FRAMING SCIENCE AND CONSERVATION FILMS FOR WIDER ACCEPTANCE: USING SOCIAL SCIENCE TO ENGAGE AUDIENCE THROUGH THEIR WORLDVIEW AND CULTURAL COGNITION

by

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ABSTRACT

Using the work of Yale professor Dan Kahan, this thesis explores how his 'cultural cognition' theory demonstrates the ineffectiveness of communicating controversial environmental topics using the deficit model. It applies Valerie Reyna's Fuzzy Trace Theory, which demonstrates how communicators can use 'gist' and 'verbatim' in their messaging to connect to an audience's worldview and reduce polarization. This thesis uses these theories to analyze three documentary case studies, including my MFA thesis film*, Deep Discoveries*. *Deep Discoveries* documents the underwater ocean exploration of Marine National Monuments in the Pacific Ocean from 2014 to 2016 and utilizes the above tools to promote conservation of the ocean.

INTRODUCTION

When it comes to many current environmental conservation issues, the United States is so deeply divided it is immobilized (Dunlap, et al., 2016). Scientific evidence suggests the planet is facing potentially grave global changes (Strona and Bradshaw, 2018, UN Environment, 2019). In the United States, however, many do not believe that these changes are a problem or, in fact, are even happening (Hamilton, 2011). For scientists and documentary filmmakers, this creates a profound challenge: to determine why the public is so polarized as well as how to create effective messaging to a wide audience without polarizing the audience further (Kahan, 2014). Environmental communicators and psychologists are realizing that communicating controversial environmental conservation topics is extremely complicated. By using research about the science of science communication, new approaches for inclusive and engaging filmmaking can be explored (Kahan, 2014, Fischhoff, 2011).

Conservation actions could play a key role in mitigating for these environmental challenges (Watson, et al. 2018). As such, using film to promote conservation is an important tool in driving policy and public awareness (Sakellari 2014). Conservation is part of the overall effort to improve environmental communication. Though different, these are related activities and environmental commination guidance recommends similar communication techniques for conservation and for climate change (). Within this paper, studies focused on the communication of climate science will be discussed. Conservation science, being a similar environmental initiative, can use these studies to further improve their connection with their audiences.

Communicating environmental science in America has been a challenge for those in the scientific community. According to Neal Lane, the former director of the National Science Foundation and science advisor to President Bill Clinton, "The science community can do so much more to engage on the policy side." (Moskowitz, 2012). Dan Kahan, a Yale professor of law and philosophy, believes the problem is not the quantity of science communication, but the quality (Kahan, 2014, Braman, 2012). He coined the term "deficit model" to describe the misleading assumption that has dominated science communication over the past several decades (Braman, 2012). Kahan explains that the scientific community has been relying on the false assumption that the reason the American public did not accept scientific findings was due to their "deficit" or lack of knowledge of the science itself. Therefore, if the science is explained clearly to science deniers, they would suddenly see the logic and trust the data. This model suggests that facts and data are the primary way that the scientific community can connect with the general public (Braman, 2012, Kahan, 2014).

Kahan's research has shown that a lack of knowledge about science is not the cause of science rejection (Braman, 2012, Kahan, 2014). A person's cultural norms and worldview- their 'cultural cognition' - plays a far greater role in their opinions on science than their science literacy (Braman, 2012, Kahan, 2014). The 'cultural cognition' theory "[draws] on concepts and methods from psychology, anthropology, and communication, this theory holds that individuals can be expected to form perceptions of risk that reflect and reinforce values that they share with others" (Douglas & Wildavsky, 1982, Kahan 2014). Kahan's research suggests most scientists, documentary filmmakers and media have targeted the wrong issue for decades. Since the historic, traditional methods of

science communication have been shown to be ineffective when communicating controversial environmental issues like climate change to the public, more sophisticated and data-driven methods of presenting these issues must be evaluated and tested for the future production of conservation documentary films.

