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VIRTUAL REALITY AND ITS IMPACT ON TRAVEL JOURNALISM AUDIENCES: A STUDY OF PRESENCE, CREDIBILITY, AND DESTINATION IMAGE THAT CAN INFLUENCE VR USER ATTITUDES ABOUT A TRAVEL DESTINATION

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VIRTUAL REALITY AND ITS IMPACT ON TRAVEL JOURNALISM AUDIENCES: A STUDY OF PRESENCE, CREDIBILITY, AND DESTINATION IMAGE THAT CAN INFLUENCE VR USER ATTITUDES ABOUT A TRAVEL DESTINATION

A THESIS APPROVED FOR THE GAYLORD COLLEGE OF JOURNALISM AND MASS COMMUNICATION

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VIRTUAL REALITY AND ITS IMPACT ON TRAVEL JOURNALISM AUDIENCES

Abstract

Virtual reality technology is becoming more common in journalism storytelling as the technology develops. However, the technology can require highly technical skills to operate, compose, and produce a product, which is not always a viable or affordable option for smaller newsrooms or freelance journalists. This thesis examined how a VR 360-degree photo display paired with an audio voice track could impact a travel journalism story, and the audience's feeling of presence, destination image, and perceived credibility could be changed when experiencing the story through a VR headset built to display a 360-degree image on a phone compared to a flat-screen image paired with an audio voice track.

This study was a 2 (2 destinations with corresponding audio) x 2 (medium: 360-degree photo display with VR headset view or full-screen view of the 360-degree photo on handheld phone) repeated measures experiment, where destination is a with-subjects' factor and the medium is a between-subjects factor. Participants were randomly assigned to the between-subjects' factor, and the order of the with-subjects factor was randomly assigned to participants. Participants were shown 360-degree photos of the Eiffel Tower in Paris, France, and part of the Acropolis featuring the Pantheon in Athens, Greece. A minute-long audio travel journalism story about the destination was paired with the corresponding 360-degree photo. This study sought to determine media differences in presence, credibility, and destination image between experimental conditions.

Repeated measures and mixed design analysis of variance tests were run on the data in SPSS to answer the 2 hypotheses and 3 research questions posed in this study. Results indicated that there was a significant increase in feeling of presence in the VR condition compared to the

flat-screen condition. The outcomes, limitations, and conclusions are discussed in the corresponding sections of the paper.

Keywords: virtual reality, destination image, immersive journalism, presence, credibility, medium, travel journalism, 360-degree photo

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CHAPTER I

INTRODUCTION

Some leading news organizations are incorporating 360-degree video and virtual reality (VR) into their news reporting and other sectors, such as travel. Major travel-associated media outlets, such as Discovery (Discovery VR), National Geographic (Nat Geo WILD, 2015), and the BBC (BBC Research & Development, 2014-present), have started incorporating and exclusively using VR in storytelling.

The term virtual reality (VR) was originally applied to a patent for a technological object, the "Sensorama Stimulator" – a vibrating seat for entertainment, in 1962 (Najafipour, Heidari, Foroozanfar, 2014, p. 15). In 1970, Myron Kruger used the term to describe a theoretical approach to understanding the human/computer interface (Williams & Perry Hobson, 1995, p. 424). VR, now understood from the perspective of the human experience rather than the technological aspects of the experience, is the concept of presence not in the context of physical world surroundings, but of one mediated by a communication technology (Steuer, 1992, p. 75). VR technology at this point can be considered a form of interactive media with components such as the combination of 360 technology and cardboard goggles from Google, in which a smartphone is mounted, making it possible to see things from a real-life perspective using physical motion cues (i.e., the device perspective follows the user when they tilt their head to look down, showing them the ground) (Google Cardboard: USA Today). The goggles and other such head-mounted devices allow users to split the photo into two frames that match the eye holes and encompasses most, if not all, of the users' field of view. Otherwise, people are still

able to hold their devices horizontally and view a 360-degree photo or video as full-screen on their mobile device.

The modern definition of VR is classified as the use of a computer-generated 3D environment in which one can navigate and interact with a simulation in real-time that engages one or more of the user's five senses (Guttentag, 2009, p. 638; Najafipour, Heidari, Foroozanfar, 2014, p. 14). The engagement of these senses is also what brings about realistic qualities for the medium. A VR experience is determined to be effective by its ability to provide this immersion through the isolation of the user's senses from the real world, and psychological presence, where a person behaves in a virtual experience as they would in a similar real situation, with the ability to explore and interact (Guttentag, 2009, p. 638; Najafipour, Heidari, Foroozanfar, 2014, p. 14).

VR can have a strong influence on audiovisual engagement of a journalism audience (Butet-Roch, 2017; Sienkowski, 2016), but existing research does not indicate the extent of the impact that this element has on a consumer compared to a regular travel journalism photo (Steuer, 1992; Sundar, 2008), or if the place shown can also be a factor in determining the depth of their engagement in the virtual world (Guttentag, 2009).

In travel journalism, the destination audiences experience through media can influence their mental image about the place and even cause them to accept the experience as a reality (Bien-Kahn, 2016; Segal, 2017). Their destination image is modified with each new piece of information that is introduced through that medium, especially if the medium shows the destination to a clearer or more trustworthy degree than another media (Chi & Qu, 2008, p. 634). For the purposes of destination image building, if consumers trust that VR helped to accurately expand and build on that mental map of the destination and its characteristics, then they will find

the medium to be realistic and credible (Ayeh, Au, & Law, 2013; Xiang & Gretzel, 2010). Individuals are more willing to use certain media to form a destination image depending on what they perceive as a credible and trustworthy source (Najafipour, Heidari, Foroozanfar, 2014, p. 15).

Usually, a destination image is developed using written and visual media through research either on online search engines or through social media, since people researching a place foreign to them usually trust information from people like them (Minazzi, 2015, p. 48; Xiang & Gretzel, 2010, p. 185). This destination image is essentially a mental image composed of all previous information a person has remembered as unique to or associated with that place (Bratman, Israel, & Pollack, 1988, p. 352; Chi & Qu, 2008; Koo, Joun, Han, & Chung, 2016, p. 134). Therefore, those that supply destination information through travel journalism can develop more credibility by providing that information through a medium that is perceived as having a greater degree of proof for information presented and is through a medium that a user would not typically associate as common to use (like a VR experience versus a travel video on Facebook) (Ayeh, Au, & Law, 2013, p. 438; Litvin, Goldsmith, & Pan, 2008; Månsson, 2011; Xiang & Gretzel, 2010). VR is not a typical tool for individuals to use to document their travels or to simply take video, but it is becoming a commonly used tool by journalists (Wakefield, 2016).

Journalists of all practices, including travel journalists, are seeking new ways to engage audiences and regain their trusted position in news distribution (Washburn, 2009, p. 20). Most travel journalism research traditionally covered the potential of travel journalism to influence destination images since it was assumed that travel outlets were a dominant force in distributing that foreign culture's story (Hanusch, 2011, p. 669). This additionally has indicated that these

traditional media are seeking to recover the credibility that was traditionally assumed and applied to the journalism profession (Hanusch, 2011, p. 669; Washburn, 2009, p. 156). Video as a means of storytelling offers audiences visual and audial support for the information the journalist is presenting that might influence their destination image, and the extent to which VR can further accentuate that information is why audiences would want to use it in developing that image (Washburn, 2009, p. 156). Audiences of travel journalism can create a mental image of a destination based on journalism media that might not be inaccurate if the journalist forwards traditional news values that have traditionally reported stereotypes of that foreign place, or does something even simpler like taking a photo of a place that features the majesty but not necessarily the entire picture. For instance, photos of the Pyramids of Giza are typically shot from an angle that shows the Pyramids and sand, and these structures being remote in the desert might be the destination image consumers who have never traveled there build. However, the city of Cairo is very close to the Pyramids, and turning around from that sandy expanse shows the enormous city is closer to the site than people expect (Salem, 2018). Additionally, many are disappointed to find the Mona Lisa to be a small painting that is hard to view – because of its size and the crowd jockeying for a picture at the front against the rope barrier (Salem, 2018).

Therefore, the purpose of this study was to measure if a person viewing a travel journalism story finds a VR view of a 360-photo paired with an audio story has greater presence that is more effective for forming a credible destination image than when using a traditional flat-screen 360-degree photo. Audiences who have never been to a destination that consume travel journalism might find that if they later travel to that place, it does not match the visual and emotional connection that they had mentally built with that place. If a person felt excitement to

see the beauty of an exotic location or popular travel destination they read about in a story and found the reality did not match their expectations, this could impact their perception of the credibility of travel journalism. 360-degree imagery might be a possible media solution to this problem and offer audiences a new perspective of a place that they typically see in typical travel photography as they build their destination image. For journalists, knowing the most effective way to present their media to their audience to enhance credibility is an important consideration when it comes to deliberately choosing what media to produce with what story. While many outlets can be restricted in their reporting and storytelling by the kind of media producer they are (like a newspaper, magazine, or television station), they are also better able to experiment with newer technology if they have large budgets for funding staff and gear. However, smaller news entities or freelance journalists might be more restricted when it comes to producing 360-degree products. Thus, the purpose of this study might help them to find more easily achievable ways to maintain the integrity of their craft, or at least offer insight into the ways the basic production of this kind of media can be presented to an audience in an impactful way, should they choose to include it in their storytelling.

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CHAPTER II

REVIEW OF LITERATURE

Media research typically uses VR to investigate the concept of presence in a simulated world that is created to seem very real by an interactive medium (Steuer, 1992, p. 75). The components of visualization, immersion, and interactivity all impact a person's sense of being in the mediated experience (Williams & Hobson, 1995, p. 424). Virtual reality and 360-degree visual media have become very popular in certain industries, from video games to real estate. Google Streetview allows you to virtually walk through areas of the globe. However, the journalism industry is still researching and discovering best practices for 360-degree visual media and how that media can be most impactful when reporting.

Virtual Reality

VR shifted to being understood from the perspective of the human experience rather than when referring to technological systems and the features of the systems themselves (Steuer, 1992). The basic underlying component of VR is the concept of presence in world mediated by a communication technology (Steuer, 1992, p. 75). VR is distinguishable as a communication technology because it includes immersion and interactivity through its modal components (the way sensory information is presented to the human senses for interpretation - like an audiovisual presentation) (Williams & Hobson, 1995, p. 424). A virtual experience that increases in modality has been found to increase the vividness and interactivity of the experience (Hyun, Lee, & Hu,

2008, p. 152). Vividness is how sensationally rich the mediated environment in the technology is, and interactivity is the degree to which a user can influence the content of the mediated environment (Steuer, 1992, p. 80). Vividness is directly related to interactivity, as vividness determines the effectiveness of producing a sensationally rich mediated environment that depends on the level of interactivity, which means the degree the user can influence the form or content of that environment (Steuer, 1992, p. 80; Williams & Hobson, 1995, p. 424). These qualities of vividness, immersion, and interactivity are key to evoking a sense of presence in the user through the objective modal qualities of the medium, in addition to other more subjective qualities that are necessary for presence.

Presence. Presence is one of the most defining features of a sense of being in a virtual environment, as the more immersive an experience is, the more people felt that they were present within the virtual world presented (Youngblut, 2003). Presence is often termed as a psychological construct that indicates a sense of being in another world (whether in a dream state, hallucination, a book, etc.), and telepresence indicates that a person has a sense of presence within a mediated environment (Deimer, et al., 2015; Makransky, Lilleholt, & Aaby, 2017; Steuer, 1992; Sundar, 2008).

