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## The End of the World (EOTW) Scientist and the Framing of Science in Science Fiction Films from 1950 to 2010

Jennifer Naoko Lui

University of Nevada, Las Vegas, [jennifer.n.lui@gmail.com](mailto:jennifer.n.lui@gmail.com)

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THE END OF THE WORLD (EOTW) SCIENTIST AND THE FRAMING OF  
SCIENCE IN SCIENCE FICTION FILMS FROM 1950-2010

By

Jennifer Naoko Lui

Bachelor of Arts in English  
University of Hawai'i  
2009

Bachelor of Arts in Communication  
University of Hawai'i  
2010

A thesis submitted in partial fulfillment  
of the requirements for the

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Hank Greenspun School of Journalism and Media Studies  
Greenspun College of Urban Affairs  
The Graduate College

University of Nevada, Las Vegas  
May 2015



We recommend the thesis prepared under our supervision by

**Jennifer Naoko Lui**

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Julian Kilker, Ph.D., Committee Chair

Olesya Venger, Ph.D., Committee Member

Gary Larson, Ph.D., Committee Member

David Vallett, Ph.D., Graduate College Representative

Kathryn Hausbeck Korgan, Ph.D., Interim Dean of the Graduate College

May 2015

## ABSTRACT

### **THE END OF THE WORLD (EOTW) SCIENTIST AND THE FRAMING OF SCIENCE IN SCIENCE FICTION FILMS FROM 1950-2010**

by

Jennifer Naoko Lui

Dr. Julian Kilker, Thesis Committee Chair  
Associate Professor of Journalism & Media Studies  
University of Nevada, Las Vegas

The current study looks at scientists in End of the World (EOTW) films spanning from 1950 to 2010 through stereotypes and gender roles. Eighteen films, 12 representing EOTW films and 6 that are considered “regular” science fiction films, were analyzed in terms of Goffman’s (1976) 6 aspects, first introduced in *Gender Advertisements*, as well as aspects of visual and textual frame analysis. The analysis of these films provided a way to look at the portrayal of scientists in EOTW films and add to the limited body of literature on this particular sub-genre of film.

Previous research identified that scientists were portrayed as predominantly Caucasian males, typically older, and stereotyped as Mad Scientists, Nutty Professors or Absent-Minded Scientists, or Heroic Scientists. The representation of these scientists was supported, along with additional findings that scientists in EOTW films were often not identified as main characters in the films and the female scientists that were portrayed were often characterized with predominantly masculine traits. In comparison, “regular” science fiction films represented scientists in almost identical ways. A trend in all films analyzed showed that in more recent years, female scientists have begun playing a larger role in science fiction films and although they are being portrayed as main characters, the masculine traits still remain, showing that the gender roles and stereotypes that are traditionally employed are still there, however, the greater presence of female scientists in more prominent roles could have a positive influence on females who are potentially interested in scientific careers.

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## CHAPTER ONE

### INTRODUCTION

Think about a movie that you've seen recently that's included a scientist. Was the scientist male or female? Chances are, if the movie contained both male and female scientists, you would only remember the male. Gender stereotypes are hard at work in many forms of media. Media such as film and television often reinforce these stereotypes.

A wide variety of media messages influence our values, ideologies, and beliefs, as well as affect how we interpret the world (Gamson, Croteau, Hoynes, & Sasson, 1992, p. 374). More than any other art form, film has a wide reach (Fahri, 1999, p. 157). In 2014, there were more than 142,000 cinema screens worldwide and the global box office total for all films, regardless of genre or country of origin, totaled \$36.4 billion, with \$26.0 billion in countries other than the United States and Canada (MPAA, 2014). American films could be considered one of the most common and widespread form of media. Films are accessible not only in the movie theaters, but also on television, in the form of digital media such as DVDs and online streaming providers such as Netflix, and on airplanes and other modes of transportation. This far reach means that film has the unique opportunity to influence the way people think and feel about the future of the world as we currently know and experience it, and to communicate knowledge and information about science to an audience that may have had little, if any, exposure to such topics previously. Films have the "ability to mold, shape, and direct popular beliefs and attitudes" (Hinton, 1991, p. 2) because they are so widely seen.