FRAMING CONSERVATION AND DOCUMENTARY FILM FOR WIDER ACCEPTANCE

Research into the traditional models of science outreach and documentary filmmaking has shown some popular concepts to be inaccurate or in need of deeper analysis. As discussed earlier, Kahan's research has shown that science denial is perpetuated through clashing values and worldviews rather than a lack of knowledge about science. In his 2011 paper, Kahan says the "public dissensus over climate change, according to [the 'cultural cognition' theory], originates in a more basic conflict between opposing groups whose members' cultural outlooks dispose them to form opposing perceptions of environmental and technological risks generally"(Kahan 2010; Verwij, Douglas, Ellis, Engle, Hendriks, Lohmann, Ney, Rayner & Thompson 2006).

Kahan, et al. (2017) analyzed who is vulnerable to selectively believe information in accordance with their own 'cultural cognition'. One of the primary focuses was to test topics that politically motivated people. They showed a test group data tables, which they claimed were results from a clinical trial on skin cream. They used the example of a skin cream due to the unlikeliness that the participants would have any political biases regarding the results. The findings showed that participants in the test group who were scientifically literate tended to accurately decipher the trial data. Using the same data table, they then showed it to a test group claiming it was data about cities who had instigated a gun control policy, a topic they expected would be politically motivated. They found that when subjects analyzed a non-politically motivated topic, the scientifically literate participants deciphered the data table correctly more often than

those who were less scientifically literate. But when the data table was applied to gun control, far more of the scientifically literate participants deciphered the table incorrectly to align with their political leanings and personal beliefs.

In other research, Kahan made what he called a surprising discovery. He identified a specific group that he called 'science-curious'. These individuals displayed enjoyment in simply investigating science. Kahan found that this group resisted the tendency to draw incorrect conclusions based upon their worldview. Further research is needed to determine how someone comes to be 'science-curious', but this finding could lead to new ways to educate and communicate with the general public. (Kahan, 2016)

Kahan's research provides science communication and documentary film concepts that could allow for better connection with their intended audience. Based on his findings, Kahan recommends science communicators provide facts in a way that engages diverse values without motivating any group of people to simply rebel against the concepts. Filmmakers who are mindful of the ideologies and methods they use to frame their message could find a more receptive audience. Using the tools suggested by Kahan's research, filmmakers who create a more accessible film will be able to connect with a wider audience (Kahan, 2014).

Dr. Valerie Reyna, Professor of Human Development at Cornell, studies what happens in the human brain when we engage in risk-based communication and decision-making. She explains that the modern model of human memory, called fuzzy-trace theory, shows that our memory stores incoming material into two types of representations: 'verbatim' and 'gist.' 'Verbatim' is remembering the facts of what occurred in a precise literal 'trace'. In film, 'verbatim' is the scientific facts and

information. ‘gist’ is the general, or ‘fuzzy’, idea of approximately what occurred and is focused on the fundamental meaning. In a film, ‘gist’ is the primary topic of the work or what it means “in a nutshell” (Reyna, 2012).

When reading or following a narrative, such as film, the human brain receives ‘verbatim’ information and then translates the message it understood into ‘gist’ to store it (Broniatowski, 2013). The information that comes into a person’s mind has to be filtered through their values, principles, past experiences, and biases. Only after this process is it available to them to add to their worldview or to use as a basis for decision-making. As Reyna explains: “It is not the direct message- it is the interpretation of that message based on previous experiences, morals, etc. Interpretation drives emotional response.” Two people who read or watch the same ‘verbatim’ information may come to very different conclusions. Their worldviews will cause them to translate ‘verbatim’ messages differently. Filmmakers who present most of their message in “verbatim,” may have the audience translate their message into the incorrect ‘gist’. If filmmakers primarily focus their message on ‘gist’, it is more likely to be correctly interpreted by the audience. Reyna’s research suggests effectively using ‘gist’ in messaging is key to effectively transmit information to the audience (Reyna, 2012).

Reyna’s research suggests a message is easier to transmit if it is presented in an engaging way and relies more on ‘gist’ than “verbatim.” ‘Gist’ is more memorable, more engaging, and it holds attention (Reyna, 2012). Scientific institutions that use rapid-fire facts and dry narration (mostly ‘verbatim’) in their communications allow the audience to interpret the ‘gist’ of the message according to their own worldview, which can lead the audience to different conclusions than the institutions intended. When making

documentary films, the message is most effective when it presents mostly 'gist' surrounded by well-timed supporting 'verbatim' information (Reyna, 2012).