There is conflict in determining the extent to which presence and immersion are interchangeable in literature (Estupiñan, et al., 2014; Schuemie, et al., 2001; Slater & Wilbur, 1997). Presence research has been defined in many ways, but when related specifically to immersive VR, presence is typically characterized by the definition of telepresence within an immersive system, where immersion is the extent to which senses are engaged by the mediated environment (Schuemie, et al., 2001). Immersion delivers a display of information that gives the

viewer an illusion of reality that is inclusive, extensive, surrounding, and vivid (Slater & Wilbur, 1997). Researchers also assert that the technology should match actions as immediately as possible when initiated by users, and that users need to perceive that their body is present in the simulation specifically through the viewpoint of the eyes (i.e., their perspective in the simulation is as realistically eye-level as it would be in real life). For some researchers, presence meant that users are experiencing the virtual world as a reality more engaging than the surrounding physical world, and that presence was an increasing function of the aspects of immersion.

Immersion. Interactivity and vividness are both important components for presence, which is when the user's senses are isolated from the real world, and the psychological presence in the simulation causes them to behave as they would in a real-world situation due to the amount of immersion they feel in the simulation (Guttentag, 2009, p. 638; Najafipour, Heidari, & Foroozanfar, 2014, p. 14). This sense of immersion is called telepresence, which is a subjective experience for each user and the level of engagement that the system has with the user's senses (Guttentag, 2009, p. 639; Najafipour, Heidari, & Foroozanfar, 2014, p. 14-15; Steuer, 1992, p. 75-76). This is composed of two concepts related to the technological qualities of VR: vividness and interactivity.

Vividness and interactivity. Vividness requires both sensory breadth, the range of users' senses engaged at once (audiovisual would be hearing and sight), and sensory depth, the quality of the engagement material (a photo that has high quality and resolution) (Hyun, Lee, & Hu, 2008, p. 152; Steuer, 1992, p. 75-76; Steuer & Nash, 1995; Van Kerrebroeck, Brengman, & Willems, 2017). Additionally, the component of interactivity (the rate that inputs occur in the environment, the different possibilities for action, and the system's ability to match the

environment to the user's controls) can impact the immersion a user feels (Steuer, 1992; Steuer & Nash, 1995). This interactivity is still individually subjective, so for this paper, it would be more clearly understood if interactivity referred to perceived interactivity. While objective measures can define the components of the device that are interactive, the measures of interactivity in this study are for individual perception of interactivity, not the strictly technical aspects of the device that can be perceived as interactive (Kent, Laslo, & Rafaeli, 2016; McMillan & Hwang, 2002)

Immersion vs. presence. Steuer (1992) discussed sensory breadth and depth using the term vividness when defining telepresence, rather than immersion, and the impact it can have on media credibility judgments. Others consider vividness to be an aspect of immersion rather than presence, with immersion contributing to feeling presence within a simulation (Deimer, et al., 2015). For instance, Lombard and Ditton (1997) conceptualized presence into six parts, while Steuer (1992) found it to be composed of two. In Lombard and Ditton's 1997 study, social intimacy, realism, transportation or "being there," presence as immersion (perceptual immersion and psychological immersion,) social interaction within the medium, and social interaction with the medium itself, all represent an aspect of presence. "Being-there" is triggered when viewers feel as if they are part of a VR simulation and can factor in the authenticity and intensity of their experience into their credibility judgment (Sundar, 2008, p. 81). Presence-related heuristics like realism and being there help to increase story-recall, and the aspect of immersion through the heuristics of being-there, interaction, and realism are relevant to making stories in a way meant to improve recall and to add to realism (Sundar, Kang, & Oprean, 2017, p. 673).

For presence to occur, a person must be using the medium and feel some, if not all of, those aspects that help make the world within seem nonmediated (Lombard & Ditton, 1997). McMahan (2013) describes the realism aspect is the extent that the media portrayal is true to life, and the transportation aspect is a sense of being in a place that would otherwise be inaccessible to the user at that moment in time. (McMahan, 2013, 75-78). These are important components within that explication for experiencing presence in a virtual reality in which there is no social interaction with anyone in the mediated world.

Overall, immersion tends to be thought of objectively, defined by the level of sensory engagement a VR system can produce, while presence is the subjective response of the user while in the VR system, with a few overlapping qualities no matter what the interaction with the environment is (immersion, interactivity, vividness, being there, and realism) (Bowman & McMahan, 2007; Deimer, et al., 2015). Presence and immersion have been thought of in a variety of ways – such as terms that can be interchangeable, separate, and as the impetus for the other. Immersion can be its own objective measure, or it can be considered as part of whole of the subjective experience of presence. Therefore, presence within a VR scenario is likely to be experienced when immersion is part of the media experience. While immersion can be its own measure, it contributes in some way to the feeling of presence.

H1: Viewers will feel a greater sense of presence when in the VR 360 photo condition than the flat screen condition.

Valence and Arousal

VR through a head-mounted display partnered with audio has a strong valence for users, which can help increase that sense of immersion for the viewer more than the audiovisual media

would for other visual output devices that did not isolate their field of view (Guttentag, 2009, p. 639; Najafipour, Heidari, & Foroozanfar, 2014, p. 14-15; Steuer, 1992, p. 80). This helps measure how viewers feel (such as good/bad) about a stimulus while arousal is also important to measure how someone is stimulated (feel sleepy/awake) by the content (Estupiñán, et al., 2014). Valence can be weakened when picture size is reduced, or when the immersion factor (in this case, the view field) is reduced (Baños, et al., 2004; Codispotti & Cesarei, 2007). Viewer emotions can also be impacted with changes in immersion, with increased picture size enhancing viewer attention and emotional arousal (Visch, 2010). Emotional intensity is the indicator in this case for increased presence, with increased immersion also factoring into the valence of the experience. Strong arousal can also indicate presence will be strong; however, emotional intensity does not have to be significant for a person to experience presence – it can simply help increase the feeling of presence (Baños, et al., 2004; Chertoff, Goldiez, & Laviola, 2010). Emotional response measured through valence and arousal can help strengthen the presence a person feels in a VR scenario. VR through a head-mounted display partnered with audio can have strong valence and arousal for users, which can help increase that sense of immersion for the viewer (more than the audiovisual media would for a visual output device that did not isolate their field of view but was the same screen size) (Bradley & Lang, 1994; Guttentag, 2009, p. 639; Najafipour, Heidari, & Foroozanfar, 2014, p. 14-15; Steuer, 1992, p. 80). Measuring the arousal and valence a person associates with an experience can help indicate they feel a stronger sense of presence in a VR scenario, although arousal and valence do not have to be activated for presence to occur. Bradley and Lang (1994) found that ratings of pleasure reflect one's tendency to approach a stimulus, and arousal can influence behavioral choices. For emotional reactions in

viewers, it is shown that affective virtual environments (built to activate an emotion in the user through arousal and the valence of the affect) engender more presence than those that are neutral, but valence is not required for presence to occur (Riva, et. al, 2007). Therefore, the way a person feels about an experience (valence) can determine presence, but so too can the arousal (how much they felt awakened/alert/attentive toward the experience). This means strong arousal and valence can help make a sense of presence stronger.

H2: If strong arousal and valence are present, a person's presence will increase when experiencing a VR 360 photo condition more than in the flat screen condition.

Modality

While heuristics of VR have been found to enhance presence within a story, there is a specific component of audiovisual VR experience that can impact the perceived credibility of the story (Cheng & Lo, 2012, p. 139). There are technological and video feature assets that can impact perceptions of credibility (Bracken, 2006). Field of view can impact presence, which is due to the stronger engagement of a person's peripheral vision in the entire image being presented with outside environmental distraction minimized (Bracken, 2006, p. 726-727). Therefore, credibility judgments are based and made depending on the realistic qualities of the viewing medium (Bracken, 2006, p. 736-737).

Immersive Journalism

Immersive storytelling attempts to make the participant respond realistically in a virtually recreated scenario of a story even though they know it is not real (de la Peña, et al., 2014, p. 292-293). Researchers have been exploring the use of immersive storytelling in creating an immersive journalism experience by using these heuristic cues to create an illusion of place for a

viewer and engage them both in physical sensations and emotional reactions while experiencing the story (de la Peña, et al., 2014, p. 294; Riva, et al., 2007, p. 49-51). Immersive journalism has been a goal of some news organizations, with the basic goal being to "elicit a connection between the audience and the news story" (de la Peña, et al., 2014, p. 291). It seeks to provide consumers "a first-person experience of events, locations, and stories" (Sundar, Kang, & Oprean, 2017, p. 672). There are certain features in the virtual reality itself that help to make place illusion effective enough to convince people they are participating in the story: such as a virtual body that responds to a participant's' movements in the scenario to both create plausibility (that something is real based on its similarity to reality and the world is accurately responding to you carrying out actions) and to engage people's mental sensations and perceptions of being in their body in the simulation, which enhances their emotional reactions and investment in the story (de la Peña, et al., 2014, p. 294).

Reporting styles change with each new technological evolution. From the writing style of the inverted pyramid for newspapers and the telegraph, to search-engine optimized headlines of online news stories, the way news is presented changes (Lohr, 2006). VR is still a rather unstylized story medium, and newsrooms mostly experiment with VR as a supplement to traditional reporting (Bailenson, 2018; Migielicz, & Zacharia, 2016). Immersive journalism is still a relatively unexplored and undeveloped area, but there is interest in developing that sector of the industry. In 2017, the Online News Association, Knight Foundation, and Google News Initiative began a project called Journalism 360, which is meant to "accelerate the understanding and production of immersive journalism" through "a global network of storytellers" (Journalism 360, n.d.). But the news outlets using this 360 technology tend to be looking to create higher-end

products with features and capabilities that can require specialized skill sets that are not easily incorporated into a newsroom but rather require a specific department to create the product (Marconi & Nakagawa, 2017). While a highly immersive version of storytelling could be very effective in engaging and impacting an audience, but the technology required to view advanced virtual reality can include expensive headsets, or the story is so involved that it can be time consuming for journalists to create and audiences to consume, which is why there is still a novelty aspect to the practice (USC News, 2017).

For news organizations who might not be able to have this level of skill in developing 360-degree storytelling or that have staff members who not be comfortable with the actual filming process on a 360 camera and editing the three-dimensional video, having a 360-photo paired with audio might be a better approach. There is still an audiovisual aspect, but it is not as complicated to achieve as it might be for those using a camera to film video rather than something more basic to accomplish a 360-degree photo, such as with apps that will stitch panoramas together ("10 best 360 camera apps," 2018). Using 360 audiovisual media in their reporting could be especially rewarding for journalists to show audiences a more complete look at places they are unlikely to go on their own (Migielicz, & Zacharia, 2016).

Travel Journalism

Travel journalism is a form of lifestyle journalism that holds different news values than "hard" news counterparts like politics and crime (Hanusch, 2011). However, within that news content are topics that can be just as newsworthy for readers, such as unique cultural practices or reporting about the area from a "newsworthy" perspective like environmental, health, or poverty initiatives, like Amsterdam being known as a healthy and environmentally friendly city for its

"bike-ability" (Hanusch, 2011; Nield, 2015). The language and story subject in travel journalism is typically focused on describing the novelty of the place from a tourist gaze, but this brought up problems with previously untouched places becoming commoditized and their culture stereotyped (Laine, 2013, 44). For instance, an iconic image of Hawaii is a hula girl dancing in a coconut bra and grass skirt. Those garments are not Hawaiian and are not traditional wear for the hula, yet they are synonymous with the culture (McAvoy, 2012). The way Hawai'i was marketed helped to build these images as traditional rather than for the images to be known as the Californian invention they actually were (McAvoy, 2012). In these cases of false portrayals as reality, tourists have used inaccurate information to build their mental image of the destination after media consumption (Chi & Qu, 2008, p. 634; Laine, 2013, p. 45).