Films about the end of the world as we currently know and experience it, such as apocalyptic, dystopian, and disaster films, have gained popularity in recent years, many stemming from similarly-themed books (like the *Divergent* series by Veronica Roth, *The Hunger Games* series by Suzanne Collins, or *The Maze Runner* trilogy by James Dashner, along with the films that have been made from the novels), and television shows (such as *Life After People*, *The Walking Dead*, and *Doomsday Preppers*). Through these movies, filmmakers are able to create a fictional world in which to give the general public potential futures of the world in dramatic and realistic environments. End of the world (from here on abbreviated as EOTW) films allow and encourage their audiences to think about the future. Furthermore, these films also have the opportunity to convey and explain potentially complex issues of science and the environment in an easier to understand format.

This project looks at the portrayal of scientists in EOTW films from 1950 through 2010 in motion picture films. The purpose is to determine what gender stereotypes are employed in these films and interpret how these portrayals of scientists enforce those stereotypes, along with what frames can be identified and the potential impact, positive or negative, these films may have on the impression of scientists and the scientific field on the general public. For comparison purposes, “regular” science fiction films (those without End of the World elements) were also viewed.

### **The Impact of Film**

From its humble beginnings, film has had a way of engaging audiences and conveying messages. Hooks (1996) found that “most of us, no matter how sophisticated

our strategies of critique and intervention, are usually seduced, at least for a time, by the images we see on screen. They have power over us and we have no power over them” (p.3). The numbers provided on the Motion Picture Association of America (MPAA) website demonstrate just how powerful the film industry is and how its influence has a worldwide reach.

### *The Economic Impact*

Its economic outreach is vast, with the U.S./Canadian box office totals for 2014 being reported as \$10.4 billion (MPAA, 2015). This does not include the costs of production and the amount of jobs that were created for the tradespeople that were involved in making the films. The highest grossing films at the box office in 2014 were *Guardians of the Galaxy*, bringing in a total of \$332.9 million, and *The Hunger Games: Mockingjay, Part 1* with \$313.3 million (MPAA, 2015). Many states have implemented programs that would offer tax credits to production companies that come to their areas to film movies and television shows. An article on the MPAA website by Kate Bedingfield described a study conducted in March 2013 on the economic impact of the Florida Film and Entertainment Industry Financial Incentive Program. It was reported that the state and local tax revenues in Florida in the 2011 - 2012 fiscal year totaled an estimated \$547 million (Bedingfield, 2014). The study goes on to report findings that show that the incentive supported 87,870 jobs and \$2.3 billion in labor income, as well as \$7.2 billion in economic spending across the state (Bedingfield, 2014).

### *The Social Impact*

The social impact of the film industry is also quite impressive. More than two-thirds of the U.S./Canadian population, 68%, or the equivalent of 229.7 million people, headed to the movie theater at least once in 2014 (MPAA, 2015). There were more than 43,265 movie screens in the United States and Canada (MPAA, 2015). For those who would prefer to have other options of watching a movie, a variety of technologies to view films virtually anywhere exist. Audiences can view films from their homes through digital cable television signals, satellite distribution, Blu-ray, digital versatile disc (DVD) rental or purchase, as well as through streaming digital video provided through Internet connections (Stelter, 2010). Because of the reach movies have, it's not surprising that science fiction films are firmly embedded in popular culture and mythology. Unlike comedy, science fiction, fantasy, and action films are easier to sell overseas. The social impact and significance of them, go beyond their popularity and place in everyday conversation because they have the ability to "take viewers outside their world as it is to explore the world as it might be, they can provide special perspectives on ourselves and our society" (Perkowitz, 2007, pp. 13 - 14). Films help to shape our attitudes toward to world. Socially, they allow us to spend time with others, and escape the world around us just for a little while. Movies are a large part of the American culture and continue to have an impact on the country in many ways.