While 'gist' is an effective tool to connect with an audience, when used poorly it can cause an audience to disconnect and/or become more polarized. Kahan warns against overusing emotion: "…beware of appealing *too much* emotion, because people become numb and shut down when they are overwhelmed with alarming images." (Kahan, 2014) Dr. Bjorn Lomborg further warns against using communication tactics that are inaccurately pessimistic or frightening statements about the state of the environment (Lomborg, 2001). In his book *The Skeptical Environmentalist*, Lomborg refers to these messages as "the Litany." In the book, he identified areas where some environmental organizations were selectively using and manipulating data to show the environmental situation as worse than it is. He noted instances where deforestation claims were inaccurate, food production claims were better than suggested, economic impacts from severely reducing fossil fuel consumption were not addressed, and many more. From a skeptic's perspective, he has found discussing these types of concerns leads to his perspective being demonized by those with opposing views:

> …this has given the environment debate a peculiar status. Over the past few decades, there has been an increasing fusion of truth and good intentions in the environmental debate (Poulsen 1998). Not only are we familiar with the Litany—that the environment is in poor shape and getting ever worse—we know that the Litany is true and that anyone who claims anything else must have disturbingly evil intentions (Lomborg, 2001).

Relying on high risk messaging for environmental communication creates a polarizing effect among the public and reduces efforts to discuss science and environmental policy openly. Lomborg laments that having a "matter-of-fact discussion

of the environment can be very difficult because everybody has such strong feelings on the issue" (Lomborg, 2001).

In one of his studies about 'cultural cognition', Kahan tested various polarized culture groups and found that the groups did care what scientists believed (Kahan 2014). He found, however, that they had a hard time identifying the true scientific consensus. Each group believed that their group's position was consistent with scientific consensus (Kahan 2014). This tendency of 'cultural cognition' to change the meaning of facts to suit a person's own beliefs inevitably leads all people to build a worldview that may not be scientifically accurate. Kahan muses that the worst of the disconnect through cultural cognition might vanish if Americans did not have such ingrained loyalties to political parties with defined leanings:

> We need science communication strategies that make crediting the best available evidence compatible with membership in the diverse cultural groups that comprise our pluralistic liberal society. If we can rid the science communication environment of the toxic partisan resonances that transform positions on climate change into badges of loyalty to contending factions, then we can be confident that ordinary members of the public, using the normal and normally reliable faculties that they use to discern who knows what about what, will converge on the best available scientific evidence on climate change… (Kahan, 2014).

While research is ongoing, currently science communication researchers do not have enough understanding of these issues to propose tactical solutions at this time. The one thing many researchers stress is that science communication needs to proceed in a scientific way, performing extensive testing to understand the outcomes, so the field and methods can continue to evolve and improve (Kahan, 2014. Fischhoff, 2011).

With the toolset for communicating science still in development, filmmakers have a challenging task of testing new avenues for outreach while scientifically analyzing the

results. Determining what makes a film successful becomes a nuanced assessment (Kahan, 2014). For example, by industry standards, *An Inconvenient Truth* ,was a very successful science documentary. It is the 11th highest-grossing documentary box office release of all time (Box Office Mojo, 2019) and it won two Oscars (Academy of Motion Pictures Arts & Sciences, 2019). It brought climate concerns into the forefront of international politics. While this all may be true, it also served to polarize the public along political ideologies (Sakellari, 2014). This polarization is predicted by the 'cultural cognition' theory.

> The Gore narrative has worked amongst certain audiences but has not been able to engage the diverse range of audiences needed to further action on climate change. In fact, it could be argued that it has disengaged certain audiences. There are several reasons for this, including its over-emphasis of the certainty of climate science, its reliance on the information deficit model, the messenger used and the misalignment of scales between problem and solution that is presented. (Bushell, et. al, 2017)

Research suggests that *An Inconvenient Truth* may have been less polarizing, and able to motivate a broader audience to action had it used not used 'verbatim' in accordance with the deficit model and gist' that polarizes through cultural cognition theory.

