characters. Conversely, 360° videos place viewers behind the "fourth wall", removed from active interaction with events or characters. With these current trends and limitations in mind, this study uses the term 360° journalism to refer to news stories filmed with omnidirectional cameras, which affords a wider viewing angle and stereoscopy through head-mounted VR goggles. Although we acknowledge that 360° videos restrict the user's range of interactions with the virtual world, the videography may better enhance the authenticity of the news event compared to computer-generated media environments.

In 360° journalism, viewers adopt the first-person point of view in the immersive news story presented through visually realistic backgrounds and characters, which is thought to lead to deeper engagement with news stories by reducing the psychological distance between audiences and news events (Goutier et al. 2021). Immersion is often used casually to refer to the degree to which a person becomes completely involved or engrossed in an event, and as a result, its definition and use varies widely even in academic discourse. In this paper, we concur with Slater's argument (Slater 2003) to separate device features from subjective feelings of user experience and use the term immersion to refer to the technology's capability to envelope the user with layers of sensory information to recreate sensations of the physical world. Following this logic, a 360° journalism news story would be more immersive than the same news presented through a website.

3. Cognitive Empathy via 360° Journalism: Taking the Perspective of Others' Suffering

The perceived distance between audiences and news events is particularly important for foreign affairs news which can often seem distant and irrelevant to audiences (Kwon et al. 2017). In efforts to reduce this perceived distance, most 360° journalism pieces attempt to deliver visceral experiences of everyday people who are suffering in different parts of the world, imploring audiences to put themselves in the shoes of those who are suffering even though they may be located a distance away. Mentally putting oneself in the shoes of another person via mental imagery is called perspective-taking (Batson et al. 1997), and has been a critical component in understanding the multidimensional concept of empathy (Davis 1996).

Empathy is "the general phenomenon in which one individual, through observation of another, comes to experience some change in his or her thoughts or feelings" (Davis 1996, p. 443). Although the debate on the exact definition of empathy has been long and heated (Sánchez Laws 2020), most scholars agree that the concept of empathy should include both cognitive and affective components. The cognitive dimension of empathy involves mentally understanding the other, and adopting the other's point of view. Then, the ability to engage in cognitive empathy is likely to vary based on an individual's capacity for imagination (De Waal 2008), and their ability to mentally construct another person's mental world (Hogan 1969). For Hollin (1994), "the ability to see the world, including one's own behaviour, from another person's point of view is to display empathy" (p. 1240).

Earlier findings have demonstrated that sharing another person's experiences in immersive environments can be more effective in inducing perspective-taking than traditional means of perspective-taking that relies on mental imagery, leading to an increase in favorable outcomes such as helping behavior or involvement with the issues presented (Ahn et al. 2013, 2016; Van Loon et al. 2018). When individuals can see, hear, and feel as another person and undergo an experience in that person's shoes in immersive virtual worlds, they feel a stronger sense of having merged and "at one" with the other person compared to being asked to imagine that person's experiences (Ahn et al. 2013). Furthermore, the favorable attitudinal and behavioral outcomes that result from using immersive experiences for perspective-taking persist longer over time than traditional perspective-taking manipulations (Ahn et al. 2013; Herrera et al. 2018).

In journalism studies, the impact of immersive journalism has been mostly discussed through critical and descriptive approaches (Nielsen and Sheets 2021; Sánchez Laws 2020; Sánchez Laws and Utne 2019) than with a media effects approach. Therefore, there is a critical need for experimental studies with a control group to empirically test the assumptions that immersive journalism, when compared against traditional journalism, can substantially increase individuals' engagement in cognitive empathy. We chose to compare online news against 360° journalism to increase the ecological validity of the experiment. Namely, *The New York Times*, whose 360° news was used as a stimulus in this experiment, is known for its excellence primarily in print and online news. Their news production in the area of digital journalism, such as 360° video, should thus be juxtaposed to an online version of the news, in order to stay faithful to the organization's primary modes of storytelling.

H1: *A 360° journalism news story will elicit greater cognitive empathy than the same story delivered through online news.*

4. Emotional Empathy via 360° Journalism: Sharing Others' Emotions

In addition to cognitively processing and understanding others' suffering, the ability of immersive news stories to closely mimic intense real-life situations, such as conflict in Iraq, by engaging viewers with concrete visual cues and sounds, has been found to trigger emotional responses (Diemer et al. 2015; Sundar et al. 2017) and enjoyment of the news story (Vettehen et al. 2019). However, the bulk of these earlier studies treated empathy as a single, global variable without parsing the different impact of cognitive and emotional empathy. For example, Sundar et al. (2017) found that participants in their VR and 360°

video news story conditions were more empathetic (i.e., expressing more emotions of sympathy and compassion) towards the story characters than their counterparts in the text condition. Archer and Finger (2018) combined cognitive and emotional empathy in one measure. In their study, 360° videos viewed with two different platforms (laptop computer and HMDs) elicited more emotional reactions than print, but no significant differences between the two 360° videos were found (Archer and Finger 2018).

Consequently, findings reported on the impact of immersive journalism on empathy have not been consistent. Some scholars posit that manipulating the modality through which the news story is delivered might not be sufficient to elicit changes in emotional empathy. For example, Steinfeld (2020) did not find correlations between the story modality (360° video vs. 2D video vs. print news) and participants' empathetic reaction, or identification with the sexual assault victim portrayed in the news story. Wang et al. (2018) compared between 360° video and 2D video and found that a more immersive experience did not promote emotional reactions or engagement with the mediated content. The inconsistency in these results may be an artifact of the vague conceptualization of empathy—360° journalism may be leaving some affective or cognitive impact on participants but the varied conceptualization of empathy has made it difficult to accurately assess the impact of 360° journalism.