Films also have a way of impacting the way people act and think. Films that urge the audiences to become aware of specific aspects of society or to take action have a great impact on the way people act and think long after the film is over. Movies like *Happy Feet*, which warns of the impact of overfishing and the diminishing Ozone layer, while

also communicating the importance of conservation, and *Wall-E*, which urges the audience to be aware of overconsumption and the dependence on technology not only reach the younger generation, which many animated films are aimed towards, but also their parents, siblings, and other family members. A 2013 study by Adkins and Castle looked at the influence of motion pictures on the political attitudes of the viewers. The 1999 film *The Cider House Rules* influenced the way people thought about pro-abortion rights, while *Malcom X* (1997) brought to the forefront racial issues, such as discrimination and race relations (Adkins & Castle, 2013, p. 1232). Other films mentioned were *JFK* (1991) which affected the way Americans viewed the American political system, and *All the President's Men* (1976), which commented on the role of the press as a watchdog on the activities of the government (Adkins & Castle, 2013, p. 1232).

### *The Educational Impact*

Film does not only have a social and economic impact on the culture of the United States, but also an educational impact. Dalton (1999), Dittas (2007), and Tucciarone (2007) recognized the power of American films. They urged administrators and educational leaders to investigate the medium because it provides a rich data source for learning for not only students but also administrators and faculty.

Professional areas outside of education have taken the opportunity to look at film as a resource for data and understanding of cultural changes. Groups such as lawyers, religious leaders, and philanthropists have found that films have a way of communicating a greater understanding of how their professions are viewed by their constituent groups.

Film also has its place in the classroom, as many researchers are consistently finding. In an article in *The Guardian*, Swain (2013) wrote about a roundtable discussion that included many educators. One of the many different viewpoints of using film in education was that film puts all students on a level playing field. There are very few, if any, people that have not had any exposure to films and movies in any capacity. Other opinions were that everyone can relate to film, even students with special needs, because film can be considered a universal language which can help to open the doors to discussions on topics such as racism and homophobia (Swain, 2013). However, as Renee Hobbs mentions, film and movies in the classroom are often misused, with many educators using movies to fill time or as a crutch (Hobbs, 2012). Hobbs goes on to say that a 10-minute clip of a video would be more than adequate to launch a discussion that is meaningful amongst students (Hobbs, 2012).

The use of feature films in the classroom should be an enrichment of the classroom learning rather than a replacement of (Dubek et. al, 1988, p. x). Science fiction film can be used in classrooms to help students not only understand the basic scientific principles by having them identify these principles, or violations of, in science fiction films but to help them learn how to use what they have learned and relate them to other aspects of their lives, thus possibly making them less likely to be taken in by pseudoscience in other media (Dubek et. al, 1988, p. x). Students are encouraged to move out of what they believe science to be and to unfamiliar experiences, such as learning physics, astronomy, biology, and chemistry, things that can be learned in part through science fiction films.



Hooks believes movies provide a shared experience from which different audiences can discuss issues and that “whether we like it or not, cinema assumes a pedagogical role in the lives of many people. It may not be the intent of a filmmaker to teach audiences anything, but that does not mean that lessons are not learned” (1996, p.2).

### **Stereotypes**

Seiter (1986) believes that “assumptions about stereotyping influence the way we think about media effects, uses and gratifications, and the ideology analysis of television,” (p. 14) however, this idea can also be attributed to other forms of media, such as film. According to Seiter, “popular genres such as soap opera or science fiction are deemed full of stereotypes” (p. 21).