While the topic of travel writing and travel journalism can be considered a more promotional media topic than newsworthy, there has been a growth of travel media that have been expanding in conjunction with the immense industry that tourism has become (Fursich & Kavoori, 2001, p. 150-153). Travel journalism covers an industry that is global and growing; therefore, travel journalism "functions much like international news to provide both information and cultural frames" for those who are building knowledge about those foreign people and places (Fursich & Kavoori, 2001, p. 153-154). The goal of travel journalism in this sense is to package or translate culture for audiences internationally to help them understand various global identities (Fursich & Kavoori, 2001, p. 162, 164-167). This is not always considered as a form of hard-hitting journalism, rather it is viewed as soft journalism (in the sense that it is not news an audience must receive immediately about daily life, but rather is a lifestyle form of journalism)

(Hanusch, 2011). Thus, it is relevant to measure how newsworthy the audience judges the content of a travel journalism story to be.

There is an argument within travel journalism and foreign reporting in general regarding credibility due to stereotypes. Traditional news journalism, lifestyle journalism, and foreign reporting can consciously and unconsciously reinforce representations of foreign cultures in stories that do not authentically represent the culture outside of the Western viewpoint (Fürsich & Avant-Mier, 2012). Some find that a West/rest filter is applied to travel journalism discourse and therefore misrepresents the "other" culture due to a lack of authenticity in ethnicity since the journalists do not present it from the culture's point of view, but rather try to frame it so that the audience can understand it within the context of their culture (Fürsich & Avant-Mier, 2012). While it can make sense for a journalist to try to contextualize information for an audience, they should still strive to keep it as realistically portrayed as possible. With travel photographs of a foreign destination, the photograph can contain imagery that is stereotyped to the viewing public (Albers & James, 1988). While there are many factors that people use to judge credibility in photos, the limited perspective captured by the photographer can influence how consumers of that media can form a destination image based on those photos, and if they find the reality to be different from the mental image they built based on the photo, that can impact their perception of credibility of travel photographs (MacKay & Fesenmaier, 1997). The events that travel journalists cover might therefore follow the journalistic strictures of being newsworthy to an audience, but the audience might find the story itself to not be entirely credible if they do not feel that the photo matches the reality of the destination. Even with objectivity in the mix, traditional journalism values have been criticized because they maintain a standard of reporting that

dominates every subsequent journalist's approach to reporting on any subject (Mayo & Leshner, 2001). By relying on traditional journalism values regarding newsworthiness, journalists may be forwarding a skewed view rather than a picture of reality. This type of misleading cultural information presented through a limited lens has led to doubts by audiences of the travel journalism industry in its authentic portrayal of cultures; but, the form of media used to present these stories can help information feel more credible to consumers and help journalists to create more culturally accurate and visually realistic stories by visually portraying the entirety of the environment in which the story is occurring to hopefully help expand the destination image an audience builds while consuming media (Ayeh, Au, & Law, 2013, p. 438; Fursich & Kavoori, 2001; Litvin, Goldsmith, & Pan, 2008; Månsson, 2011; Xiang & Gretzel, 2010).

Information consumption. There are individual differences in knowledge gain or understanding of the news that reflect a difference in news interpretation, which impacts the viewer's reception of the news (Mitu, 2010, p. 131). This means that viewers use their prior individual and social knowledge of an issue to construct an interpretation of the subject matter presented in a news program, which is why it is important that an accurate story be built by journalists (Mitu, 2010, p. 131-132). This can impact the way in which the chain of knowledge acquisition, retention, and recollection, is used when making attributions or judgments in responding to a situation, such as a person might consider themselves more open to traveling to that place after exposure to media (in this case, the virtual environment) than they were before (Krokos, Plaisant, & Varshney, 2018). This indicates that a person's attitude toward a place (whether they perceive the destination to have a specified attribute, and whether those attributes

are important to note) can change after exposure to media and that the information that led to the change in attitude can be interpreted in many ways by individuals (Um & Crompton, 1990).

Destination Image

Destination images are formed through impressions of a travel destination from various forms of communication, including media, and are then modified by each new item or stimulus received by the individual that help make the image more diversified, detailed, or realistic (Chi & Qu, 2008, p. 634). Destination images formed through media impact attitudes about that destination (Quintal & Phau, 2015, p. 110). Destination source information has been shown to positively influence destination image, which tourism marketers have used in developing positive association with the destination (Veasna, 512-513). Destination source credibility also plays a role in building tourists' behavioral intentions and attitudes about the destination, which impacts their destination image (Veasna, 513; Washburn, 2009, p. 156). Changes in attitude about a destination can be indicative that a person was aroused by the subject of a news story, as the belief-desire-intention model indicates that when a person's initial gratification with the content (belief) is changed by media exposure, they form a desire to see if their new destination image lives up to the real thing, causing an intention to travel (Koo, Joun, Han, & Chung, 2014). This assumes that the people wanting to experience the destination themselves view the new information added to their mental database about the place positively or in a way that was arousing enough to create a desire to travel, and it can also mean that they want to see if the image they built is actually realistic to the place (Krokos, Plaisant, & Varshney, 2018). A person's opinion and attitude about a destination can change after exposure to story content about the place in question. Therefore, the impact of the medium on the overall change in

destination image can help to indicate if destination source information presented through VR can influence destination image (de la Peña, et al., 2014; Fursich & Kavoori, 2001; Riva, et al., 2007; Sundar, Kang, & Oprean, 2017). This retention could be enhanced by the immersive nature of the simulation, since a person may not have seen a panoramic view of the site, no matter how famous the landmark, when forming destination images. Since research has not indicated that a person will significantly modify their destination image after the exposure to the 360-degree photos in either of their forms, this will be addressed as a research question.

RQ1: Does destination image significantly change when exposed to a VR 360 photo condition than to a flat-screen condition?

Credibility judgment of content. The VR system also can influence users' credibility judgments of the content (Cheng & Lo, 2012; Sundar, 2008). The validity of the presence that a VR system creates are determined by user judgments about the quality of those components, also known as heuristics, that viewers use to base and adjust their views of content quality (Sundar, 2008, p. 75, 80). Sundar (2008) explicated many heuristics common to credibility judgments related to VR. One of these is realism, the extent a person can compare the mediated experience to reality based on their trust of the medium (Sundar, 2008, p. 80). For this heuristic, it is possible to predict that a person is more likely to trust the audiovisual and interactive modality of the VR system over other methods of presentation since it has content that has a high resemblance to the real world (Sundar, 2008, p. 80). Other heuristics, such as "being-there" is triggered when the viewer feels as if they are part of a VR simulation and can factor in the authenticity and intensity of their experience into their credibility judgment (Sundar, 2008, p. 81).

This sense of reality is associated with greater trust and perceived expertise of news sources (Sundar, Kang, & Oprean, 2017, p. 681). Therefore, the being-there heuristic required for immersive journalism also is important for enhancing the credibility of the VR story (Sundar, Kang, & Oprean, 2017, p. 681). Establishing credibility when presenting information about a destination will impact whether the audience adds that information from the media to their database that builds their destination image.

Trust in sources. Studies have found that people are more likely to be influenced by media when there are no other personal experiences that they have had to compare the content to (Shapiro & Chock, 2004, 675). Therefore, an environment that the person is not familiar with can influence how credible the information about the destination is to them (Shapiro & Chock, 2004, p. 690). While destination images and the source that that information comes from can affect credibility perceptions, it is more likely that the medium will affect credibility judgments since the viewer does not have much personal experience or prior background knowledge with which to judge the information disseminators (Bracken, 2006; Shapiro & Chock, 2004). Therefore, a VR travel journalism story can seem credible to a viewer because of the characteristics of the medium, but not because of the medium itself. The VR function of the medium can add a real-life 360 field of view that the user controls – to an extent – rather than having the user be reliant on a photographer to tell them what view to look at, which can make the medium seem more credible to the viewer (Cheng & Lo, 2012; Sundar, 2008). By being able to control their viewpoint within the mediation, the user can become a sort of actor rather than spectator within the story (Aylett, & Louchart, 2003). However, the issue of whether a VR 360-degree photo experienced through a headset can make a travel story more credible to a user than

those who simply view it on the screen without changing their field of view is not clear in literature. Therefore, this is to be posed as a research question.

RQ2: Does perception of story credibility change when experiencing a travel journalism story through a VR 360 photo condition compared to a fixed-screen view?

It is also not clear if a person's destination image will be changed if the viewer perceives a travel story to be more credible. While their destination image may be changed by media shown, it may not occur specifically because the source information is perceived as credible. An audience's destination image may change because the media introduces a new piece of information about the destination, but they may not necessarily take time to consider its credibility before allowing it to change their destination image. Therefore, the last research question will try to answer whether credibility can have a significant impact on change in destination image.

RQ3: Does a person's destination image significantly change if the information in the story is perceived to be credible?

Summary

These various components have all been found to impact the attitudes of media consumers in relation to the use of VR; however, if viewers do consider a travel journalism story through a VR medium to be more credible than through another medium, the extent to which their destination image can be impacted is not certain. The use of VR in travel journalism can build media consumers' destination image, and the audiovisual qualities of VR help to better immerse viewers in the environment, so that they find the experience to be more credible through the qualities of presence and the ability of the medium to impact the arousal and valence, or an

emotional response, in the viewers (Chertoff, Goldiez, & Laviola, 2010; Chi & Qu, 2008, p. 634; Codispotti & Cesarei, 2007; de la Peña, et al., 2014, p. 292-293; Fursich & Kavoori, 2001, p. 150-153; Sundar, 2008, p. 75, 80; Visch, 2010). These experiences are all subjective in the creation of destination image; therefore, studying the extent to which VR can immerse and engage media consumers can help determine how their destination image is changed by the experience (Bratman, Israel, & Pollack, 1988, p. 352; Chi & Qu, 2008; Koo, Joun, Han, & Chung, 2016, p. 1341). The variables that could potentially change between the two media (VR and flat screen) include attitude about the destination, credibility judgment, and immersion.

CHAPTER III

METHODOLOGY

This study is a 2 (2 destinations with corresponding audio) x 2 (medium: 360 photo display with VR headset view or full-screen view on handheld phone) repeated measures experiment, where destination is a with-subjects' factor and the medium is a between-subjects factor. Participants were randomly assigned to the between-subjects' factor, and the order of the with-subjects factor was randomly assigned to participants (Leshner, 2014, p. 241; Wimmer & Dominick, 2014, p. 251). The participants listened to an audio story about a travel destination and viewed a 360-degree photo in one of the two between subjects' conditions. Participants were shown the Eiffel Tower in Paris, France, and part of the Acropolis featuring the Pantheon in Athens, Greece. A minute-long audio travel journalism story about the destination was paired with the corresponding 360-degree photo. This study sought to determine media differences in presence, credibility, and destination image between experimental conditions.

Independent Variables

This study has two independent variables. The first independent variable is the destination shown. One of two destinations is shown in a 360-degree photo. These photos are viewed on the Google "Streetview" app from an iPhone 6 (n.d.). The photos are both of famous

landmarks and taken at eye level and the people captured in the photos are interacting with the scenes naturally, albeit frozen in time. The second independent variable is the way the photo is viewed. One view is full-screen and tilted horizontally on the phone, while the other is meant for a head-mounted VR headset. The increased field-of-view through the head-mounted condition is the manipulation.