News stories on war topics can elicit both positive (e.g., sympathetic feelings of caring) and negative (e.g., distress at victims' suffering) empathic emotions. We anticipate that when participants consume an immersive news story about a foreign affairs event, such as a 360° journalism news story about conflicts in Iraq, they are more likely to feel as if they are sharing the experiences of the protagonist and are personally witnessing the horrors of a post-conflict environment in the city of Fallujah, filled with dusty streets and empty and destroyed buildings, compared to reading the same news online, allowing audiences to better share the emotions of people featured in the news story. Therefore, we aim to assess emotional empathy independently of cognitive empathy and anticipate the following:

H2: *A 360° journalism news story will elicit greater (a) positive and (b) negative emotional empathy than the same story delivered through online news.*

5. The Mediating Role of Spatial Presence on Cognitive and Emotional Empathy

When individuals consume news content through 360° videos, the array of sensory information in the immersive environment is likely to promote feelings of having genuinely visited the environment depicted in the news story (Biocca 1997; Lombard and Dutton 1997). This psychological experience of "being there" in a mediated environment, referred to as *spatial presence* (Slater and Wilbur 1997; Witmer and Singer 1998), increases the feeling that individuals are located in the mediated environment and that they can interact with objects and events in the mediated space (Wirth et al. 2007), which may be important for situations that participants are unlikely to experience in their everyday lives, such as being in the middle of a war zone. On the other hand, in traditional journalism, the psychological distance between the reader and the foreign news event may serve as a barrier to news engagement. Audiences have been found to be disinterested in foreign news, mainly due to the perception that there is little local relevance. The question of "who gives a damn" illustrates the problem distinctly (e.g., Hoge 1997). This distance between a foreign news event and a domestic audience, in part, is due to the traditional form of storytelling in which foreign correspondents tell "those of us who live *here* about what has happened *over there*" (Livingston and Asmolov 2010, p. 745; emphasis in original).

Previous studies have shown that 360° video is more powerful than traditional messages in provoking spatial presence. For example, in Sundar et al.'s (2017) study, participants who saw a story via a 360° video presented in a head-mounted display felt greater presence than those who read a print story. In Vettehen et al.'s (2019) study, those who saw a news story in a 360° video format reported a considerably stronger feeling of presence than those who watched the 2D version of the same video. However, message processing does

not end with perceptions of "being there". Studies in immersive journalism suggest that presence serves as a mediator, indirectly leading participants who consumed 360° video news to feel stronger emotions (e.g., enjoyment, Vettehen et al. 2019). Further research is necessary to determine the outcomes and consequences of spatial presence following exposure to immersive (vs. non-immersive) news. Taking the earlier findings into consideration, we hypothesize that a news story told in the 360° journalism format will facilitate greater levels of spatial presence than a news story delivered through print, which would then lead to greater emotional empathy—both positive and negative, as shown in H3 below.

6. Impact of Empathy on News Credibility

One core element of journalism involves the accuracy and truthfulness of the depicted events in the story. Members of the public cannot make good decisions if they lack reliable, accurate facts placed in meaningful context. Studies have shown that media modality can have a significant impact on the evaluation of news, including credibility perceptions (Abel and Wirth 1977; Ibelema and Powell 2001; Kiousis 2006). For immersive journalism, Sundar et al. (2017) found that participants who consumed news stories in 360° video perceived a higher source credibility than those who read the same story as print news. In Vettehen et al.'s (2019) study, participants who watched the 360° video news regarded the story as more credible than those who watched the 2D video of the same news. Typically, the explanation behind the increase in perceived news credibility following exposure to 360° video has been that spatial presence mediates the relationship between news modality and perceived news credibility. That is, it is not the mere exposure to technology that heightens perceived news credibility, but the feeling of being there and experiencing the news event at the moment that leads to perceptions of credibility.

Building on these earlier findings, the current study poses another potential mechanism through which a news modality can impact news credibility—cognitive and emotional empathy. Scholars and practitioners have argued that one of the main functions of journalism is to foster the understanding of another's perspective and how they feel in the audience's own terms (i.e., cognitive empathy) through factual storytelling (for discussion see Sánchez Laws 2020). Experts agree that immersive journalism can generate the understanding of other people's situation and their lived experiences (Damas and de Gracia 2022). Despite these normative assumptions, little research has tested the effects of traditional or immersive journalism on cognitive empathy. Newer studies have shown that immersive journalism can enhance cognitive empathy through spatial presence. Participants who experienced higher spatial presence in the Barreda-Ángeles et al. (2020) study while watching 360° stories (vs. on-screen news) were more likely to engage in perspective-taking compared to those who experienced lower spatial presence. This is consistent with the assumptions of construal level theory (Trope and Liberman 2010), which posits that events that are psychologically close are represented in more concrete and detailed ways than distal events, thus facilitating perspective-taking.

Simultaneously and despite the dominance of the traditional perspective that journalism should primarily be based on cold, hard facts because these facts help audiences make rational choices to engage in politics (Strömbäck 2005), journalism research in recent years has noted the importance that emotion plays in an audience's news perceptions. In the deluge of information, individuals pay attention to information when it directly speaks to their emotions (Brader 2005; Graber 1990; Marcus 2000). In addition to these gatekeeping roles for political information, research demonstrates that emotion can also bias perceptions of news credibility (Arpan and Nabi 2011). Prior findings suggest that the valence of emotional responses following news consumption can significantly impact their perceived credibility of the news story (Arpan and Nabi 2011; Porter et al. 2014). In earlier studies, positive emotions after news consumption, such as happiness, led to positive evaluations of credibility (Wang and Hickerson 2016), whereas negative emotions after news consumption, such as anger, led to negative evaluations of credibility (Arpan and Nabi 2011; Wang and Hickerson 2016). Therefore, we will independently investigate

the influence of positive and negative emotions after exposure to 360° video versus online news and test whether the valence of emotional empathy mediates perceptions of news credibility. Taken together with the mediating role of spatial presence, we propose and test the three different serial mediation models for news credibility:

H3: *A 360° journalism news story will elicit more spatial presence than the same story delivered through online news. Spatial presence will lead to more (a) cognitive empathy, (b) positive emotional empathy, and (c) negative emotional empathy, respectively, ultimately leading to high perceived news credibility.*

7. The Impact of Dispositional Empathy on Empathic Outcomes of 360° Journalism

An important moderating influence to consider in the relationship between immersive journalism and empathy is how dispositional empathy, or individual trait differences in feeling cognitive and emotional empathy (Davis 1996), can influence how individuals feel empathy following exposure to immersive journalism. Ahn and colleagues (Ahn et al. 2013) have found that individuals with varying levels of dispositional empathy might respond differently to cognitive empathy (i.e., perspective-taking) induced by immersive environments. Specifically, immersive experiences simulating the perspective of another person seemed to be more helpful to participants with lower (versus higher) dispositional empathy. Therefore, we aim to replicate these earlier results in the context of immersive journalism:

H4: *Participants with lower dispositional empathy will feel greater cognitive empathy experiencing a 360° journalism news story than those with higher dispositional empathy.*

We will also investigate how feeling emotional empathy from exposure to immersive environments may be contingent upon individual differences in dispositional empathy. For individuals with innate tendencies to share others' emotions, using immersive environments to induce perspective-taking may serve as a catalyst, resulting in greater engagement with the virtual experience and amplified levels of state empathy. Conversely, individuals with high dispositional empathy may not need technological assistance to share others' emotions, whereas individuals with low trait tendencies may meaningfully benefit from immersive experiences designed to facilitate perspective-taking. To test these competing possibilities, we propose the following two competing hypotheses of the moderating role of dispositional empathy:

H5A: *Participants with higher dispositional empathy will feel greater emotional empathy experiencing a 360° journalism news story than those with lower dispositional empathy.*

H5B: *Participants with lower dispositional empathy will feel greater emotional empathy experiencing a 360° journalism news story than those with higher dispositional empathy.*

8. Methods

8.1. Design and Participants

This study compared the effects of two types of news modalities, 360° journalism and online news, on cognitive and affective responses toward the news story with a two condition between-subjects design. Participants (N = 199, 123 females; 141 Caucasians, 25 Asians or Pacific Islanders, 20 African Americans, 10 Hispanics, 3 Other) were recruited from the general population as well as through a research pool at a large public university. The community participants were recruited through social media, local newspaper, and personal contact, and received USD 15 Amazon gift cards for their participation. Student participants were offered extra credit for their participation. Their age ranged from 18 to 80 (M = 26.42, SD = 12.66). When asked to identify with a political party, 47.2% of participants identified with the democratic party, 28.6% with the republican party, and 12.6% were

independent. Approximately 48.7% of the participants indicated that their main source of information is social networks, and 40.2% mainly received information from online news portals.

8.2. Stimuli and Procedures

Before being exposed to the news story, participants responded to a questionnaire that assessed baseline levels of dispositional empathy, news consumption habits, and demographic information. Upon arrival at the laboratory, participants were randomly assigned to either the 360° journalism or the print news condition. In the 360° journalism condition (*n* = 93), participants were exposed to *The New York Times* immersive 360° video, *The Fight for Fallujah*, using Google Cardboard for a head-controlled point of view and headphones for audio. The 360° video was then presented to the participants by fitting the Google Cardboard with a smartphone that can present the video content in stereoscopy. The news story covered in the 360° journalism is an 11 min experience that transports viewers directly into the violent center of Iraqi battles to retake Fallujah from ISIS and the aftermath of the war that has devastated the entire region.

In the online news condition (*n* = 106), participants viewed the same news story on a website. To develop the online news, the narration featured in the 360° journalism was transcribed. Then, five research assistants compared the 360° journalism news against the online news to add information that they thought was missing, to present equivalent levels of information between both conditions. Researchers cross-checked the two modalities to ensure that the visual and auditory information provided in the 360° journalism news story was reflected in the online news. The final online news piece was presented to participants on a desktop computer with the traditional *New York Times* website layout. Following exposure to the news story about Fallujah, all participants responded to a post-treatment questionnaire.

8.3. Measurement

8.3.1. Interpersonal Reactivity Index (IRI)

Dispositional empathy was assessed at the pretest with the Interpersonal Reactivity Index (Davis 1980), a 28-item measure of empathy as a trait. The items asked participants to indicate the extent to which the statements accurately describe how they are in general (*1 = Not at all; 5 = Extremely*). Sample items include, "I really get involved with the feelings of the characters in a novel", "I sometimes try to understand my friends better by imagining how things look from their perspective", and "When I see someone being taken advantage of, I feel kind of protective toward them". The reliability for all 28 items was high (Cronbach's α = 0.82) and a single composite IRI score was created.

8.3.2. Cognitive Empathy

Cognitive empathy (i.e., perspective-taking) was measured by a one item, five-point Likert-type scale (*1 = Not at all; 5 = Extremely*) that asked the participants to indicate the level to which they concentrated on what it would be like to experience what happened to people in Fallujah while they were reading/watching the news story about Fallujah.

8.3.3. Emotional Empathy

Emotional empathy was measured by two subscales; a six-item, five-point Likert-type scale for positive emotions, and an eight-item, five-point Likert-type scale for negative emotions (*1 = Not at all; 5 = Extremely*, Batson et al. 1997). The positive emotional empathy subscale asked the participants to indicate the extent to which they experienced a set of positive emotions (sympathetic, softhearted, warm, compassionate, tender, moved) about the people presented in the news story (Cronbach's α = 0.89). The negative emotional empathy subscale asked the participants to indicate the extent to which they experienced negative emotions (alarmed, grieved, troubled, distressed, upset, disturbed, worried, perturbed) about the people presented in the narrative (Cronbach's α = 0.94).

8.3.4. Spatial Presence

Spatial presence was measured by a five-item, five-point Likert scale (*1 = Strongly Disagree; 5 = Strongly Agree*) adopted from similar studies (Ahn et al. 2016; Bailenson et al. 2005) (e.g., I felt I was really walking in the streets of Fallujah; I felt I really visited the city of Fallujah; Cronbach's α = 0.86).

8.3.5. Credibility

News story credibility. News story credibility was measured by eight 7-point Likert scale items (Meyer et al. 2010), which asked the participants to indicate the extent to which they agreed with a set of statements (e.g., the news story about Fallujah was fair; the news story about Fallujah was unbiased; the news story about Fallujah was accurate; Cronbach's α = 0.81).

Source credibility. Source credibility was measured by an 11-item, 7-point Likert scale (Whitehead 1968), which asked participants to indicate the extent to which they agreed with a set of statements (e.g., The New York Times is a fair news source; The New York Times is an honest news source; The New York Times is an experienced news source; Cronbach's α = 0.96).

Organizational credibility. Organizational credibility was measured by five, 7-point Likert scale items (Meyer et al. 2010), which asked the participants to indicate the extent to which they agreed with a set of statements (e.g., The New York Times cares about the readers like me; The New York Times reporters seem to be well-trained; Cronbach's α = 0.87).

Control variables. Based on previous research that has shown that females react differently to news about crises and disasters (e.g., Cantor et al. 1993; Lachlan et al. 2010), and rate the credibility of news content differently when compared to males (e.g., Bucy 2003), we control for sex when examining the impact of the same news story delivered via 360° journalism versus online news.

9. Results

9.1. Effect of Immersive Journalism on Cognitive and Emotional Empathy

First, the results of an analysis of covariance (ANCOVA) revealed that, controlling for sex, 360° journalism (*M* = 3.86, *SD* = 0.84) led to greater efforts to take the perspective of people in Fallujah than the online news (*M* = 3.46, *SD* = 0.96), $F(196)$ = 11.28, p = 0.001, *d* = 0.44. H1 was supported. Next, an ANCOVA controlling for sex confirmed that 360° journalism (*M* = 3.32, *SD* = 0.86) led to more positive emotional empathy in participants compared to online news (*M* = 3.06, *SD* = 0.99), $F(196)$ = 4.40, p = 0.04, *d* = 0.30. H2A was supported. Finally, an ANCOVA controlling for sex confirmed that 360° journalism (*M* = 3.25, *SD* = 0.94) did not lead to more negative emotional empathy in participants compared to online news (*M* = 3.08, *SD* = 0.97), $F(196)$ = 2.45, p = 0.12, *d* = 0.22. H2B was not supported.