However, before we are able to identify and analyze which stereotypes are used to portray scientists in films, we must come to a workable definition of the term. Social psychology, mass communications, and popular culture use the term differently (Seiter, 1986, p. 14). Because of this, there are varying definitions and understands of what stereotypes are. According to Dimnik and Felton (2006), Walter Lippman first used the term “stereotype” in 1922 to describe a “cognitive process in which individuals employ simplifying generalizations as a means of organizing perception and imposing their personal values on the world” (p. 131). A stereotype is a collection of attributes believed to describe the members of a social group. Berg (1990) offered a definition of stereotype as a way in which humans make sense of the world. He elaborates that “stereotyping is a psychological mechanism having to do with the creation of categories, which allow

people to manage the swirl of data from the environment” (p. 287). From there, Berg goes on to say that “it [stereotyping] is an ethnocentric process of emphasizing the differences among groups. It is a non-flattering generalization used by one group about members of another group” (Berg, 1990, pp. 277 and 288). For the purposes of this study, the working definition that will be utilized is one that is close to the one offered by Oakes, Haslam, & Turner, which says that “they [stereotypes] are used to form and identify social groups and influence our interaction with those identified as members of those groups” (Oakes et. al, 1994, p. 1).

Stereotypes in mass media are relatively common and have been frequently analyzed. Prior research has primarily been done regarding racial stereotypes, such as studies on Asian stereotypes in mass media (Park et. al, 2006; Xie, 2007; Nailog, 2009). In fiction, as opposed to visual media such as film, a stereotype is created through the use of several immediately recognizable and defining traits that direct attention to general, recurrent features of a specific social group (Dyer, 1993). Grant (1986) states that “film is especially effective in reinforcing social stereotypes because it encourages character identification, engaging the spectator more intensely than other art forms” (p. 114). Since movies cannot communicate the detail that is woven into the written word as precisely as say a novel could, they frequently rely on stereotypes to convey information about a character (Dimnik & Felton, 2006, p. 133).

As aware of stereotypes as we are, we often overlook them or accept them as fact. They influence the way we view other groups and therefore also shape the way we communicate with them. Through film, these stereotypes are potentially enforced and encouraged, and could very well change the attitudes and beliefs of their viewers.

## Overview of Research Questions

Several research questions have been formulated to drive this project. Although they will be discussed in more detail in the Methodology chapter of this thesis, they are outlined here to give a point of reference for what will be studied and analyzed throughout the remainder of this paper.

RQ1: How are scientists depicted in End of the World movies and how has this depiction changed over the decades?

RQ2: What are the prominent gender stereotypes of scientists, if any, that are reinforced in these films?

RQ3: Is the portrayal of scientists in EOTW films favorable or unfavorable?

RQ4: How are scientists framed in EOTW films?

Scientists have been portrayed in many ways throughout the history of film. This portrayal often shapes the way viewers visualize the scientists and the scientific environment. Other questions that are asked, but not focused on in the research of this study are *Are the portrayals of scientists in film realistic? Do the portrayals of scientists lend to public understanding of what scientists do? Is there a difference in the way scientists are portrayed in EOTW films in comparison to “regular” science fiction films?*

## Purpose of the Study

The purpose of the study is to determine how scientists are portrayed in films about the end of the world and to identify the gender stereotypes that help to form these

portrayals. More than \$16.7 billion in public revenue were brought in between television and film and together the two media generated \$14.3 billion in exports worldwide (MPAA, 2014). The typical moviegoer bought 3.7 movie tickets over the course of the year (MPAA, 2015). We are constantly being bombarded with media that reflect the end of the world, with production companies constantly releasing new movies (in 2014 alone, there have been more than 22 films released (movieinsider.com, 2014) in the science fiction genre.)

Scientists often play a large part in television shows and movies, not only about the end of the world, but in general (most notably, *Avatar*'s Dr. Grace Augustine, Adrian Helmsley in *2012*, and Dr. Emmett Brown from *Back to the Future*). However, the stereotypes associated with the scientists often make viewers compartmentalize them before watching the film or the show. Often times, these stereotypes are gender-based, drawing from what we learn as children on television and in movies. Through the use of Goffman's six gender aspects, as well as a visual analysis of the complete films individually, I hope to be able to gain a greater understanding of the role that these scientists play in the films.