CASE STUDIES

Using the tools and concepts already discussed, I will analyze three documentary productions related to conservation that attempt to increase awareness and persuade the audience to take action. Since many traditional film methods have polarized the public over environmental issues, I wanted to explore productions that used different, innovative approaches to try reach their goals. They were well-funded productions that used different platforms to reach a large audience. The first documentary production I will discuss is as an online web series called *Nature is Speaking*, specifically the episode "The Ocean" from 2014. The second production, *The Age of Stupid* is a theatrical, full-length documentary released in the UK in 2009. The third production is *Years of Living Dangerously,* which is a cable television series from 2014. Each productions' use of 'gist' and how the 'cultural cognition' theory can predict the connection to differing worldviews will be assessed.

Nature is Speaking

The first selection is from Conservation International, a well-respected nonprofit organization that seeks to promote conservation for nature worldwide. They produced a web series of short conservation videos. The series uses celebrity voices to explain the importance of conservation for the future of our civilization. The videos each speak from the point of view of the oceans, the redwoods, the soil, Mother Nature, etc. The specific video of the series I will review is titled "The Ocean." The videos all attempt to deliver

their messages stressing a sense of urgency. The first minute of script from "The Ocean" is narrated by Harrison Ford:

> I am the ocean… I'm water. I'm most of this planet. I shaped it. Every stream every cloud, every raindrop…it all comes back…to me. One way or another, every living thing here needs…..me. I'm the source, I'm what they crawled out of… humans.. they're no different… I don't owe them a thing. I give, they take… but I can always take back… ("The Ocean," *Nature is Speaking* Series, Conservation International)

The film ends with written title cards that say: "Nature doesn't need people. People need nature." The *Nature is Speaking* series attempts to innovate by showing pristine wilderness with the voiceover coming from various aspects of nature.

Conservation International features the *Nature is Speaking* series on their website and on YouTube. As of June 2019, the video has more than two million views with 19,000 "likes" verse 300 "dislikes. (YouTube, 2019a)" "The Ocean" is the most viewed of the *Nature is Speaking* series (YouTube, 2019b). "The Ocean" won a Cannes Gold Lion Award, which is awarded from the prestigious Lions International Festival of Creativity. By these metrics this video can be judged successful.

The filmmakers for the *Nature is Speaking* series chose to primarily use 'gist' in their messaging much more than 'verbatim'. Instead of quoting statistics, the viewer comes away with a sense of what the film was trying to communicate with some facts included to make the viewer realize the immensity of the problem.

The use of 'gist', however, attempts to use nature to directly threaten and "guilt trip" humans to care about climate issues. Overly powerful use of 'gist' yields polarizing effects on the audience (Kahan 2014, Lomborg 2001). In an article with *The Guardian*, a news website, Connie Roser-Renouf, associate research professor at George Mason

University's Center for Climate Change Communication, worries that this series may make the audience feel concerned but helpless on how to take action:

> The research we at George Mason have been doing in collaboration with our colleagues at Yale places just over a third of the American public into this group. Building support for action among them is critical to building momentum for national action on the issue. I see these messages as potentially effective at speaking to people who view nature as something separate from us, who haven't thought about how dependent we are on nature, and who don't strongly reject evolution and climate change. I would have advised against threatening people with extinction – it's too scary for some people and not credible for others. (Harman, 2015)

Therefore the research suggests these films may appeal to some, but are unlikely to appeal to a large enough audience to impact the state of conservation policy or opinion.

The Age of Stupid

The second selection, *The Age of Stupid,* is a full-length documentary about conservation and climate change. It was released in 2009 and was written and directed by Franny Armstrong in the United Kingdom. The film was financed through crowdfunding, a new approach at the time. This film's premiere was held in a solar-powered tent which was satellite-linked to 62 other screens across the UK. This made it the largest simultaneous film premiere in history by number of total screens which was a Guinness World Record (Largest simultaneous film premiere,` 2019).

The Age of Stupid uses a unique storytelling technique to share its message of advocating for conservation and climate action. *The Age of Stupid* mixes fact with fiction and traditional documentary style with dramatic narrative. The film is guided by a

fictional character in the year 2055 in a world that has been utterly devastated by climate change. The character tells the story of the destruction of humanity, eventually transmitting his final report to space in the hope that somebody will hear the story and know that humankind existed. This film uses snapshots of real footage from the years leading up to 2009 and fills in the gaps with fictional narration from the guide. He explains that humanity let itself be destroyed through its own apathy, politics, and stupidity. The film also includes the stories of six real people who are either impacting or impacted by climate change. In between the stories of the real people, it aggressively attacks consumerism, large corporations, and overconsumption, with animations.