Dependent Variables

There are eight dependent variables measured in this experiment: presence, quality, valence, arousal, credibility, newsworthiness, attitude, and destination image. These variables help determine whether a person's presence, credibility judgments, and destination image are changed between conditions (flat-screen vs. VR headset) when viewing travel destinations through a 360-degree photo. Most variables were measured using a 1-7 intensity scale, and some questions were written to be reverse coded later to ensure the results match measures for internal validity (Appendix A; Leshner, 2014; Nardi, 2003; Wimmer & Dominick, 2014). A composite index was created for each variable. The same variables were measured after each exposure and combined based on place before testing.

Presence: The first dependent variable measured presence. To determine the technological qualities that contribute to presence, questions were asked about immersion, perceived interactivity, and vividness of the scene. The subjective sense of presence was determined using questions to gauge how the user felt regarding a sense of being there, involving, and realism. The questions for this condition are drawn from past research questionnaires for presence, such as a presence in a virtual environment questionnaire from Witmer and Singer (1998), a telepresence questionnaire developed by Lombard, Ditton, and

Weinstein (2013), and a virtual environment evaluation questionnaire by Chertoff, Goliez , and LaViola (2010). The questions measured immersion (α=.61), interactivity (α=.64), being there (α=.83), realness (α=.74), involving (α=.85), quality (α=.84), and interference (α=.73).

Immersion was a composite index of four items. The questions were measured on a 1-7 scale.

- How aware were you of events occurring in the real world around you while you watched the story?
- How much was your field of view taken up by the 360 photo?
- How completely were your senses engaged?
- Were you able to forget the devices you were using while watching the story?

Interactivity was a composite index of three items. The questions were measured on a 1-7 scale.

- How natural did your interactions with the environment seem?
- Did you experience delay between your actions and the device's response?
- Was the device difficult to use?

Being there was a composite index of three items. The questions were measured on a 1-7 scale.

- Did you feel captivated by the 360 photo and story?
- Did you feel that you were in the 360-photo environment rather than viewing it?
- Did you feel that you were actually at **the Eiffel Tower/Parthenon**?

Realness was a composite index of two items. The questions were measured on a 1-7 scale.

- Did the environment in the 360 photo seem real to you?
- How much did your interaction with the 360-photo environment seem consistent with your interaction if you were there in the real world?

Involving was a composite index of three items. The questions were measured on a 1-7 scale.

- How much did the visual aspects of the environment draw you in?
- How involving was the experience?
- How much did the auditory aspects of the environment help you get involved in the story?

Quality was a composite index of three items. The questions were measured on a 1-7 scale.

- How would you rate the quality of the story?
- How would you rate the quality of the 360 image?
- How would you rate the quality of the audio?

Interference was a composite index of two items. The questions were measured on a 1-7 scale.

- How much did the visual display quality interfere with your attention to the story?
- How much did the quality of the audio hardware interfere with your attention to the story?

Valence and Arousal: Valence and arousal were measured using a 7-point scale to judge bipolar adjectives to score what user felt about their experience during the scenario (Bradley & Lang, 1994; Lang, Dhillon, & Dong, 1995). These questions determine how users reacted to the

media experience. For valence (α=.86), participants were asked to rate whether the experience was pleasant to not pleasant, unpleasant to not unpleasant, good to not good, bad to not bad, and unpleasant to not unpleasant. Arousal (α=.76) was measured from relaxed to stimulated, calm to excited, and unaroused to aroused.

Credibility: Credibility (α=.87) was measured using five dimensions: believability, accuracy, trustworthiness, bias, and fair (Cheng & Lo, 2012). Participants were asked to rate these items on a 1 to 7 scale.

Newsworthiness: Newsworthiness (α=.85) was assessed using four dimensions: importance, informativeness, seriousness, and how interesting it was (Shoemaker, Danielian, & Brendlinger, 1991).

Attitude: Attitude (α =.96)was measured using a bivariate measure on a scale gauging what people thought of the place after exposure to the story and photo. Attitude was measured as enjoyable to unenjoyable, like to dislike, and negative to positive (Um & Crompton, 1990).

Destination Image: The final dependent variable, destination image (α=.80), was measured using the belief-desire-intention model to indicate if participants' mental image of the place had changed, whether they desired to see the place in person, and if they plan to travel to see the destination, and if they wanted to travel to the destination to confirm the experience in the story was accurate (Chi & Qu, 2008).

Destination image was a composite index of four items. The questions were measured on a 1-7 scale.

- Do you have a desire to see **the Eiffel Tower/Parthenon** in person?
- Did the story change the mental image you had about **the Eiffel Tower/Parthenon**?

- Do you plan to visit **the Eiffel Tower/Parthenon**?
- Do you have a desire to travel to see **the Eiffel Tower/Parthenon** in person to confirm that the experience in the story was accurate?

Covariates

There have been some studies show that there can be nausea, eye strain, disorientation, and other discomforts associated with head-coupled immersive VR (Regan, 1995). Therefore, discomfort was measured (α=.83).

Discomfort was a composite index of three items. The questions were measured on a 1-7 scale.

- Did you feel confused while wearing the headset/moving to view the photo?
- Did you feel disoriented while wearing the headset/moving to view the photo?
- Did you feel any discomfort (nausea, headache, eye strain, etc.) while wearing the headset/moving to view the photo during the story?

Sampling

For this study, a convenience sample was taken from the student population of the University of Oklahoma (Leshner, 2014, p. 249; Wimmer & Dominick, 2014, p. 97). G*Power software analysis was used to conduct a power analysis for participant number. Sample size was found by calculating power (0.8) with a medium effect size (0.25), α=.05, 1 degree of freedom, and 2 groups, which came out to 128 participants. To recruit participants for this study, teachers at OU were asked to inform their students about the study and ask them to participate. Extra credit may be offered for their participation depending on the teacher. In this case, the researcher

offered to create an assignment equal to participation in the study for students who are not able to participate in the study ("Are you recruiting OU students", 2018).

Population

This study utilized students of the University of Oklahoma to conduct this experiment. Credibility judgments about VR technology are more salient to judge from the perspective of generations more actively engaged in digital media, and college students are a relevant population for this sort of engagement (Sundar, 2008). Credibility has been found to usually be higher in television news (i.e. video) for viewers due to its audiovisual source characteristics (Kiousis, 2001, p. 386). Many college students can be grouped in the Millennial generation or Generation Z. A report by Expedia Media Solutions (2017) found that a majority of Generation Z (those born from 1996, on) use their smartphones when looking for travel inspiration and take the same number of holidays per year as those who are part of Generation X (early 1960s-late 1970s). It was also found that they are more influenced by socially shared pictures and videos (such as photos shared online or through social media) of travel destinations than previous generations (Expedia Media Solutions, 2017). Generation Z members will work to save money to go on a trip, are more likely to travel internationally, and watch twice as many videos as other generations (Biesiada, 2018; Expedia Media Solutions, 2018; Fuggle, 2016). Therefore, a relevant participant for this study includes those within a Generation Z age range to study the effects that this media has on their perceptions of immersion, credibility, etc., in addition to how it might contribute to a destination image (Expedia Media Solutions, 2017). While findings for a convenience sample cannot be generalized to Generation Z, the OU students exists within that group and findings who are part of Generation Z, or earlier generations such as millennials,

could offer insight to whether this topic is worth pursuing on a larger scale. However, there were no age limits or level in college limits set when recruiting.

OU population demographics for the study included gender, age, ethnicity, classification in college, and citizenship status. Total, there were 50 men and 87 women who participated in the study, and 1 participant chose not to answer. The mean age for participation was 24.3 years, and 11 respondents did not answer. Ethnicity was broken into categories of White, Hispanic/Latino, Black/African-American, Native American/American Indian, Asian, Native Hawaiian/Pacific Islander, Other. Some respondents answered with multiple races, so another category was created to incorporate those responses. A majority of respondents were White (94), while the Hispanic/Latino participation was 14. There were 9 Black/African American participants, 3 Native American/American Indian, and 7 Asian participants. There were 3 participants who marked Other, and 7 participants were multiple races. One participant did not answer for ethnicity. For classification in college, there were 20 freshmen, 31 sophomores, 28 juniors, 28 seniors, 8 graduate students, and 10 doctoral students. There were 13 respondents who did not answer for college classification. For citizenship status, a majority of participants were U.S. citizens (128), 1 was a permanent resident, 8 were non-U.S. citizens, and 1 did not wish to provide that information.

Stimuli

The flat screen stimulus was a fixed-screen 360-degree photo that the viewer watched on a phone screen while listening to an audio feature news story about the destination in the photo. The VR stimulus was a destination through the Google “Streetview” app (n.d.) and was a 360-degree photo of shown to a participant using a phone and low-cost headset as the medium

through which the audiovisual story is viewed and heard. These two images allow the user to sit in one place in a computer chair and look around the full 360-degrees of the photo as they listen to a short audio feature news story through headphones. Two destinations were included—the Eiffel Tower in Paris, France and the Parthenon in Athens, Greece. The same two presentations for the flat-screen conditions were created using the same image without the view field change that allows use of a VR headset (Nield, 2015). For the view field change, the phone was placed in a VR headset that narrows the subject's field of view to just the photo, thereby meeting the peripheral engagement qualities as outlined by Bracken (2006) (YouTube Creators, n.d.). The same audio feature track was used for the destination whether it is the flat-screen condition or the VR condition between subjects to ensure control between conditions (Leshner, 2014). The flat screen condition was a video tour created through the Google Earth tour feature (Google Earth Help). The length of these videos was approximately one and a half minutes in length, as a study by the Pew Research Center (2012) found videos of approximately length were most popular to watch, and since it was a 360-degree photo, a minute-and-a-half-long story was also long enough give participants enough time to look around their virtual environment while keeping the experience short enough to maintain engagement in the content (Leshner, 2014; Nardi, 2003). This also helped ensure the amount of time it required for the volunteer to be in the experiment is no longer than 20 minutes.

Condition

The application of the experimental treatment was to either show a flat-screen image story seen on a phone held horizontally or VR image story seen on a phone that was set up for a VR headset view to the respondent with a recorded audio story presented through Bluetooth

headphones, and participants were randomly assigned to conditions and viewing order (Wimmer & Dominick, 2014, p. 253). This process involved users viewing the 360-degree photos of the Eiffel Tower and the Parthenon through the same device and listening through headphones to the audio story (the audio is the same for a single destination, no matter which condition the photo is viewed in) (Sundar, Kang, & Oprean, 2017, p. 681). The participants were either hold a phone in their hands and move it independently around the scene or they used a common VR headset that holds a phone in front of eyepieces, which are adjustable. The audio headset was worn in both conditions and is also adjustable. A paper questionnaire was administered for the pretest and post-viewing data to be measured.