Instead of documentary, fantasy, historical drama or other genres of film, I focus on movies about the end of the world because of the recent resurgence in interest about the topic. Interest about the end of the world has been around for many years, tracing its roots back to a psychological phenomenon known as "Millennial Fever," documented since its occurrence in the late 10th century. It is loosely defined as the "phenomenon of mass, public hysteria just before the turn of the millennium" and can be traced back to The Great Disappointment of 1844, when William Miller's prediction of the end of the

time, or when the return of Christ would occur with cataclysmic results and precede a thousand-year reign of peace (McArthur, 1996, p. 369-370) did not arrive. This current resurgence in the end of the world has occurred because of various reasons, including the end of the Mayan calendar in 2012, real life threats (such as climate change, the possibility of nuclear war, threats of worldwide pandemics and zombie apocalypse,) and wanting to rebuild society and have a simpler life (Perrottet, 2014). Aspects of the end of the world, the apocalypse, and the threat of disaster have roots in science and therefore can be conveyed through the role of the scientist.

Historically, film follows the trends of what is happening in the world at the time. These time periods can be divided up in 20-year segments from 1950 until present day, each period with major events or events with cultural significance. According to Thompson (2007), the 1950s and 60s brought a fear of the Cold War and communism, which led to stories of public invasion and private contamination in such films as *The Day the Earth Stood Still* in 1951 and *I Married a Communist* in 1950 (p. 11). Also in the same era came the apocalyptic fear of nuclear annihilation with movies like *On the Beach* (1959) and *Dr. Strangelove or: How I Learned to Stop Worrying and Love the Bomb* (1964). The 1970s and 80s brought with it the idea of extraterrestrial or supernatural invasion as well as merging public policy with science fiction. Films like *The Terminator* (1984) and *E.T. the Extra-Terrestrial* (1982) supported these ideas. Around the time of the 90s, there was an explosion of apocalyptic films as Hollywood fed upon the fears about technology and the year 2000. *The Matrix* (1999) and *12 Monkeys* (1995) is representative of this. The early 2000s began taking contemporary anxieties about global warming and climate change and turning them into somewhat plausible doomsday plots

such as *The Day After Tomorrow* (2004) and *The Core* (2003) (Thompson, 2007, p. 12). Most recently, ongoing fears of climate change and zombie apocalypse, as well as resurgence in fears of chemical warfare and extraterrestrial invasion have influenced films such as *The Book of Eli* (2010), *World War Z* (2013), and *Pacific Rim* (2013). The reoccurrence of similar fears and the continuing appearance of many specific themes in end of the world films reinforce the idea that these issues are circular and either never fully go away or are often, for all intents and purposes, recycled. It can be interpreted that this means that films about the end of the world will always be current and relevant to their audiences.

### **Significance of Study**

This study attempts to add to a limited body of research regarding scientists and how they are portrayed in film. Few studies and books have been done to look at portrayals of scientists in films (Evans, 2010; Weingart, Muhl, & Pansegrau, 2003) or gender representations of scientists in movies (Noonan, 2005; Jones, 2005; Flicker, 2003). However, studies on the portrayal of scientists in films specifically about the end of the world were not identified through a review of previous literature.

The resurgence of films about the end of the world have made a huge impact not only on the film industry and Hollywood, but also on the way general audiences view the end. Graphs on Google Trends show that 2009 was a turning point when searches for “apocalypse” on the Internet gradually began to rise (Saidi, 2012). Some people are just drawn to idea of the world as we know it ending, while others fear it. Harris (2009) gives the simplest of reasons for the interest in post-apocalyptic films: “there is a long (and

lucrative) tradition in US popular culture, especially in Hollywood: a simple job in watching things blow up.” *The Business Insider* reported that on the annual Zeitgeist list of most-searched for films of 2013, *World War Z* was the third highest on that list (Acuna, 2013). Scientists in these films often play a critical role in helping to provide some sort of scientific background to the action that is surrounding the rest of the film. This role can be filled either as a main character or as a secondary character, depending on the film and the storyline surrounding the end of the world.