The *Age of Stupid* generated measurable impact. The film was shared widely throughout the world and a documentary society in Britain reported that it was shown on TV in 14 different countries, thousands of smaller screenings, and seen by an estimated 10 million people worldwide (The Impact Field Guide and Toolkit, 2019). The film had a corresponding campaign for political and policy change that has been extensive and long lasting in the UK, including 10:10, a campaign to reduce 10% of UK emissions in one year. 10,000 people signed up for 10:10 on the first day, including the prime minister. Several years later, 110,000 individuals, 5000 businesses, 1700 schools, 1600 organizations, and 176 councils, which represent 25 million people have signed up (*The Impact Field Guide and Toolkit*, 2019). This campaign is also credited with the UK government cutting 13.8% of its emissions, the London Underground cutting 10% across all their tube stations, and the UCLH hospital 13% of their emissions (*The Impact Field Guide and Toolkit,* 2019). In 2010, the city of Paris also signed up for 10:10. Ultimately the 10:10 campaign resulted in saving almost 1 million tons of C02 emissions. This is the

equivalent to taking around 400,000 cars off the road." (*The Impact Field Guide and Toolkit,* 2019) *The Age of Stupid* won a series of awards, including Best Green Documentary from Grierson and best feature from the Hawaii International Film Festival (*The Impact Field Guide and Toolkit,* 2019).

Although its storytelling can be impactful, *The Age of Stupid* uses an overabundance of scientific information and tries to educate its audience with lessons on how the current environmental problems will lead to drastic changes. This over-abundance of 'verbatim' falls directly in the category of films that try to cater to the deficit model. In some ways, the film uses 'gist' to great effect. The dramatization of the future has a very clear message about the potential outcome of climate policies that fail to adequately protect and conserve the environment.

The story arc of the film, however, uses 'gist' in less effective ways. The film is strictly told from the worldview of filmmaker Anderson, who is an advocate for the environment and conservation. It utilized a great deal of frightening and politically charged messaging. The last quote from one section of the film states, "We knew how to profit but not how to protect.", and one of the last things the fictional narrator says is "It's too late for us." The audience is left with a feeling that the entire problem of climate change is so huge and unstoppable that the situation is nearly insurmountable. It risks leaving some of the audience feeling hopeless and frustrated rather than with a drive to fight for their home (Sakellari, 2014).

Part of the film narrative uses the stories of the six real people to tell their tale of climate change. These stories have many messages that can connect to a wider audience

and multiple worldviews. Based upon its impact, this film clearly must have crossed some cultural divides. Though research suggests it likely increased polarization:

> If viewers do *not* believe that a rise in global sea levels, desertification, runaway climate change, and eventually the extinction of mammals are among the possible future consequences of our current practices, and also do not *trust* the filmmakers that they tell the truth about these issues, they will probably understand the documentary as a *misrepresentation* of the actual world and refuse to engage with its message. (Weik von Mossner, 2013)

By using 'verbatim' that caters to the deficit model and a polarizing 'gist', the film will be primarily be appreciated by an audience that is already aligned with its message.

Years of Living Dangerously

The third selection is a television series, called *Years of Living Dangerously*, which aired on Showtime in 2014 (a second season was aired on National Geographic in 2015). The series was conceived by *60 Minutes* veteran producers David Gelber and Joel Bach who "didn't want to do another competent documentary that would essentially preach to the choir and would be seen by a relatively small audience who already agreed this is a big deal" (Blake 2014). This series features celebrity personas such as Don Cheadle, Harrison Ford and Thomas Friedman who meet with various scientists and everyday people around the world. Two of its producers include James Cameron and Arnold Schwarzenegger. It uses star-power to add interest and give everyday people a reason to watch it, even if they are not particularly interested in environmental issues.

Episodes show the stars flying to remote areas of the globe to see environmental impacts in person and to talk to the people who have experienced them first-hand. The episodes are highlighted with exciting, real-world, front-line action. The stars visit Syrian war zones, fight forest fires on the ground, and snorkel remote coral reefs. The introduction to the show is exciting with storm footage, forest fires, and a house floating away in a raging river, intermixed with digital and scientific looking animations like a digital model of ocean waves. Echoing voices drop periodic quotes about the climate and human world events.