9.2. Effects of Immersive Journalism on Perceived Credibility

To test the impact of 360° journalism on three dimensions of credibility, a multivariate analysis of covariance was conducted to protect against the inflation of Type 1 error rates (Cramer and Bock 1966). The news modality was the independent variable, and the three dimensions of credibility were entered as dependent variables, controlling for sex. The main effect of news modality was significant; $F(194)$ = 4.88, p = 0.003. Tests of between-subjects effects revealed that participants in the 360° journalism condition perceived greater news story credibility (*M* = 4.85, *SD* = 0.88) than participants in the online news condition (*M* = 4.43, *SD* = 0.72), $F(196)$ = 13.10, p < 0.001, *d* = 0.52. However, 360° journalism did not impact source credibility (*M* = 5.15, *SD* = 1.12; online news *M* = 5.10, *SD* = 1.04), $F(196)$ = 0.11, p = 0.74, *d* = 0.05. Also, 360° journalism did not impact organization credibility (*M* = 5.31, *SD* = 1.05, online news *M* = 5.18, *SD* = 1.03), $F(196)$ = 0.73, p = 0.39, *d* = 0.12. Therefore, the ensuing analyses on credibility focused on the dimension of news credibility.

To test the mediating roles of spatial presence and empathy on news credibility following exposure to 360° journalism (H3), three serial mediation models were tested with the PROCESS macro model (Model 6; Hayes 2012). The first model looked at the impact of spatial presence and cognitive empathy serially mediating the relationship between news modality and credibility, controlling for sex. News modality had a direct impact on spatial presence, with 360° video news leading to higher spatial presence than online news ($b = 0.32$, $p = 0.01$). High spatial presence led to more cognitive empathy ($b = 0.27$, $p < 0.001$). However, cognitive empathy did not lead to higher news credibility ($b = 0.05$, $p = 0.41$). News modality had a direct impact on cognitive empathy ($b = 0.32$, $p = 0.01$). The indirect effect of news modality to spatial presence and news credibility was significant (95% CI: 0.02, 0.19). However, the indirect effect of news modality to spatial presence, cognitive empathy, and finally news credibility was not significant (95% CI: −0.01, 0.02). Therefore, H3A was not supported.

The second model looked at the impact of spatial presence and positive emotional empathy serially mediating the relationship between media modality and news credibility, controlling for sex. Again, news modality had a direct impact on spatial presence, with 360° video news leading to higher spatial presence than online news ($b = 0.34$, $p = 0.01$). High spatial presence led to more positive emotional empathy ($b = 0.28$, $p < 0.001$). The positive emotional empathy led to higher news credibility ($b = 0.13$, $p = 0.03$). News modality did not have a direct impact on positive emotional empathy when controlling for spatial presence ($b = 0.17$, $p = 0.20$). The indirect effect from news modality to spatial presence, positive emotional empathy, and finally to news credibility was not significant (95% CI: −0.001, 0.04). Therefore, H3B was not supported.

The third model looked at the impact of spatial presence and negative emotional empathy serially mediating the relationship between media modality and news credibility, controlling for sex. News modality had a direct impact on spatial presence, with 360° journalism leading to higher spatial presence than online news ($b = 0.35$, $p = 0.01$). High spatial presence led to more negative emotional empathy ($b = 0.41$, $p < 0.001$). Negative emotional empathy led to higher news credibility ($b = 0.14$, $p = 0.02$). News modality did not have a direct impact on negative emotional empathy when controlling for spatial presence ($b = 0.06$, $p = 0.63$). The indirect effect from news modality to spatial presence, negative emotional empathy, and finally to news credibility was significant (95% CI: 0.001, 0.05). Therefore, H3C was supported.

9.3. Moderating Role of Dispositional Empathy on Situational Empathy

Next, the impact of dispositional empathy on situational empathy was tested with three moderation models with the PROCESS macro model (Model 1). In the first model, news modality was entered as the independent variable, cognitive empathy was entered as the dependent variable, and dispositional empathy (IRI) was entered as the moderator, controlling for sex. When dispositional empathy was entered into the model, news modality did not lead to greater cognitive empathy ($b = 0.23$, $p = 0.80$). The main effect of IRI had a significant impact on cognitive empathy, in that participants with lower dispositional empathy experienced greater cognitive empathy ($b = 0.25$, $p = 0.02$). However, the interaction between the news platform and dispositional empathy (IRI) was also not significant ($b = 0.01$, $p = 0.92$); therefore, IRI did not have moderating effects on cognitive empathy. H4 was not supported.

A second test of moderation was conducted with news modality as the independent variable, positive emotional empathy as the dependent variable, and dispositional empathy (IRI) as the moderator, controlling for sex. The main effect of news modality did not have a significant impact on positive emotional empathy ($b = 0.82$, $p = 0.44$). The main effect of IRI still had a significant impact on positive emotional empathy ($b = 27$, $p = 0.03$). However, the interaction between news modality and dispositional empathy was not significant ($b = −0.04$, $p = 0.58$); IRI did not have moderating effects on positive emotional empathy.

A final test of moderation was conducted with news modality as the independent variable, negative emotional empathy as the dependent variable, and dispositional empathy (IRI) as the moderator, controlling for sex. The main effect of news modality had a significant impact on negative emotional empathy, wherein 360° journalism led to greater negative emotional empathy in participants than online news ($b = 2.29$, $p = 0.03$). The main effect of IRI had a significant impact on negative emotional empathy ($b = 0.43$, $p < 0.001$). The interaction between IRI and news modality was also significant, with participants with lower IRI scores feeling greater negative emotional empathy when exposed to 360° journalism news than participants with higher IRI scores ($b = -0.16$, $p = 0.03$). H5A was not supported and H5B was supported for negative emotional empathy only.

10. Discussion

The present study examined the impact of a news story about the conflict in Fallujah, Iraq, presented through a 360° video, on cognitive and emotional empathy, and the mechanisms through which the empathic responses among American audiences are enhanced while they consume an immersive news story, as well as the role of empathy in impacting perceptions of news credibility. The findings demonstrated that, when compared to online news, 360° journalism news led to greater efforts to take the perspective of subjects presented in the news story (cognitive empathy) and greater feelings of positive emotions (but not negative emotions) towards the people presented in the story, as well as a greater perception of spatial presence.