Although television has an equal or larger impact on society as film, I focus specifically on movies because of their immediate impact. While television series often last for years, and viewers are unable to determine what ultimately happens at the end until the series is over, films cover a relatively short amount of time. The average movie is approximately two and a half hours, in which time they cover a significant amount of information. However, it is important to note that due to the short amount of time that a movie has to complete an entire storyline, including character development and coming to a resolution at the end, it’s almost expected that there may be the use of stereotypes for characters at some degree. While television often has the opportunity to be able to take its time and develop characters fully within the life of the show, allowing writers the option of avoiding preconceived stereotypes, movies do not have that luxury. There are some similarities in the way stereotypes are used in films and television shows, however, mainly in the way that they give the audience something they recognize. According to Covert in a 2008 article from the *Union Tribune* in San Francisco about stereotypes in movies, “nearly all comedies traffic in stereotypes – it’s a quick-and-dirty way of connecting with audiences.” This echoed a thought included in a lesson plan about TV

stereotypes found on mediasmarts.ca from 1995 which said “stereotypes are used because they enable a viewer to easily understand a character's role quickly and easily.” Still, movies tend to have a different reach than many television shows, due to the fact that TV shows are often shown on various channels, networks, and days of the week. It may not be feasible or convenient for people to be able to access all channels to view all shows. However, with film, all a person has to do is find a nearby theater, online streaming website, or movie rental location with the film they want to watch. For many, it is much more convenient and a more enjoyable form of entertainment.

From an academic standpoint, stereotypes are an aspect of human nature that we, as people, encounter on a daily basis. Through an analysis of these films, it is hoped to be able to add to the knowledge that mass media, specifically motion pictures, accentuate these stereotypes and influence the way that we view scientists. By being aware of this, we can then draw our own conclusions on whether or not the portrayals are accurate and if the science can be considered as valid.

### **Theoretical Framework**

The theoretical framework for this project is based on Goffman's *Gender Advertisements* (1976), which focused on how men and women are portrayed differently in print advertisements, as well as framing theory through the perspective of gender as a social construct. Both are employed in the theoretical framework as well as the methodology.

The argument that gender is a social construct urges us to examine our assumptions about gender and what society has deemed that men and women, boys and



girls, can or should be or what they can or cannot do. The gender inequalities in the organization of social life can be challenged as illegitimate when gender is recognized as a social construct (West & Zimmerman, 1987, p. 146). According to West and Zimmerman, “doing gender means creating differences between girls and boys and women and men, differences that are not natural, essential, or biological” (West & Zimmerman, 1987, p. 137). They pose the idea that people learn and have learned to “do gender,” encouraging gender differences and that doing so is necessary in order for men and women to function in society (West & Zimmerman, 1987, p. 126). Gender is defined by Butler (2004) as “the apparatus by which the production and normalization of masculine and feminine tasks take place along with the interstitial forms of hormonal, chromosomal, psychic, and performative that gender assume” (p. 42). It’s implied that although gender is complex, the tendency is often to over simplify it and conflate gender with ideas of masculinity and femininity. By restricting the view of gender, we are limiting individuals and not allowing for the idea that a person’s gender identity may not match their outside appearance, placing people into boxes based on how they were born. Risman (2004) believes that gender is social structure, meaning that is it “embedded at the individual, interactional, and institutional dimensions of our society” (p. 446). Individuals are shaped by social structure and accordingly, social structure is shaped by individuals (Risman, 2004, p. 432). Through this, we are able to understand that through social interactions, we are taught the boundaries of what are considered acceptable actions for our gender and that any deviation from that would be considered to be strange or wrong. However, because specific gender “norms” are enforced and impressed on us from the time we are young, that when we encounter a situation where we would be

considered to be out of place, such as a woman in a career field that is traditionally believed to be a man's field, the individual would begin to take on the characteristics and traits familiar with that gender role.