The series, originally planned to be one season, was successful enough that the creators added a second season (Gaudiosi 2014). The series won an Emmy in 2014 for outstanding documentary or nonfiction series (Academy of Television Arts and Sciences). Although these were positive signs, the creators of the series were not satisfied with the viewership the series received.

> We weren't happy with the ratings numbers that we got. We had hoped for more, but we had been braced for less because historically people tend to not tune into something that's environmentally themed or climate change related. (Gaudiosi 2014)"

The series saw many positive reviews of the show from publications such as *The New York Times, LA Times,* and *The Hollywood Reporter.*

The team behind the series felt that numerous documentaries, notably *An Inconvenient Truth*, had already discussed the threat of global warming. (Blake, 2014). They decided to create a more engaging approach that "instead of relying on sober talking heads and a litany of grim statistics, they wanted to combine high production values with deeply human stories to convey the urgency of climate change" (Blake,

2014). Each episode includes scientists and laypeople. There are everyday people from around the world who tell stories about how climate change has already impacted their lives. The audience is introduced to staunchly conservative citizens who have their minds changes about climate change. It covers faith leaders as they convince other evangelists that faith and environmental activism are not contradictory. Episode 3 shows Presidents Ronald Reagan, George H. W. Bush, Richard Nixon, and Senator John McCain speaking during the past few decades in support of climate change or other environmental policies. By showing such a wide variety of speakers in each episode, *Years of Living Dangerously* is attempting to find plenty of real voices that would appeal to every conceivable worldview in the U.S.

The series also tries to show how disinformation has been spread by anti-environmental interests. Episode 3 also explains that U.S. oil and coal companies have spent billions of dollars in the past couple decades on messaging geared to make climate change more of a controversy. The episode makes the point that it is only very recently that climate change and environmentalism have become so politically charged. A current Republican politician admits in his interview that it would be suicidal to his career to embrace climate change. There are some moments of every episode that seem heavy-handed, but then they balance it well by hearing from a tremendous variety of people and mingling their different stories and voices.

Years of Living Dangerously uses an effective mix of 'gist' and "verbatim." The series limits the scientific 'verbatim' information by acquiring much of the information from everyday people who are much more relatable. The episodes usually include a mid-range amount of 'verbatim' information, but it is well balanced by high usage of 'gist'

that is given by a variety of relatable people. The 'gist' it uses is powerful, frequently coming from war zones or environmentally stricken areas around the world. It does not hold back from presenting the facts. One scientist was asked if climate change will be as fast as apocalyptic movies suggest, and he answered "In some parts of the planet, yes." But it also does not over-dramatize. It tries to be honest but does not give you those bits of scientific truth constantly. *Years of Living Dangerously* is presented in a very carefully crafted way to appeal to popular culture, the everyday person, and conservatives and liberals alike. It seems to be trying to extend a hand in partnership, and tries to convince its viewers that climate change and environmental conservation are not or at least should not be partisan issues. In this way, the series avoids the deficit model by relating the 'gist' of the information in an effective way while being sensitive to all types of audiences. The series uses an effective balance of 'gist' with moments of "verbatim." The 'verbatim' is used occasionally to support the message and is transmitted in a way that does not turn off viewers. The series demonstrates that even when filmmakers create films with good use of 'gist' and appealing to multiple worldviews, it is still a challenge to connect environmental messages to every audience. Despite the significant attempts by the filmmakers to make *Years of Living Dangerously* relatable to a wide audience, the directors were disappointed by the ratings and viewership (Gaudiosi 2014). Xiaoquan Zhao, a climate change communications researcher from George Mason believes that television is not the ideal platform for climate change media:

> Indeed, this limitation is probably part of the reason why television viewing did not emerge as a significant predictor of global warming perceptions in this study—compared to newspapers and the Web, television is probably more often used for entertainment purposes than for information acquisition (Kaye, 1998; Papacharissi & Rubin, 2000; Vincent & Basil, 1997).

It may be the case that the average television audience is just not interested in this type of information when they are watching television for entertainment.