Spatial presence mediated the relationship between news modality and both cognitive and emotional empathy; 360° journalism led to higher spatial presence, and higher spatial presence, in turn, ultimately led to higher cognitive empathy and negative emotional empathy (but not positive emotional empathy), respectively. Spatial presence also mediated the relationship between news modality and news credibility; 360° journalism led to higher spatial presence, and higher spatial presence, in turn, ultimately led to higher news credibility.

Between cognitive and emotional empathy, only emotional empathy had a direct impact on perceptions of news credibility, wherein higher positive or negative emotional empathy felt during exposure to 360° journalism led to higher credibility toward the news story. Taking the perspective of the people introduced in the news story (cognitive empathy) did not have direct impact on news credibility. In particular, the serial mediation analysis found that 360° journalism coverage of the war in Fallujah elicited high spatial presence experiences, leading to high negative emotional empathy for people portrayed in the news story. The negative emotional empathy felt by audiences ultimately led to high perceptions of news credibility.

The impact of 360° journalism on empathy was partially contingent on individual differences in dispositional empathy; participants exposed to the 360° news with lower IRI scores demonstrated greater negative emotional empathy than participants with higher IRI scores. However, dispositional empathy did not moderate the relationship between 360° journalism and cognitive empathy or positive emotional empathy for the war coverage used in this study.

11. Theoretical Contributions

One of the main arguments in favor of immersive journalism has contended that using 360° video to depict the plight of others suffering amidst foreign affairs issues is more likely to induce empathy in audiences compared to traditional news modalities. We add further support to earlier findings (e.g., Sundar et al. 2017) by confirming that 360° journalism indeed has an impact on empathy. Furthermore, we took a more nuanced approach to studying empathy by parsing the global variable of empathy into distinct dimensions. Our results echo earlier findings (Ahn et al. 2013) in that 360° journalism promotes perspective-taking, an action that leads to cognitive empathy. 360° journalism also led to increases in positive and negative emotional empathy. Given that the main manipulation varied

immersion (online news vs. 360° journalism) and the narrative line of the news story was kept equivalent across the two conditions, these findings contribute to the development of a process model for immersive journalism, wherein immersion leads to spatial presence, which, in turn, elicits both positive (e.g., sympathy, compassion) and negative (e.g., grief, distress) emotional empathy for the protagonists featured in the news story.

Of the different dimensions of empathy, emotional empathy (both positive and negative) directly increased audience perceptions of news credibility, whereas cognitive empathy did not. The outcome variable evaluated in the current study is the *perception* of news credibility and not an objective measure of credibility. It is therefore likely that going beyond merely understanding the plight of the war-ravaged people of Fallujah and becoming emotionally involved with the people in the news story led to what participants *perceived* to be credible news stories. A deeper investigation into the relationship between empathy and news credibility through a serial mediation analysis sheds further light into the psychological mechanisms driving this credibility outcome. The results indicated that news stories presented in 360° video elicited higher spatial presence compared to online news. High spatial presence led participants to feel more negative emotional empathy toward the people presented in the news story, ultimately leading to news credibility. This relates to earlier findings that some forms of empathy may, counter to intuition, be related to rational thinking (Martingano and Konrath 2022), and emotional empathic responses to an issue increases the perceived involvement with the issue (Bae 2008). The main value of integrating 360° journalism formats in foreign war coverage seems to be the increase in specifically negative emotional empathy via spatial presence, which serves to heighten news credibility.

Our findings are further nuanced by the finding that individual differences in dispositional empathy (IRI) moderate the impact of immersion on negative, but not positive, emotional empathy, nor cognitive empathy. Participants who have lower IRI scores felt greater negative emotional empathy for the protagonists featured in the 360° journalism story than participants with higher IRI scores. This echoes findings from Ahn et al. (2013) and confirms that individuals who are inherently more likely to empathize with others may not need facilitation through technologies. Rather, it seems that individuals with lower IRI scores benefit more from using technology to facilitate perspective-taking. Perhaps reflecting the negative context of war presented in the news story, the impact of IRI was only significant for negative emotional empathy, suggesting that participants with low IRI scores may have benefited from the 360° journalism format to share negative emotional empathy, such as grief and distress, but may have found it relatively easier to share positive emotions such as sympathy and compassion, without the assistance of a 360° video.

Perspective-taking and empathizing is a controlled, effortful process that requires substantial cognitive and emotional resources (Davis et al. 1996). Consequently, individuals may have low motivation to empathize with others (Gehlbach et al. 2012; Hodges and Klein 2001), particularly when the shared emotions are negative and place an undue burden on individuals, such as grief and distress. Positive emotions, on the other hand, may be easier to process and therefore require less facilitation. The current findings point to the importance of considering individual trait differences in dispositional empathy as well as accurately parsing different dimensions of empathy when conceptualizing the impact of immersive journalism.

12. Limitations and Future Directions

Most of the currently available content on 360° journalism, and news in general, is negative in nature, depicting the suffering of people in a variety of contexts. Therefore, it is not clear whether the model we tested applies in the same way for positive or neutral news, such as an individual's success story or a scientific breakthrough. Earlier studies have demonstrated that bad emotions usually have more impact on audience responses than the good ones (Baumeister et al. 2001). Future studies should distinguish and compare the impact of positive versus negative valanced news story content of 360° journalism. Emerg-

ing studies have noted the current movement toward constructive news in journalism, opposing the negativity bias of traditional approaches and promoting and solution-framed news stories that evoke positive emotions (Baden et al. 2019).

Another critical question to ask is whether repeated exposure to 360° journalism eventually habituates viewers into becoming less empathic or less engaged over time. Earlier findings indicate that the impact of immersive environments on attitude and behavior change is longer lasting than other channels of information delivery (Ahn et al. 2013; Ahn 2015, 2018), with a recent study demonstrating that the impact on empathy may last for up to eight weeks (Herrera et al. 2018). However, very few studies have looked at repeated exposures to immersive stimuli to document decaying effects, if any, of exposure over time. In the real world, news agenda-setting is often constructed through repeated exposure, which suggests that repeated exposure may signal importance rather than elicit habituation. These limitations, among others, suggest the need for future research to shed further light on the impact of immersive journalism. The current study provides the initial steps by offering a process model of the mechanisms that lead to cognitive and affective outcomes of immersive journalism as well as testing the individual differences that moderate the observed effects.