Procedures

Pretest. Participants were asked to sign a consent form that describes the nature of the study and how the results of their questionnaire was used. Participants were randomly assigned to one of the flat-screen or VR conditions (Leshner, 2014; Wimmer & Dominick, 2014). Then, the participants were asked to fill out a questionnaire. The pretest was a questionnaire that participants indicate their levels of agreement with the questions, which allowed a base measure to be made regarding their familiarity with the destination, using the medium, views on travel journalism, immersive tendencies, etc., so the findings in post-test can be accounted for (Leshner, 2014; Nardi, 2003; Wimmer & Dominick, 2014; Slater, 1999). The pretest of the questionnaire asked about the strength of their familiarity with the destination they were randomly assigned to since the study seeks to find if the VR condition can significantly add to their destination image (I have seen Destination A in media, I have traveled to Destination B previously) (Sundar, Kang, & Oprean, 2017; Wimmer & Dominick, 2017). There were also

questions regarding the participant's familiarity with the medium (I have viewed 360 photos on my phone before, I have used a VR headset to view a 360-degree image in the past, I have never listened to audio while looking at a 360 photo).

Posttest. Participants were tried on the Bluetooth headphones and given a preparatory audio example at the same volume as the audio track for the VR story so they can adjust the headphone volume to a comfortable level to listen to during the scenario (Bradley & Lang, 1994; Steuer, 1992). The participant then looked at the initial destination through either the flat-screen condition or the headset condition. If participants were in the flat-screen condition, they held the phone, stand in one place, and were free to move it about the scene freely as they listen through the Bluetooth headphones. If they were in the headset condition, the head-mounted device was placed over their eyes and they had time to adjust their eyepieces to their satisfaction. They then put the headphones on. Both sets of participants were asked if they are ready by the test administrator, and the corresponding audio track to the first 360-degree photo destination was played. Participants listened through to the end and then take off the audio and visual devices. They were given a questionnaire and answer questions related to the destination they viewed. Next, they put the equipment back on as they did in the first condition, and repeated the process with the second destination. They left after finishing the questionnaire, and their answers were coded for analysis. The study took around 20 minutes total for each participant. The initial draft of the survey was tested by a small sample of those representative of the target population to ensure the statements are coherent and that the survey does not take an inordinate amount of time to respond to (Nardi, 2003, p. 86).

Analysis

The data were tested using a 2 (two destinations) x 2 (medium) repeated-measures Analysis of Variance (ANOVA). Participants were exposed to two different set destinations with corresponding audio. Participants answered a questionnaire, and those scores were analyzed against a different group with the same destinations to determine the main effect of the medium. This helped determine any significant main effects of the variables and any interaction between the destination and the medium.

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CHAPTER IV

RESULTS

The hypotheses for the independent variables sought to consider how sense of presence and arousal and valence and presence can change between two 360-degree image conditions. The research questions in this study address if there were changes in destination image between 360-degree photo conditions and if perception of credibility changed between conditions, and also if perceived credibility impacted destination image. Since this research was exploratory, an alpha of .10 significance was adopted as the criteria to reject the null.

H1: Viewers will feel a greater sense of presence when in the VR 360 photo condition than the flat screen condition.

For the first hypothesis, a 2x2 mixed design ANOVA was conducted to compare the difference of dependent variables measuring presence for the within variable place (the Eiffel Tower and the Parthenon) and the between condition of medium (flat-screen view of a 360-degree image and VR view of a 360-degree image). The dependent variables measured were immersion, interactivity, being there, realness, involving, quality, and interference. Disorientation was used as a covariate as research showed it can impact sense of presence.

Medium effects were significant for three presence variables: immersion, perceived interactivity, and being there. There was a significant main effect for medium on immersion (*F*

(1,134) = 6.12, p = .015). Participants in the VR condition showed a higher level of immersion (m = 4.86, sd = .79) compared to the flat screen condition (m = 4.54, sd = .82).

Table 1: Means for immersion, interactivity, being there as a function of medium

Dependent Variables (1-7 scales)	VR	Flat Screen	p-value
Immersion	4.86	4.54	0.015
Interactivity	5.83	5.64	0.027
Being there	4.54	4.23	0.089

There was a significant main effect for medium on perceived interactivity (F (1,134) = 5.01, p = .027) as well. Participants in the VR condition showed a higher level of interactivity (m = 5.83, sd = .78) compared to the flat screen condition (m = 5.64, sd = .98).

There was a significant main effect for medium on being there (F (1,134) = 2.93, p = .089). Participants in the VR condition showed a higher level of sense of being there (m = 4.54, sd = 1.39) compared to the flat screen condition (m = 4.23, sd = 1.24).

Overall, H1 was supported by the variables for immersion, perceived interactivity, and being there. The means for the VR vs. flat screen condition show that the immersion, interactivity, and being there increased significantly in the VR condition compared to the flat-screen condition (see Table 1).

There were no significant main effects found for realness, involving, quality, and interference. There was no significant main effect on medium for realness (F (1,134) = 2.48, p =

.118). There was not a significant effect present on medium for involving (F (1,134) = 2.20, p = .140). There was no significant main effect on medium for quality (F (1,134) = .567, p = .453). There was not a significant main effect on medium for interference (F (1,134) = 1.64, p = .203). This indicates none of these increased significantly between the VR condition and the flat screen condition.

Other tests were run to test for main effects on place for each variable. Additional analyses showed that the main effect for immersion was significant (F (1,134) = 8.80, p = .004) for place, such that immersion was greater for the Parthenon (m = 4.82, sd = .081) than it was for the Eiffel Tower (m = 4.58, sd = .074).

Table 2: Means for immersion and interactivity as a function of place

Dependent Variables (1-7)	Mean Paris	Athens	p-value
Immersion	4.58	4.82	0.004
Interactivity	5.73	5.75	0.072

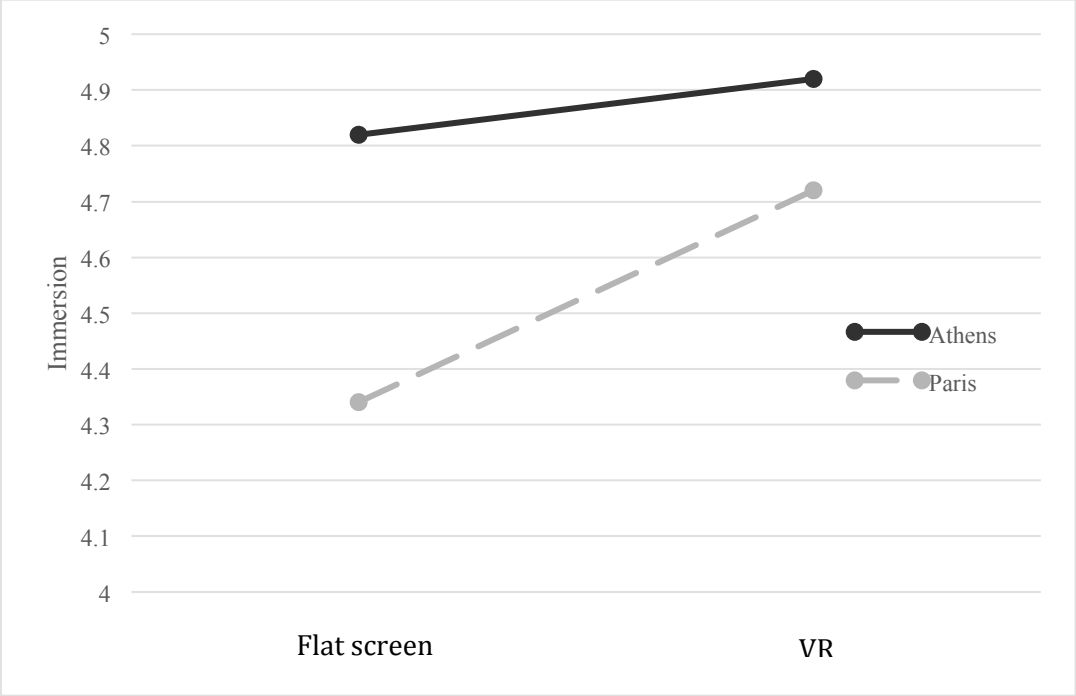
The main effect on place for interactivity was significant (F (1,134) = 3.28, p = .072). No significant interaction for place x medium was present (F (1,134) = .62, p = .434). This shows increased interactivity between places for the Eiffel Tower (m = 5.73, sd = .074) and Parthenon (m = 5.75, sd = .081).

There was no main effect on place for being there (F (1,134) = .036, p = .850) was present. There was no main effect on place for realness (F (1,134) = .05, p = .823). No main effect was found on place for involving (F (1,134) = .09, p = .771). There was no main effect on

place for quality (F (1,134) = .07, p = .791). There was no main effect on place for interference (F (1,134) = 1.87, p = .17) .

Post hoc tests were additionally run to determine if any significant interaction effects for place and medium were present. A significant interaction for place x medium for was also present (F (1,134) = 3.51, p = .063). The Eiffel Tower in the VR condition was less immersive than the Parthenon (m_{Paris} = 4.82, sd = 1.05 ; m_{Athens} = 4.92, sd = 1.15) and the same was true for the flat screen condition as well (m_{Paris} = 4.34, sd = 1.05 ; m_{Athens} = 4.72, sd = 1.15). This indicates immersion was higher for the Parthenon on both the VR and flat screen condition, with a more pronounced effect in the flat screen condition (see Fig. 1).

Fig. 1: Interaction for medium x place on immersion



Perceived interactivity did not change significantly for the interaction between place and medium. This indicates that interactivity was higher at the Parthenon than the Eiffel Tower, but the interaction between place and medium did not show a pronounced effect in either condition (see Table 2). There was no interaction effect on place x medium for being there (F (1,134) = .04, p = .848). This indicates there were no pronounced effects in any of the conditions.

There was also no interaction effect on place x medium for realness (F (1,134) = .72, p = .397). This indicates realness did not change significantly for place or medium, and there were no pronounced effects in any of the conditions.

Involving showed no interaction effect found on place x medium (F (1,134) = .01, p = .928. There was no interaction effect found on place x medium for quality (F (1,134) = .54, p = .465). Interference also showed no interaction effect on place x medium (F (1,134) = .625, p = .431). This indicates there were no pronounced effects in any of the conditions.

These results indicate that while main effects on medium supported the hypothesis, there is also potential for the place a story takes place or a combination of the two to have a significant impact on the dependent variables measured with presence.

H2: If strong arousal and valence are present, a person's presence will increase when experiencing a VR 360 photo condition more than in the flat screen condition.

For hypothesis 2, a one-way repeated measures ANOVA was conducted comparing presence for the within variable of place (the Eiffel Tower and the Parthenon) and the between condition of flat-screen view of a 360-degree image and VR view of a 360-degree image.

There were no significant results for medium, place, or medium and place.

No main effect was found on medium for arousal was found (F (1,136) = 0.19, p = .667). No main effect on medium for valence was found (F (1,136)= .51, p = .479).

Additional tests were run for effects for place and an interaction for place and medium.

There was no main effect found on place (F (1,136) = .53, p = .470) for arousal, nor was there a main effect on place (F (1,136)= .08, p = .775) for valence

No interaction effect was found for arousal on place and medium (F (1,136) = 0.000, p = 1.00). There was also no interaction effect found for valence on place and medium (F (1,136) = 2.44, p = .120).

This indicates there were no pronounced effects in any of the conditions for valence or arousal.

RQ1: Does destination image significantly change when exposed to a VR 360 photo condition than to a flat-screen condition?

For RQ1, a one-way repeated measures ANOVA was calculated comparing destination image for the within variable of place (Eiffel Tower and The Parthenon) and the between condition of flat-screen view of a 360-degree image and VR view of a 360-degree image.

No significant main effect was found on medium for destination image (F (1,136) = .38, p = .541) between the flat-screen condition and the VR condition. No significant main effect was found on medium for attitude (F (1,136) = 1.24, p = .268). No significant main effect exists on medium for story newsworthiness (F (1,134) = .44, p = 508) between the flat-screen and the VR condition.