AN ANALYSIS OF *DEEP DISCOVERIES*

My MFA thesis film, *Deep Discoveries,* is about the discoveries the NOAA ship Okeanos Explorer made while exploring several Marine National Monuments in the Pacific Ocean from 2014 to 2016. The Okeanos Explorer is the only U.S. government-operated ship entirely dedicated to ocean exploration and discovery. Marine National Monuments are protected areas in the ocean similar to the National Park system on the mainland. Due to the great difficulty inherent in getting to and working in the bottom of the ocean, most of these monuments have had minimal to no exploration. Scientific studies about marine reserves suggest that we need to set aside about 30% of the oceans to have a sustainable future (Gaines, et al. 2010). *Deep Discoveries* intends to share with the audience these monuments while imparting to them the importance of conserving ocean habitat.

For the past seven years, I have worked onboard the NOAA Ship Okeanos Explorer as a camera operator and filmmaker. These Marine National Monuments fascinated me. I spent my early childhood in Yellowstone National Park, where my mother was a park ranger. Being able to be there to explore National Monuments under the ocean instantly captured my imagination. I felt as if I was re-living the Hayden expeditions, which were the first surveys into the Yellowstone area, and resulted in Yellowstone becoming the first National Park in the world. My great- great- grandfather was on the second Hayden expedition. I guess we've always been explorers. I drew upon these personal experiences when creating this film.

In crafting *Deep Discoveries*, I wanted my footage and music to create a mixture of two types of film forms: blue-chip, and verité. Blue-chip documentaries emphasize stunningly beautiful imagery and music. They typically utilize narration to guide the audience through the film, and to teach them about the animals, places and people featured. Blue-chip films tend to create a sense of awe and appreciation in the audience. This style is used prominently and to great effect by the BBC, in documentary series such as *Blue Planet* or *Planet Earth*. Verité documentaries, on the other hand, have a very distinct style from blue-chip films, in that they attempt to be as "truthful" as possible. Verité films try to re-create an experience as truthfully as possible, that the audience can simply observe, without impacting their experience with narration.

Kahan and Sakellari agree that there is not yet a single film or film style that is magically effective in environmental communication. Kahan and Fischhoff believe that the shortcomings of previous environmental communication have polarized the public. They both stress the need to test new styles of science communication. But they agree it is critical to only proceed by following the "roadmap" that psychologists like them have laid out for science communicators based on their empirical research. Therefore, I decided to use my thesis film, *Deep Discoveries* as a small experiment in the efficacy of mixing two specific film styles to communicate a conservation topic. My experiment in innovation is deciding to mix verité and blue-chip film styles to create a unique experience. Verité and blue-chip films are often popular with audiences, but they historically have not been known to motivate the audience to conservation action. I used the stunning footage and emotional music of a blue-chip documentary, but also used only live audio from the pilots and scientists talking on the ship instead of narration. I

assembled much of my footage echoing a verité style by showing shots in chronological order as if in a single day, as well as showing shots of the ship, the vehicles, the pilots etc. Rather than simply showing the deep ocean creatures, I showed how the ship acquires the footage of them. I made *Deep Discoveries* an experience that allowed the audience to experience the ship vicariously with very little audio aside from the live narration from the scientists and ROV pilots.

My goal with this film is to bring the audience into the dive and show them the world under the ocean. The film starts with the launch of the ROV into the ocean. The audience then meets the actual people who conduct the dive and narrate the experience in their own words. After the audience feels like they are part of the dive, I let the people on the boat explain why they do this work and the value of it. Once the audience is engaged by both the mission and the people, I bring in the importance of conservation. Then the story finishes with the ROV being brought back to the ship and the team signing off. The structure of the film follows the events of a single day on the ship.

Through my research about the most successful ways to get a relatable conservation message across, I knew I could not focus solely on discussing the conservation aspects of my message. I portrayed the conservation message using less inciting and more universal themes including technology, exploration, fascinating undersea creatures, and people with which the audience can relate. The ultimate purpose of my film is conservation-centric, but I wanted to avoid having my conservation message be too threatening or over-done as in the *Nature is Speaking* films. I wanted imagery that was just as beautiful and engaging as *Nature is Speaking* but with audio that welcomes the audience and allows them to make up their own mind without being forced

or polarized. Ultimately, I wanted my audience to experience the moment of discovery and wonder that the people on the Okeanos enjoy because the excitement of human discovery has broad appeal. In this way, I attempted to make this film appeal to the 'science-curious' (Kahan 2016).