13. Implications for Journalism Practice

For journalism practitioners, this study provided evidence using a sample of varying age that 360° journalism has the potential to increase people's emotional and cognitive reactions. For news reporting about wars and distant places, this is a double-edged sword. On one hand, 360° journalism's potential to increase empathy could be used to emotionally connect audiences with others with whom they do not share common fates and liberate individuals from a self-centered world. On the other hand, eliciting emotional reactions of audiences could be problematic for journalism objectivity. Although emotions have gained ground in news reporting and are accepted as a legitimate part of journalistic practice (Allern 2002; Tumber and Prentoulis 2003), the ideals of modern journalism are still reflected in dispassionate investigation (Pantti 2010). In addition, research has shown that the portrayal of screen-based violence can lead to desensitization to real-life consequences of violence, and alterations in cognitive processing (Funk et al. 2004), annulling the initial purpose of using emotion-provoking content in news. Journalism practitioners would have to carefully consider the use of new technologies, including 360° video, for the reporting of real-life events, and weigh its ability to connect audiences with the protagonists of news stories against the possibility of its strong emotional content to negatively impact the role of socially responsible reporting.

In terms of the journalism theory, this study contributes to further nuancing extant knowledge on news credibility. Although previous studies found that 360° journalism boosts some credibility perceptions (e.g., Sundar et al. 2017; Vettehen et al. 2019), this study investigated its effectiveness on different types of credibility, finding that 360° journalism news positively affected news story credibility, but did not impact source and organizational credibility. This suggests that when evaluating 360° journalism stories, news users are primarily focused on the characteristics of the story itself and less invested in thinking about the source and organization that produced it. Taking into account that in this study both source and organizational credibility were directed towards the evaluations of *The New York Times*, the findings could impact the way we approach some aspects of journalism credibility. If the immersiveness of the medium detracts users from paying attention to who delivered the information, the credibility construct in the context of immersive media platforms would need to be reconsidered. We would also be remiss not to note that the ability for 360° journalism to heighten news credibility may be a double-edged sword, particularly in the era of fake news and AI-driven deep fakes. Espousing the importance of checking and confirming the authenticity and authority of the news source to the public may become critical as journalism formats continue to evolve over time.

References

Abel, John D., and Michael O. Wirth. 1977. Newspaper vs. TV Credibility for Local News. *Journalism and Mass Communication Quarterly* 54: 371–75. [CrossRef]

Ahn, Sun Joo. 2015. Incorporating immersive virtual environments in health promotion campaigns: A construal-level theory approach. *Health Communication* 30: 545–56. [CrossRef] [PubMed]

Ahn, Sun Joo, Amanda Minh Tran Le, and Jeremy Bailenson. 2013. The effect of embodied experiences on self-other merging, attitude, and helping behavior. *Media Psychology* 16: 7–38. [CrossRef]

Ahn, Sun Joo Grace. 2018. Virtual Exemplars in Health Promotion Campaigns: Heightening Perceived Risk and Involvement to Reduce Soft Drink Consumption in Young Adults. *Journal of Media Psychology: Theories, Methods, and Applications* 30: 91–103. [CrossRef]

Ahn, Sun Joo, Joshua Bostick, Elise Ogle, Kristine L. Nowak, Kara T. McGillicuddy, and Jeremy N. Bailenson. 2016. Experiencing nature: Embodying animals in immersive virtual environments increases inclusion of nature in self and involvement with nature. *Journal of Computer-Mediated Communication* 21: 399–419. [CrossRef]

Aitamurto, Tanja. 2019. Normative paradoxes in 360 journalism: Contested accuracy and objectivity. *New Media, and Society* 21: 3–19. [CrossRef]

Allern, Sigurd. 2002. Journalistic and commercial news values: News organizations as patrons of an Institution and market actors. *Nordicom Review* 23: 137–52. [CrossRef]

Archer, Dan, and Katharina Finger. 2018. *Walking in Another's Virtual Shoes: Do 360-Degree Video News Stories Generate Empathy in Viewers?* New York: Tow Center for Digital Journalism, Columbia University. Available online: https://www.cjr.org/tow_center_reports/virtual-reality-news-empathy.php (accessed on 5 June 2024). [CrossRef]

Arpan, Laura M., and Robin L. Nabi. 2011. Exploring Anger in the Hostile Media Process: Effects on News Preferences and Source Evaluation. *Journalism and Mass Communication Quarterly* 88: 5–22. [CrossRef]

Baden, Denise, Karen McIntyre, and Fabian Homberg. 2019. The impact of constructive news on affective and behavioural responses. *Journalism Studies* 20: 1940–59. [CrossRef]

Bae, Hyuhn-Suhck. 2008. Entertainment-education and recruitment of cornea donors: The role of emotion and issue involvement. *Journal of Health Communication* 13: 20–36. [CrossRef]

Bailenson, Jeremy N., Andrew C. Beall, Jack Loomis, Jim Blascovich, and Matthew Turk. 2005. Transformed Social Interaction, Augmented Gaze, and Social Influence in Immersive Environments. *Human Communication Research* 31: 511–37. [CrossRef]

Barreda-Ángeles, Miguel, Sara Aleix-Guillaume, and Alexandre Pereda-Baños. 2020. An "Empathy Machine" or a "Just-for-the-Fun-of-It" machine? Effects of immersion in nonfiction 360-video stories on empathy and enjoyment. *Cyberpsychology, Behavior, and Social Networking* 23: 683–88. [CrossRef] [PubMed]

Batson, C. Daniel, Shannon Early, and Giovanni Salvarani. 1997. Perspective Taking: Imagining How Another Feels Versus Imagining How You Would Feel. *Personality and Social Psychology Bulletin* 23: 751–58. [CrossRef]

Baumeister, Roy F., Ellen Bratslavsky, Catrin Finkenauer, and Kathleen D. Vohs. 2001. Bad is Stronger than Good. *Review of General Psychology* 5: 323–70. [CrossRef]

Biocca, Frank. 1997. The Cyborg's Dilemma: Progressive Embodiment in Virtual Environments. *Journal of Computer-Mediated Communication* 3: JCMC324. [CrossRef]

Brader, Ted. 2005. Striking a Responsive Chord: How Political Ads Motivate and Persuade Voters by Appealing to Emotions. *American Journal of Political Science* 49: 388–405. [CrossRef]

Bucy, Erik P. 2003. Media Credibility Reconsidered: Synergy between On-Air and Online News. *Journalism, and Mass Communication Quarterly* 80: 247–64. [CrossRef]

Cantor, Joanne, Marie-Louise Mares, and Mary Beth Oliver. 1993. Parent's and children's emotional reactions to televised coverage of the Gulf War. In *Desert Storm and the Mass Media*. Edited by Bradley S. Greenberg and Walter Gantz. New York: Hampton Press, pp. 325–40.