This indicates there were no pronounced effects in any of the conditions for destination image with medium.

There were also no significant main effects for destination image on place (F (1,136) = .008, p = .929). Additional analyses show that the main effect on place for attitude was significant (F (1,136)= 11.21, p = .001), attitude was more positive for the Eiffel Tower (m = 6.11, sd = 1.31) than the Parthenon (m = 5.85, sd = 1.30). These data indicate that attitude was more positive for the Eiffel Tower than for the Parthenon (see Table 3), but no conclusions can be drawn about this information to answer the research question.

Table 3: Means for attitude as a function of place

Dependent Variables (1-7)	Paris	Athens	p-value
Attitude	6.11	5.85	0.001

There was also no significant main effect for newsworthiness on place (F (1,134) = 1.478, p = .226).

There was also no interaction effect for destination image on place and medium (F = .339, p = .561). There was not an interaction effects on place and medium for attitude (F (1,136)= .000, p = 1.00). There were no interaction effects for newsworthiness on place and medium (F (1,134) = .200, p = .656). These data suggest that there are not pronounced effects in any of the conditions.

RQ2: Does perception of story credibility change when experiencing a travel journalism story through a VR 360 photo condition compared to a fixed-screen view?

For RQ2, a one-way, repeated measures ANOVA was calculated comparing perceived story credibility for the within variable of place (the Eiffel Tower and the Parthenon) and the between condition of flat-screen view of a 360-degree image and VR view of a 360-degree image. No main effect was found on medium for credibility (F (1,136) = .208, p = .649). Additional testing showed there was also no main effect on place (F (1,136) = .21, p = .651) or interaction effect (F (1,136) = .25, p = .621). These data suggest that there are no pronounced effects in any of the conditions.

RQ3: Does a person's destination image significantly change if the information in the story is perceived to be credible?

For RQ3, a one-way repeated measures ANOVA was calculated comparing destination image for the within variable of place (Eiffel Tower and The Parthenon) and the between condition of flat-screen view of a 360-degree image and VR view of a 360-degree image.

No significant main effect was found on medium for destination image (F (1,136) = .38, p = .541) between the flat-screen condition and the VR condition. No significant main effect was found on medium for attitude (F (1,136) = 1.24, p = .268). No significant main effect exists on medium for story newsworthiness (F (1,134) = .44, p = 508) between the flat-screen and the VR condition. This indicates there were no pronounced effects in any of the conditions for medium.

There were also no significant main effects for destination image on place (F (1,136) = .008, p = .929). Additional analyses show that the main effect on place for attitude was significant (F (1,136)= 11.21, p = .001), attitude was more positive for the Eiffel Tower (m = 6.11, sd = 1.31) than the Parthenon (m = 5.85, sd = 1.30). These data indicate that attitude was

more positive for the Eiffel Tower than for the Parthenon (see Table 3), but no conclusions can be drawn about this information to answer the research question.

No main effect was found on medium for credibility (F (1,136) = .208, p = .649). Additional testing showed there was also no main effect on place (F (1,136) = .21, p = .651) or interaction effect (F (1,136) = .25, p = .621). These data suggest that there are no pronounced effects in any of the conditions.

A Chi Square Test of Independence for demographic information against medium was calculated examining the relationship between gender (x^2 = 1.84, *(df)* = 1, p = .175), age (x^2 = 1.773, *(df)* = 1, p = .183), ethnicity (x^2 = 7.82, *(df)* = 6, p = .252), level of school (x^2 = 8.11, *(df)* = 5, p = .150), and citizenship status (x^2 = 2.50, *(df)* = 3, p = .475). None of the relationships between categorical variables were significant, so there is no association between these variables and the independent variables of place and medium.

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CHAPTER V

DISCUSSION

This study sought to determine how virtual reality (VR) in the form of a 360-photo paired with an audio voice track could impact a travel journalism story and the audience's reception of experiencing the story through an immersive medium compared to a flat-screen image paired with an audio voice track. This study predicted a person viewing a travel journalism story finds a VR view of a 360-photo paired with an audio story more effective for forming a credible destination image than when using a traditional flat-screen 360-degree photo. For the concepts studied in this test (presence, credibility, and destination image), presence dependent variables immersion, interactivity, and being there were found to be significant between the flat-screen and VR conditions. Credibility and destination image did not show significant differences between the flat-screen and VR conditions. Thus, only one of the hypotheses was supported and no research questions were answered positively.

H1. The results for H1 indicate that viewers perceived a greater sense of presence when in the VR 360-degree photo condition compared to the flat-screen condition. The majority of variables that made up the subjective and technical aspects of presence showed that presence was higher in the VR condition than in the flat screen condition. However, realness, involving, quality, and interference were not significant. Discomfort, such as confusion, nausea, and eye strain, was measured as a covariate since research indicated it could reduce sense of presence.

Therefore, viewers may each individually have a subjective experience with discomfort while looking at a 360-degree flat-screen or VR photo, which causes a loss of sense of presence. Thus, while H1 was supported, an experience of high discomfort may prevent the rejection of the null since it covaries with presence. This finding indicates that journalists who would like to use VR technology when telling stories could successfully create a psychological sense of presence through being there, realism, and involvement, with technology that is immersive and interactive. While immersive journalism has been studied and practiced, the practice tends to be studied using headsets that can be more expensive technology than what a mass audience might be using and that might require a skillset or knowledge base that not every journalist has, so knowing that the qualities of a basic VR headset using a phone VR view can create a sense of presence might help this form of storytelling become more widely accessible and more easily produced.

There were also significant main effects for place and one significant interaction effect for immersion. There was also a significant main effect for interactivity. The effects showed the Parthenon was rated for increased immersion and interactivity in each effect compared to the Eiffel Tower. This might be due to the characteristics of the photo, the story, or potentially another variable. This could help researchers begin to build a basis of research for the various options for presentation of an audiovisual story in virtual reality through which presence can occur and help journalists understand the variety of ways presence can be invoked when trying to piece together an immersive journalism piece.

H2. The data for H2 suggest that there is no significant main effect for medium and the DVs arousal and valence, and therefore H2 is not supported. There are not significant differences for arousal and valence between the flat-screen and VR conditions. Therefore, it is unlikely that

arousal and valence in this case will have a significant impact on presence. Research indicated that arousal and valence do not necessarily have to be present for a sense of presence to be felt, so the differences between H1 and H2 do still match potential outcomes. The photos were static and the audio was not meant to elicit any specific reaction on the part of the viewer, so a different type of 360-degree storytelling approach intentionally meaning to cause a reaction might be more effective in arousing the viewer or causing them to feel a certain way about the experience.

RQ1. The medium had no significant effect on destination image. This would indicate that a 360-degree image presented through a VR view does not significantly change the mental image of the destination compared to a flat-screen view, the perceived newsworthiness of recent events that could change the way a participant thinks about a place, nor does it significantly change attitude about the destination. The first research question was answered in the negative. Therefore, while travel journalism audiences might see a place from a new perspective, this research question cannot conclusively determine if their destination image is changed after seeing the 360-degree image in the flat screen condition compared to the VR condition. This could be since the photos were static, the limited perspective and lack of movement did not allow participants to explore the environment beyond being able to see what was immediately in the photo. Giving the viewer more autonomy in exploring the space might change their destination image more effectively if they are able to explore the space how they wish instead of having it controlled for them. However, the technology required to accomplish this level of VR might require specialized equipment. Place did show a significant main effect on attitude, so

investigating what aspects of a place in a travel journalism story impact destination image could help journalists effectively report on different destinations.

RQ2. No significance was found between credibility for the flat-screen condition and the VR condition. The research question is therefore answered in the negative. This reveals that, even with prior studies indicating that screen size can impact credibility, the size of the medium not changing – instead changing the field of view – did not have a significant impact on credibility in this case. Despite the significant results for presence variables that have heuristics that can enhance credibility, it seems that the use of a VR 360-degree photo view in this experiment did not help significantly increase credibility with travel journalism stories. While the medium for this experiment may not significantly impact perceived credibility, there may be other aspects of a 360 media travel journalism story or different headsets presentations of VR that can impact credibility, and further research into this subject could help journalists understand how VR could help or hinder storytelling through this technology.

RQ3. No significant differences existed between the flat-screen condition and the VR condition for destination image dependent variables with credibility. This research question is therefore answered in the negative and it cannot be determined if these two dependent variables can influence destination image. The potential reasons why the destination image and credibility in the previous research questions did not show significance could also apply to this question. It may be worth investigating if attitude can have an impact on perceived credibility since that showed some significance for place, but overall, credibility was not significant enough to warrant a change in destination image. In this case, it may be worth investigating other forms of VR technology and audience response to the credibility of the story and whether that can change

their destination image. There might be features of VR not available in this experiment that are able to significantly change an audience's destination image, which could be important for travel journalism to know about so that they can more accurately tell stories from multicultural perspectives that help lessen stereotypes or break away from standard storytelling techniques that might offer more visually limited perspectives.

Limitations and future research

One of the main limitations of this study is that sense of presence could be impacted by discomfort. Discomfort while experiencing a 360-degree image, video, etc., is an individually subjective issue that cannot necessarily be controlled for a mass audience. Therefore, future research on the components of very basic, mass-produced virtual reality technology that trigger these discomforts could help reduce this issue when trying to control for it in the future.

Another limitation for the results could be that the destinations featured in the imagery were popular tourist destinations in Europe that people may have already been familiar with through media. A paired T-test showed that people were more familiar with the Parthenon (m = 4.45, sd = .159) compared to being less familiar with the Eiffel Tower (m = 3.50, sd = .140). However, while the news in the travel journalism audio story might have added new information to their destination image, it did not significantly impact that destination image. Therefore, future research into what stories could be enhanced by using 360-degree media either as a supplement to a story or to completely tell the story in the context of travel journalism could help add to the ever-growing best practices list for journalists using the medium.

Some participants indicated verbally during their time in the study that they had always wanted to go to the place in one or both stories and were more excited about traveling there after

the story exposure. This brings up a question to consider for both the travel journalism industry and the journalism industry. Do these types of stories help engender a desire to see a place, like with the belief-desire-intention model, or will it satisfy that desire to go, possibly for those who cannot travel, such as if there are restrictions due to finances or health? For marketers, this could have implications for marketing to travel audiences, since 360-degree video could help show a place's best, favorite, or most exotic sites to pique their interest in a more complete view. However, those marketing a destination want to show it in the best light, while journalists are responsible for portraying it realistically. A 360-degree image could be useful for journalists in this context, since surround-view shots cannot be framed by the photographer to show only a part of a scene.

This study was also limited in that the destination image was simply measured between conditions, but did not measure for a significant change within conditions. Future research might consider whether the image itself could cause destination image to significantly change rather than change occurring due to the medium.

Age could be another limitation in this study. While many of the students who participated were Generation Z undergraduates, there were some students who were Millennial age or older who also participated. The mean age for participants was 24.3 years. Thus, future studies targeted toward specific generations might be able to build off of this study to offer a comprehensive look at how younger generations might specifically use 360-degree technology in travel journalism consumption. Additionally, there was a small sample of OU students, and the audiovisual presentation could have appealed more to some than others. The narrative was both audio and visual, which could impact news receptions. Therefore, because the audio track and

image reference each other, it could work better in one place condition than the other for certain people, which may help explain why there were main effects for place in certain conditions (Price & Zaller, 1993).