There were many conscious choices I made in *Deep Discoveries* as a result of my research. I selected audio clips that were not preachy but rather comments by friendly and passionate people who share their joy of the ocean. I minimized politically motivated comments in accordance with Kahan's research. For example, most of my audio is live commentary about the animals, the discoveries, and the ship. Amid all the sea creatures and ship shots, I have one statement about how much of the ocean is protected and how much we need to protect. Finally, at the end of the film, I close with an audio clip that ends with a very slight conservation bent, but it is mixed in with discovery:

> It's kinda amazing ya know, when we take one of these vehicles down to the seafloor every time we do it, you see something that nobody had ever laid eyes on before…. Imagery such as this is so critical for understanding what is going on on the surface of 70% of this planet that we live on.. which is covered with water." (Patricia Fryer, quoted in Smithee, 2019)

These tools will allow the film to effectively communicate its messages to a more varied audience.

Using a blue-chip film style for *Deep Discoveries* helped me to present my message in a format with a greater proportion of 'gist' compared to "verbatim." Having the audience simply observe the experience of being along with the ship and the underwater vehicles allows them to receive mostly the same type of 'gist' they would receive from watching that experience themselves. I kept *Deep Discoveries* to a minimal

amount of identifiable conservation messages with plenty of relatable 'gist' that would not cause the audience to shut off or trigger them to feel politically motivated.

For example, while I personally enjoyed *The Age of Stupid*, it did not connect with a wide audience. It presents a future scenario of doom that borders on the preposterous. For *Deep Discoveries* I wanted people to feel positive but not optimistic enough that they assume everything will be okay if nothing is done. It should engage the audience in a way that makes them feel empowered and that the necessary conservation is realistically achievable.

Years of Living Dangerously had several moments in the series that I found very well constructed. It frequently used 'gist' in effective and creative ways. For my film, I wanted to focus on using 'gist' in a similarly effective and creative way. Rather than try to communicate 'gist' with a specific narration or message, I tried to create a film that was an experience. That is why I used multiple people to share their wonderment and interest in the ocean in the film rather than a single narrator. These different voices created more opportunities for people with different backgrounds to connect with the film. I did not want the audience to feel like they had a guide but rather that they were part of a group of friends sharing an experience. This would allow the audience to connect with the mission of the Okeanos and also have the freedom to personally consider how they feel about the ocean.

Another strategy I used from the *Years of Living Dangerously* series was to try to limit the amount of 'verbatim' information coming from scientists talking about science. Instead, I included a variety of other shots and situations such as people reacting to what they were seeing, talking about the discoveries they had made and having the viewers

come along for the exciting exploration. I included a diversity of people who work with the national monuments, expedition coordinators for the cruises, the pilots who fly the ROV, and marine scientists. There are multiple viewpoints with which the audience can relate.

When I started making my thesis film and paper, I was a documentary filmmaker who assumed the deficit model was correct. I was confused by how so many rational, intelligent people in the United States could be presented with multiple scientific findings that environmental issues like climate change were real and getting worse, and yet not believe those findings. The process of making my thesis film and writing my paper has provided insight into how 'gist', 'verbatim', worldview, and 'cultural cognition' affect the connection of scientific data with an audience. By utilizing these new ideas and concepts in environmental communication I can be more strategic and effective with my messaging.

CONCLUSION

Conservation documentary filmmakers face a difficult challenge when creating productions that attempt to connect and motivate an audience. Filmmakers should learn as much as they can about the cultural and social environment of their audience. Studying the science of science communication will allow them to make more informed decisions about the way they frame and present their films (Kahan 2014). Understanding the concepts of 'gist' and 'verbatim' will further help them develop techniques to strengthen their messages (Reyna, 2012). The three documentary productions analyzed in this paper all found some success but also encountered issues with connecting to a larger audience. Finding consensus in the conservation dialogue is difficult. Filmmakers can continue to develop their tools by learning from other productions and spending more time analyzing the success of their own work. With thoughtful and measured messaging, filmmakers can communicate pro-environmental concepts without conflicting with people's cultural identities. Filmmakers that take this into consideration in their creation process can play a role in making positive environmental impacts.

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