Constine, Josh. 2015. *Virtual Reality, the Empathy Machine*. Cresskill: Tech Crunch. Available online: https://techcrunch.com/2015/02/01/what-it-feels-like/ (accessed on 14 April 2023).

Cramer, Elliot M., and R. Darrell Bock. 1966. Chapter VIII: Multivariate Analysis. *Review of Educational Research* 36: 604–17. [CrossRef]

Damas, Susana Herrera, and María José Benítez de Gracia. 2022. Immersive journalism: Advantages, disadvantages and challenges from the perspective of experts. *Journalism and Media* 3: 330–47. [CrossRef]

Davies, Caroline. 2016. Welcome to Your Virtual Cell: Could You Survive Solitary Confinement? *The Guardian*, April 27. Available online: https://www.theguardian.com/world/2016/apr/27/6x9-could-you-survive-solitary-confinement-vr (accessed on 25 January 2023).

Davis, Mark H. 1980. A multidimensional approach to individual differences in empathy. *JSAS Catalog of Selected Documents in Psychology* 10: 85.

Davis, Mark H. 1996. *Empathy: A Social Psychological Approach*. New York: Routledge. [CrossRef]

Davis, Mark H., Laura Conklin, Amy Smith, and Carol Luce. 1996. Effect of perspective taking on the cognitive representation of persons: A merging of self and other. *Journal of Personality and Social Psychology* 70: 713–26. [CrossRef] [PubMed]

De la Peña, Nonny, Peggy Weil, Joan Llobera, Bernhard Spanlang, Doron Friedman, Maria V. Sanchez-Vives, and Mel Slater. 2010. Immersive journalism: Immersive virtual reality for the first-person experience of news. *Presence* 19: 291–301. [CrossRef]

De Waal, Frans B. M. 2008. Putting the altruism back into altruism: The evolution of empathy. *Annual Review of Psychology* 59: 279–300. [CrossRef]

Diemer, Julia, Georg W. Alpers, Henrik Moriz Peperkorn, Youssef Shiban, and Andreas Mühlberger. 2015. The impact of perception and presence on emotional reactions: A review of research in virtual reality. *Frontiers Psychology* 6: 111605. [CrossRef]

Dominguez-Martin, Eva. 2015. Immersive journalism or how virtual reality and video games are influencing the interface and the interactivity of news storytelling. *Profesional De La Informacion* 24: 413–23.

Funk, Jeanne B., Heidi Bechtoldt Baldacci, Tracie Pasold, and Jennifer Baumgardner. 2004. Violence exposure in real-life, video games, television, movies, and the internet: Is there desensitization? *Journal of Adolescence* 27: 23–39. [CrossRef] [PubMed]

Gehlbach, Hunter, Maureen E. Brinkworth, and Ming-Te Wang. 2012. The social perspective taking process: What motivates individuals to take another's perspective? *Teachers College Record* 114: 197–225. [CrossRef]

Goutier, Nele, Yael de Haan, Kiki de Bruin, Sophie Lecheler, and Sanne Kruikemeier. 2021. From "Cool Observer" to "Emotional Participant": The practice of immersive journalism. *Journalism Studies* 22: 1648–64. [CrossRef]

Graber, Doris A. 1990. Seeing Is Remembering: How Visuals Contribute to Learning from Television News. *Journal of Communication* 40: 134–56. [CrossRef]

Hardee, Gary M., and Ryan P. McMahan. 2017. FIJI: A framework for the immersion-journalism intersection. *Frontiers in ICT* 4: 21. [CrossRef]

Hassan, Robert. 2020. Digitality, Virtual Reality and the 'Empathy Machine'. *Digital Journalism* 8: 195–212. [CrossRef]

Hayes, Andrew F. 2012. PROCESS: A Versatile Computational Tool for Observed Variable Mediation, Moderation, and Conditional Process Modeling. Available online: https://www.semanticscholar.org/paper/PROCESS-:-A-Versatile-Computational-Tool-for-,-,-1-Hayes/aa753b543c78d6c4f344fb431c6683edaa062c07 (accessed on 5 June 2024).

Herrera, Fernanda, Jeremy Bailenson, Erika Weisz, Elise Ogle, and Jamil Zaki. 2018. Building long-term empathy: A large-scale comparison of traditional and virtual reality perspective-taking. *PLoS ONE* 13: e0204494. [CrossRef] [PubMed]

Hodges, Sara D., and Kristi J. K. Klein. 2001. Regulating the costs of empathy: The price of being human. *The Journal of Socio-Economics* 30: 437–52. [CrossRef]

Hogan, Robert. 1969. Development of an empathy scale. *Journal of Consulting and Clinical Psychology* 33: 307–16. [CrossRef]

Hoge, James F., Jr. 1997. Foreign news: Who gives a damn? *Columbia Journalism Review* 36: 48–52.

Hollin, Clive R. 1994. Forensic (criminological) psychology. In *Companion Encyclopedia of Psychology*. Edited by Andrew Colman. London: Routledge, pp. 1231–53.

Ibelema, Mineabere, and Larry Powell. 2001. Cable Television News Viewed as Most Credible. *Newspaper Research Journal* 22: 41–51. [CrossRef]

Jones, Sarah. 2017. Disrupting the narrative: Immersive journalism in virtual reality. *Journal of Media Practice* 18: 171–85. [CrossRef]

Kiousis, Spiro. 2006. Exploring the Impact of Modality on Perceptions of Credibility for Online News Stories. *Journalism Studies* 7: 348–59. [CrossRef]

Kwon, K. Hazel, Monica Chadha, and Kirstin Pellizzaro. 2017. Proximity and terrorism news in social media: A construal-level theoretical approach to networked framing of terrorism in twitter. *Mass Communication and Society* 20: 869–94. [CrossRef]

Lachlan, Kenneth A., Patric R. Spence, and Lindsay D. Nelson. 2010. Gender Differences in Negative Psychological Responses to Crisis News: The Case of the I-35W Collapse. *Communication Research Reports* 27: 38–48. [CrossRef]

Livingston, Steven, and Gregory Asmolov. 2010. Networks and the future of foreign affairs reporting. *Journalism Studies* 11: 745–60. [CrossRef]

Lombard, Matthew, and Theresa Dutton. 1997. At the heart of it all: The concept of presence. *Journal of Computer Mediated Communication* 3: JCMC321. [CrossRef]

Marcus, George E. 2000. Emotions in Politics. *Annual Review of Political Science* 3: 221–50. Available online: https://new.crest.science/wp-content/uploads/2020/03/Marcus-EmotionsPolitics.pdf (accessed on 1 June 2024). [CrossRef]