Lastly, a limitation in the study could be the technology used to present the photo and audio. With a smartphone, basic VR headset, and headphones, anyone consuming such 360-degree travel journalism stories would be able to recreate the experience. While it might be preferable to make the media available to a mass audience, specialized technology could be more effective in having a significant impact on travel journalism audiences when it comes to immersive storytelling and changing destination image. There is a growing industry for higher-end VR headsets that might make it unnecessary to find more basic and cheaper ways to accomplish a virtual reality experience for storytelling. However, many of these VR headsets may not allow for universal publication across a variety of platforms, but instead might have different requirements for the software and other components of the technology to build the same media product across different platforms (Lamkin, 2017). However, with more modern connections, like 5G, VR on smartphones could become much more advanced, and any delay between the image and head movement could be minimalized by the speed that this network provides (Goldman, 2018).

Conclusion

The purpose of this study was to measure if a person viewing a travel journalism story finds VR more immersive and realistic for forming a credible destination image than when using a traditional flat-screen video. Watching a travel journalism story on a cell phone screen in a VR headset was more immersive, was perceived to be more interactive, and there was a higher sense

of being there. Immersion also much higher for the Parthenon story in both flat screen and VR than for the Eiffel Tower, but the Eiffel Tower showed a greater increase between conditions than the Parthenon. Immersion and interactivity were also greater for the Parthenon than for the Eiffel Tower. This could mean that place is also a factor that impacts the sense of immersion that someone feels in a story.

This shows that journalism audiences feel a greater sense of presence when experiencing a 360-degree story than when looking at a 360-degree image or video on a flat phone screen. Immersive journalism could be helped by this information as the industry develops. It is a developing area of study that has yet to determine what specific components of the practice are most effective in creating an immersive story for any audience.

Most American adults (77 percent) own a smartphone, and one in five use their phone as the primary way they access the internet from home (Pew Research Center, 2018). Additionally, 5G networks, although still in the nascent stages, are set to potentially replace wired internet connections for homes, since it can work 10 times faster than 4G with millions of people on the network, and cellular devices will likely be one of the first mass-available devices that can access a 5G connection (Goldman, 2018). Therefore, investigating how to reach the audience where they are in the most effective and impactful way for news consumption is worth exploring by researchers in the journalism industry. This information will help the travel journalism industry define how it will use 360 imagery to create immersive stories for smartphone users around the country.

Additionally, attitude was significantly changed between places, higher for the Eiffel Tower than the Parthenon, and people were overall more familiar with the Parthenon than the

Eiffel Tower before watching the stories. This indicates that 360 imagery may have an impact on attitude for places people are not very familiar with and that it could be used to help people perceive a destination differently. Travel marketing could use this to improve attitude about a destination, and journalists can use this to further study when a 360-degree photo could be more effective in a story about a place.

This study sought to identify how strong the differences are between two photos presented through a different medium regarding presence, credibility, and destination image. Presence was found to be significantly stronger in the VR headset condition than the flat-screen condition, which means the journalism industry looking to create immersive stories should find ways to encourage audiences to use headsets to increase their sense of presence in a 360-degree travel story. Additionally, 360-degree images and audio stories can be used to help viewers become more familiar with a place and could change their attitude about that destination. This thesis study adds to the growing amount of studies into the medium of VR and the use of VR in journalism and contribute information about the extent that the medium can impact users.

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Appendixes

Appendix A

Questionnaire

Pretest

Please read the following questions carefully and rate your answer by filling in the bubble.

Do you enjoy traveling?

Not at all ○ ○ ○ ○ ○ ○ ○ Very much

Do you enjoy traveling internationally?

Not at all ○ ○ ○ ○ ○ ○ ○ Very much

Have you ever been to the Eiffel Tower in Paris, France?

○ Yes ○ No

How familiar are you with the Eiffel Tower?

Very much ○ ○ ○ ○ ○ ○ ○ Not at all

Have you ever been to the Parthenon in Athens, Greece?

○ Yes ○ No

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How familiar are you with the Parthenon?

Very much ○ ○ ○ ○ ○ ○ ○ Not at all

Do you have a desire to see **The Eiffel Tower** in person?

Not at all ○ ○ ○ ○ ○ ○ ○ Very much

PreATI2

Do you want to visit **The Eiffel Tower**?

Very much ○ ○ ○ ○ ○ ○ ○ Not at all

Do you have a desire to see **The Parthenon** in person?

Very much ○ ○ ○ ○ ○ ○ ○ Not at all

Do you want to visit **The Parthenon**?

Very much ○ ○ ○ ○ ○ ○ ○ Not at all

How often do you consume news about international destinations in travel media (such as articles in National Geographic or adventure shows on the Discovery Channel)?

Very often ○ ○ ○ ○ ○ ○ ○ Not often

Have you looked at 360 photos (still images that are 360-degree panoramas, where you control which part of the photo you look) on your phone?

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○ Yes ○ No

If so, did you enjoy looking at 360 photos on your phone?

Very much ○ ○ ○ ○ ○ ○ ○ Not at all

How regularly would you say you use your phone to look at 360 photos?

Regularly ○ ○ ○ ○ ○ ○ ○ Never

Have you looked at 360 photos on your phone using a head-mounted display, like VR goggles or Google cardboard?

○ Yes ○ No

If so, did you enjoy using the head-mounted display to look at the 360 photo?

Very much ○ ○ ○ ○ ○ ○ ○ Not at all

How regularly would you say you use a head-mounted display, like VR goggles or Google cardboard?

Never ○ ○ ○ ○ ○ ○ ○ Regularly

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Please rate the following about what you think about travel journalism articles:

Believable	○	○	○	○	○	○	○	Not believable
Trustworthy	○	○	○	○	○	○	○	Not trustworthy
Accurate	○	○	○	○	○	○	○	Not accurate
Unfair	○	○	○	○	○	○	○	Fair
Biased	○	○	○	○	○	○	○	Unbiased

Please rate the following about what you think about when you see a photo of a travel destination:

Believable	○	○	○	○	○	○	○	Not believable
Trustworthy	○	○	○	○	○	○	○	Not trustworthy
Accurate	○	○	○	○	○	○	○	Not accurate
Unfair	○	○	○	○	○	○	○	Fair
Biased	○	○	○	○	○	○	○	Unbiased

Please rate the following about what you think about travel journalism videos:

Believable	○	○	○	○	○	○	○	Not believable
Trustworthy	○	○	○	○	○	○	○	Not trustworthy
Accurate	○	○	○	○	○	○	○	Not accurate

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Unfair	○	○	○	○	○	○	○	Fair
Biased	○	○	○	○	○	○	○	Unbiased

How much do travel journalism stories influence your travel decisions?

A lot	○	○	○	○	○	○	○	Never

What is your age?

To which gender do you most closely identify?

○ Male ○ Female

What is your ethnicity?

○ White

○ Hispanic or Latino

○ Black or African American

○ Native American or American Indian

○ Asian

○ Native Hawaiian or Other Pacific Islander

○ Other

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What is your classification in college?

○ Freshman

○ Sophomore

○ Junior

○ Senior

○ Graduate Student

○ Doctoral Student

What is your status?

○ US Citizen

○ Permanent Resident

○ Other, non-US Citizen

○ Do not wish to provide

END OF SECTION – SEE RESEARCHER FOR NEXT STEP

VIRTUAL REALITY AND ITS IMPACT ON TRAVEL JOURNALISM AUDIENCES

Posttest

The Eiffel Tower

Please rate the following that best matches how you felt about your experience during the story about **The Eiffel Tower.**

Very pleasant	○	○	○	○	○	○	○	Not pleasant
Very unpleasant	○	○	○	○	○	○	○	Not unpleasant
Very bad	○	○	○	○	○	○	○	Not at all bad
Very good	○	○	○	○	○	○	○	Not good
Very unsatisfied	○	○	○	○	○	○	○	Not at all unsatisfied

Very relaxed	○	○	○	○	○	○	○	Very stimulated
Very calm	○	○	○	○	○	○	○	Very excited
Very unaroused	○	○	○	○	○	○	○	Very aroused

(in the sense of being awake, not sexually)

Please rate the following

How aware were you of events occurring in the real world around you while you watched the story?

Very much	○	○	○	○	○	○	○	Not at all

How much was your field of view taken up by the 360 photo?

VIRTUAL REALITY AND ITS IMPACT ON TRAVEL JOURNALISM AUDIENCES

Not much ○ ○ ○ ○ ○ ○ ○ All of it

How much could you hear other than the audio story?

A lot ○ ○ ○ ○ ○ ○ ○ Not much

How completely were your senses engaged?

Very much ○ ○ ○ ○ ○ ○ ○ Not at all

Were you able to forget the devices you were using while watching the story?

Not at all ○ ○ ○ ○ ○ ○ ○ Very much

How responsive was the environment to your actions?

Very much ○ ○ ○ ○ ○ ○ ○ Not at all

How natural did your interactions with the environment seem?

Not at all ○ ○ ○ ○ ○ ○ ○ Very much

Did you experience delay between your actions and the device's response?

Very much ○ ○ ○ ○ ○ ○ ○ Not at all

Was the device difficult to use?

Not at all ○ ○ ○ ○ ○ ○ ○ Very much

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Did you feel captivated by the 360 photo and story?

Very much ○ ○ ○ ○ ○ ○ ○ Not at all

Did you feel that you were in the 360-photo environment rather than viewing it?

Very much ○ ○ ○ ○ ○ ○ ○ Not at all

Did you feel that you were actually at **The Eiffel Tower**?

Very much ○ ○ ○ ○ ○ ○ ○ Not at all

Did the environment in the 360 photo seem real to you?

Very much ○ ○ ○ ○ ○ ○ ○ Not at all

How much did your interaction with the 360-photo environment seem consistent with your interaction if you were there in the real world?

Not at all ○ ○ ○ ○ ○ ○ ○ Very much

How much did the visual aspects of the environment draw you in?

Very much ○ ○ ○ ○ ○ ○ ○ Not at all

How involving was the experience?

Not at all ○ ○ ○ ○ ○ ○ ○ Very much

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How much did the auditory aspects of the environment help you get involved in the story?

Very much ○ ○ ○ ○ ○ ○ ○ Not at all

Did you feel confused while wearing the headset/moving to view the photo?

Very much ○ ○ ○ ○ ○ ○ ○ Not at all

Did you feel disoriented while wearing the headset/moving to view the photo?

Not at all ○ ○ ○ ○ ○ ○ ○ Very much

Did you feel any discomfort (nausea, headache, eye strain, etc.) while wearing the headset/moving to view the photo during the story?

Very much ○ ○ ○ ○ ○ ○ ○ Not at all

How would you rate the quality of the story?

High ○ ○ ○ ○ ○ ○ ○ Low

How would you rate the quality of the 360 image?

High ○ ○ ○ ○ ○ ○ ○ Low

How would you rate the quality of the audio?

High ○ ○ ○ ○ ○ ○ ○ Low

VIRTUAL REALITY AND ITS IMPACT ON TRAVEL JOURNALISM AUDIENCES

How much did the visual display quality interfere with your attention to the story?

Not at all	○	○	○	○	○	○	○	Very much

How much did the quality of the audio hardware interfere with your attention to the story?

Not at all	○	○	○	○	○	○	○	Very much

Please rate the following

I found the story to be

Believable	○	○	○	○	○	○	○	Not believable
Trustworthy	○	○	○	○	○	○	○	Not trustworthy
Accurate	○	○	○	○	○	○	○	Not accurate
Unfair	○	○	○	○	○	○	○	Fair
Biased	○	○	○	○	○	○	○	Unbiased

Important	○	○	○	○	○	○	○	Not important
Interesting	○	○	○	○	○	○	○	Not interesting
Not serious	○	○	○	○	○	○	○	Serious
Informative	○	○	○	○	○	○	○	Not informative

After the story, please rate how you think about **The Eiffel Tower** as a place:

Enjoyable	○	○	○	○	○	○	○	Unenjoyable
Like	○	○	○	○	○	○	○	Dislike

VIRTUAL REALITY AND ITS IMPACT ON TRAVEL JOURNALISM AUDIENCES

Positive ○ ○ ○ ○ ○ ○ ○ Negative

Please read the following questions carefully and rate your answer by filling in the bubble.

Do you have a desire to see **The Eiffel Tower** in person?

Not at all ○ ○ ○ ○ ○ ○ ○ Very much

Did the story change the mental image you had about **The Eiffel Tower**?

It did ○ ○ ○ ○ ○ ○ ○ Not at all

Do you plan to visit **The Eiffel Tower**?

Very much ○ ○ ○ ○ ○ ○ ○ Not at all

Do you have a desire to travel to see **The Eiffel Tower** in person to confirm that the experience in the story was accurate?

Very much ○ ○ ○ ○ ○ ○ ○ Not at all

END OF SECTION – SEE RESEARCHER FOR NEXT STEP

VIRTUAL REALITY AND ITS IMPACT ON TRAVEL JOURNALISM AUDIENCES

Posttest

The Parthenon

Please rate the following that best matches how you felt about your experience during the story about **The Parthenon.**

Very pleasant	○	○	○	○	○	○	○	Not pleasant
Very unpleasant	○	○	○	○	○	○	○	Not unpleasant
Very bad	○	○	○	○	○	○	○	Not at all bad
Very good	○	○	○	○	○	○	○	Not good
Very unsatisfied	○	○	○	○	○	○	○	Not at all unsatisfied
Very relaxed	○	○	○	○	○	○	○	Very stimulated
Very calm	○	○	○	○	○	○	○	Very excited
Very unaroused	○	○	○	○	○	○	○	Very aroused

(in the sense of being awake, not sexually)

Please rate the following

How aware were you of events occurring in the real world around you while you watched the story?

Very much	○	○	○	○	○	○	○	Not at all

How much was your field of view taken up by the 360 photo?

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Not much ○ ○ ○ ○ ○ ○ ○ All of it

How much could you hear other than the audio story?

A lot ○ ○ ○ ○ ○ ○ ○ Not much

How completely were your senses engaged?

Very much ○ ○ ○ ○ ○ ○ ○ Not at all

Were you able to forget the devices you were using while watching the story?

Not at all ○ ○ ○ ○ ○ ○ ○ Very much

How responsive was the environment to your actions?

Very much ○ ○ ○ ○ ○ ○ ○ Not at all

How natural did your interactions with the environment seem?

Not at all ○ ○ ○ ○ ○ ○ ○ Very much

Did you experience delay between your actions and the device's response?

Very much ○ ○ ○ ○ ○ ○ ○ Not at all

Was the device difficult to use?

Not at all ○ ○ ○ ○ ○ ○ ○ Very much

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Did you feel captivated by the 360 photo and story?

Very much ○ ○ ○ ○ ○ ○ ○ Not at all

Did you feel that you were in the 360-photo environment rather than viewing it?

Very much ○ ○ ○ ○ ○ ○ ○ Not at all

Did you feel that you were actually at **The Parthenon**?

Very much ○ ○ ○ ○ ○ ○ ○ Not at all

Did the environment in the 360 photo seem real to you?

Very much ○ ○ ○ ○ ○ ○ ○ Not at all

How much did your interaction with the 360-photo environment seem consistent with your interaction if you were there in the real world?

Not at all ○ ○ ○ ○ ○ ○ ○ Very much

How much did the visual aspects of the environment draw you in?

Very much ○ ○ ○ ○ ○ ○ ○ Not at all

How involving was the experience?

Not at all ○ ○ ○ ○ ○ ○ ○ Very much

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How much did the auditory aspects of the environment help you get involved in the story?

Very much ○ ○ ○ ○ ○ ○ ○ Not at all

Did you feel confused while wearing the headset/moving to view the photo?

Very much ○ ○ ○ ○ ○ ○ ○ Not at all

Did you feel disoriented while wearing the headset/moving to view the photo?

Not at all ○ ○ ○ ○ ○ ○ ○ Very much

Did you feel any discomfort (nausea, headache, eye strain, etc.) while wearing the headset/moving to view the photo during the story?

Very much ○ ○ ○ ○ ○ ○ ○ Not at all

How would you rate the quality of the story?

High ○ ○ ○ ○ ○ ○ ○ Low

How would you rate the quality of the 360 image?

High ○ ○ ○ ○ ○ ○ ○ Low

How would you rate the quality of the audio?

High ○ ○ ○ ○ ○ ○ ○ Low

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How much did the visual display quality interfere with your attention to the story?

Not at all	○	○	○	○	○	○	○	Very much

How much did the quality of the audio hardware interfere with your attention to the story?

Not at all	○	○	○	○	○	○	○	Very much

Please rate the following

I found the story to be

Believable	○	○	○	○	○	○	○	Not believable
Trustworthy	○	○	○	○	○	○	○	Not trustworthy
Accurate	○	○	○	○	○	○	○	Not accurate
Unfair	○	○	○	○	○	○	○	Fair
Biased	○	○	○	○	○	○	○	Unbiased

Important	○	○	○	○	○	○	○	Not important
Interesting	○	○	○	○	○	○	○	Not interesting
Not serious	○	○	○	○	○	○	○	Serious
Informative	○	○	○	○	○	○	○	Not informative

After the story, please rate how you think about **The Parthenon** as a place:

Enjoyable	○	○	○	○	○	○	○	Unenjoyable
Like	○	○	○	○	○	○	○	Dislike

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Positive ○ ○ ○ ○ ○ ○ ○ Negative

Please read the following questions carefully and rate your answer by filling in the bubble.

Do you have a desire to see **The Parthenon** in person?

Not at all ○ ○ ○ ○ ○ ○ ○ Very much

Did the story change the mental image you had about **The Parthenon**?

It did ○ ○ ○ ○ ○ ○ ○ Not at all

Do you plan to visit **The Parthenon**?

Very much ○ ○ ○ ○ ○ ○ ○ Not at all

Do you have a desire to travel to see **The Parthenon** in person to confirm that the experience in the story was accurate?

Very much ○ ○ ○ ○ ○ ○ ○ Not at all

END OF SECTION – SEE RESEARCHER FOR NEXT STEP

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Appendix B

Scripts for AUDIO:

SLUG: PARIS SCRIPT WRITER: Brigette Waltermire ((TAKE PKG)) Reporter: Stingray Schuller		SOT
	00:00	THE EIFFEL TOWER MIGHT BE GETTING A MAKEOVER SOON. THE LOOMING WROUGHT-IRON STRUCTURE HAS BEEN PAINTED
	00:09	19 TIMES IN THE PAST, AND IT'S DUE TO BE REPAINTED AGAIN
	00:10	THIS YEAR.
	00:18	AT NINE-HUNDRED-AND-EIGHTY-SIX FEET TALL, THE TOWER REQUIRES SIXTY TONS OF PAINT THAT PROTECTS IT FROM THE ELEMENTS.
		TWENTY-FIVE PAINTERS STRIP

	AND PAINT THE TOWER BY HAND EVERY SEVEN YEARS. IT HAS BEEN PAINTED THREE SHADES OF BROWN THAT GET LIGHTER WITH ELEVATION TO SHOW OFF THE SILHOUETTE
00:35	AGAINST THE SKY FOR THE
00:36	PAST FIFTY YEARS. BUT, BEFORE NINETEEN-SIXTY-EIGHT, THE TOWER WAS
00:48	PAINTED VASTLY DIFFERENT COLORS. ITS ORIGINAL COLOR
00:49	WAS RED, WHICH WAS TO HELP PROTECT AGAINST RUST. OTHER PAINT JOBS HAVE INCLUDED COLORS RANGING
01:02	FROM OCHRE, YELLOW, RED-BROWN, AND – ONCE – AN
NAT SOUND https://freesound.org/people/Mxsmanic/sounds/141134/	OMBRE DESIGN OF ORANGE AT THE BOTTOM THAT LIGHTENED TO YELLOW ON TOP.

TRT: 1:02 Outcue: none	WHILE THE NEW PAINT COLOR FOR THIS REPAINTING IS NOT CONFIRMED, WE MAY SEE THE MINISTRY OF CULTURE AND THE CITY OF PARIS DECIDE TO CHANGE THE CURRENT BROWN OF THE TOWER.

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SLUG: ATHENS SCRIPT WRITER: Brigette Waltermire ((TAKE PKG)) Reporter: Stingray Schuller	SOT
00:00	THE BARE COLUMN STRUCTURE STRETCHING ACROSS THE LANDSCAPE IS THE PARTHENON –PART OF
00:10	AN ANCIENT CITADEL WHICH HAS BEEN OVERLOOKING THE
00:11	CITY OF ATHENS SINCE FOUR-HUNDRED-THIRTY-TWO B. C.
00:24	WHILE NOW A ROOFLESS, BARE MARBLE COLUMN RECTANGLE, IT WAS ONCE A
00:25	TEMPLE TO THE GODDESS ATHENA COVERED IN RENOWNED CLASSICAL MARBLE SCUPLTURES ALONG THE EDIFICE ON TOP OF THE

	COLUMNS.
00:40	IN THE EARLY EIGHTEEN HUNDREDS, THE PARTHENON
00:41	HAD FALLEN INTO DISREPAIR DUE TO NEGLECT AND WAR. A BRITISH AMBASSADOR MADE A DEAL WITH
00:50	OTTOMAN AUTHORITIES (WHO WERE IN CHARGE OF
00:51	ATHENS AT THE TIME) AND TOOK HALF OF THE SCULPTURES, WHICH ENDED UP IN THE LONDON BRITISH
01:03	MUSEUM.
NAT SOUND: https://freesound.org/people/azoso/sounds/332968/	WHEN THE GREEKS REGAINED INDEPENDENCE IN EIGHTEEN-THIRTY-TWO, THEY BEGAN REQUESTING THE RETURN OF THE
TRT: 1:03	MARBLES AND ARE STILL

Outcue: none	FIGHTING FOR THEIR RETURN TODAY. WHILE IN BREXIT NEGOTIATIONS FOR BRITAIN TO DIPLOMATICALLY EXIT FROM THE EUROPEAN UNION, GREECE HAS ASKED FOR THE MARBLES TO BE RETURNED BY ENGLAND AS A GESTURE OF DIPLOMACY.

Appendix C

Table of Means

Interference	5.03	5.23	4.84	4.90	0.431	4.86	5.14	0.203	5.13
Valence	5.83	6.05	5.93	5.91	0.12	5.88	5.98	0.479	5.94
Arousal	3.09	3.17	3.15	3.24	1.00	3.12	3.20	0.667	3.13
Credibility	5.93	5.97	5.87	5.98	0.621	5.90	5.98	0.649	5.96
Newsworthiness	5.43	5.53	5.49	5.64	0.656	5.46	5.90	0.508	5.48
Attitude	5.99	6.22	5.73	5.96	1.00	5.86	6.09	0.268	6.11
Destination Image	5.16	5.34	5.24	5.29	0.561	5.20	5.32	0.541	5.25