Martingano, Alison Jane, and Sara Konrath. 2022. How cognitive and emotional empathy relate to rational thinking: Empirical evidence and meta-analysis. *The Journal of Social Psychology* 162: 143–60. [CrossRef]

Meyer, Hans K, Doreen Marcchionni, and Esther Thorson. 2010. The Journalist Behind the News: Credibility of Straight, Collaborative, Opinionated, and Blogged "News". *American Behavioral Scientist* 54: 100–19. [CrossRef]

Milk, Chris. 2015. How Virtual Reality Can Create the Ultimate Empathy Machine. *TED Talk*, March. Available online: www.ted.com/talks/chris_milk_how_virtual_reality_can_create_the_ultimate_empathy_machine?utm_campaign1%E2%81%844linkplug&utm_source1%E2%81%844linkplug&utm_medium1%E2%81%84linkplug&utm_content1%E2%81%844linkplug&utm_term1%E2%81%844linkplug#t-5120 (accessed on 3 February 2022).

Nielsen, Søren Lund, and Penelope Sheets. 2021. Virtual hype meets reality: Users' perception of immersive journalism. *Journalism* 22: 2637–53. [CrossRef]

Pantti, Mervi. 2010. The value of emotion: An examination of television journalists' notions on emotionality. *European Journal of Communication* 25: 168–81. [CrossRef]

Pavlik, John V., and Frank Bridges. 2013. The Emergence of Augmented Reality (AR) as a Storytelling Medium in Journalism. *Journalism, and Communication Monographs* 15: 4–59. [CrossRef]

Pjesivac, Ivanka, Sun Joo (Grace) Ahn, Andrea Briscoe, and Solyee Kim. 2022. 360° Journalism as a Gateway to Information Seeking: The Role of Enjoyment and Spatial Presence. *Journalism Practice* 18: 818–839. [CrossRef]

Porter, Stephen, Leanne ten Brinke, Sean N. Riley, and Alysha Baker. 2014. Prime time news: The influence of primed positive and nagative emotion on susecptability to false memories. *Cognition and Emotion* 28: 1422–34. [CrossRef]

Sánchez Laws, Ana Luisa. 2017. Notes on Immersive Journalism. Available online: https://edutangible.wordpress.com/2017/06/12/notes-on-immersive-journalism/ (accessed on 5 June 2024).

Sánchez Laws, Ana Luisa. 2020. Can immersive journalism enhance empathy? *Digital Journalism* 8: 213–28. [CrossRef]

Sánchez Laws, Ana Luisa, and Tormod Utne. 2019. Ethics guidelines for immersive journalism. *Frontiers in Robotics and AI* 6: 28. [CrossRef] [PubMed]

Silverstein, James. 2015. The Displaced: Introduction. *New York Times Magazine*, November 5. Available online: https://www.nytimes.com/2015/11/08/magazine/the-displaced-introduction.html (accessed on 3 March 2024).

Slater, Mel. 2003. A note on presence terminology. *Presence Connect* 3: 1–5.

Slater, Mel, and Maria V. Sanchez-Vives. 2016. Enhancing our lives with immersive virtual reality. *Frontiers in Robotics and AI* 3: 74. [CrossRef]

Slater, Mel, and Sylvia Wilbur. 1997. A framework for immersive virtual environments (FIVE): Speculations on the role of presence in virtual environments. *Presence: Teleoperators, and Virtual Environments* 6: 603–16. [CrossRef]

Steinfeld, Nili. 2020. To Be There When It Happened: Immersive Journalism, Empathy, and Opinion on Sexual Harassment. *Journalism Practice* 14: 240–58. [CrossRef]

Strömbäck, Jesper. 2005. In search of a standard: Four models of democracy and their normative implications for journalism. *Journalism Studies* 6: 331–45. [CrossRef]

Sundar, S. Shyam, Jin Kang, and Danielle Oprean. 2017. Being there in the midst of the story: How immersive journalism affects our perceptions and cognitions. *Cyberpsychology, Behavior, and Social Networking* 20: 672–82. [CrossRef]

Trope, Yaacov, and Nira Liberman. 2010. Construal-level theory of psychological distance. *Psychological Review* 117: 440–63. [CrossRef]

Tumber, Howard, and Marina Prentoulis. 2003. Journalists under Fire: Subcultures, Objectivity and Emotional Literacy. In *War and the Media: Reporting Conflict 24/7*. Edited by Daya Kishan Thussu and Des Freedman. London, Thousand Oaks, and New Delhi: Sage, pp. 215–30. [CrossRef]

Van Damme, Kristin, Anissa All, Lieven De Marez, and Sarah Van Leuven. 2019. 360° Video Journalism: Experimental Study on the Effect of Immersion on News Experience and Distant Suffering. *Journalism Studies* 20: 2053–76. [CrossRef]

Van Loon, Austin, Jeremy Bailenson, Jamil Zaki, Joshua Bostick, and Robb Willer. 2018. Virtual reality perspective-taking increases cognitive empathy for specific others. *PLoS ONE* 13: e0202442. [CrossRef] [PubMed]

Vettehen, Paul Hendriks, Daan Wiltink, Maite Huiskamp, Gabi Schaap, and Paul Ketelaar. 2019. Taking the full view: How viewers respond to 360-degree video news. *Computers in Human Behavior* 91: 24–32. [CrossRef]

Wang, Guan, Wenying Gu, and Ayoung Suh. 2018. The effects of 360-Degree VR videos on audience engagement: Evidence from the New York Times. In *HCI in Business, Government, and Organizations*. Edited by Fiona Fui-Hoon Nah and Bo Sophia Xiao. Las Vegas: Springer, pp. 217–35.

Wang, Xiao, and Andrea Hickerson. 2016. The Role of Presumed Influence and Emotions on Audience Evaluation of the Credibility of Media Content and Behavioural Tendencies. *Journal of Creative Communications* 11: 1–16. [CrossRef]

Whitehead, Jack L. 1968. Factors of source credibility. *Quarterly Journal of Speech* 54: 59–63. [CrossRef]

Wirth, Werner, Tilo Hartmann, Saskia Böcking, Peter Vorderer, Christoph Klimmt, Holger Schramm, Timo Saari, Jari Laarni, Niklas Ravaja, Feliz Ribeiro Gouveia, and et al. 2007. A Process Model of the Formation of Spatial Presence Experiences. *Media Psychology* 9: 493–525. [CrossRef]

Witmer, Bob G., and Michael J. Singer. 1998. Measuring presence in virtual environments: A presence questionnaire. *Presence* 7: 225–40. [CrossRef]