According to Goffman, men and women are shown in different gender roles, suggesting that they are taught to act differently, resulting in their specific gender performances. Goffman believes that perceptions of pictures in relation to reality is a learned activity and that "this learning draws deeply and fallibly on past experience" (1976, p. 12). By drawing on these past experiences, advertisers can speak to us without ambiguity, as "we learn to decode small, flat tracings [photographs or advertisements] for large, three dimensional scenes in a manner somewhat corresponding to the way we have learned to interpret our visual images of real objects" (Goffman, 1976, p. 12).

Part of Goffman's theory is the idea of "hyper-ritualization," or the point at which a ritual becomes ritualized itself. A ritual, as defined by Goffman, is "a perfunctory, conventionalized act through which one individual portrays his regard for another to that other" (1976, p. 1). The importance of this transformation is that "how a relationship is portrayed through ritual can provide an imbalanced, even distorted, view of the relationship itself" (Goffman, 1976, p. 3). Advertisements often take images that exist in the world and distort them, changing them, affecting the relationships that we had previously defined. Through this hyper-ritualization, advertising images emphasize some aspects while de-emphasizing others, thus continuously altering and distorting the images until they are no longer recognizable from their original state. These images could include gender relationships as well as physical imagery.

Goffman believes that advertisers “do not create the ritualized expressions they employ” (1976, p. 84) instead they draw from the same rituals that we all use when participating in social situations (1976, p. 84). Gornick, in the introduction to Goffman’s *Gender Advertisements*, writes that advertisements “depict for us not necessarily how we actually behave as men and women but how we *think* men and women behave” (1976, p. vii). Through this viewpoint, advertisements essentially depict the ideal, socially acceptable portrayals of masculinity and femininity in modern society. Advertisements were used by Goffman to “jog one’s consideration of three matters: the gender behavioral styles found in actual life, the ways in which advertisements may present a slanted view thereof, and the scene-production rules specific to the photographic frame” (1979, p. 25).

Based on Goffman’s theoretical framework, use framing as a method to view and understand EOTW films and how gender and gender stereotypes factor into them. In his study, Goffman was able to identify six common categories in advertising:

- (1) Relative size – such as the differences in height of the figures in the ad.
- (2) Feminine touch – women are frequently depicted touching persons or objects.
- (3) Function ranking – the male is more likely to be shown as a superior to the female.
- (4) The family – when families are depicted, parents are shown to be closer to children of the same gender and at times men are shown separate from the family.
- (5) Ritualization of subordination – differences in height infer subordination, such as a woman lying on a couch while the man stand.

(6) Licensed withdrawal – women in advertisements are often depicted as removed from the scene around them, either physically or emotionally. (Goffman, 1976)

These common categories help to frame the advertisement and therefore also influence our viewpoint of gender in the ads.

By using Goffman's framework, along with framing as a method, these gender stereotypes within EOTW films would become more apparent, which in turn will allow me to be able to gain a greater understanding of how scientists are portrayed in these films and how movie production companies are using what we know and believe about gender to influence how we view scientists in EOTW films. The inter-disciplinary use of this theoretical framework make it appropriate for interpreting gender in both print and video advertising and within a media studies context. Even though Goffman was a social scientist, his work has influenced researchers in psychology (Jones, 1991), sociology (Smith, 1996), tourism (Sirakaya & Sonmez, 2000), clothing and textiles (Thompson, 2000), and many other areas. As advertising is universal, Goffman's approach to viewing gender in ads can be used to analyze them in many forms of media as well as in many contexts.

Framing is defined by Entman (1993) in three different ways. The broad definition of the concept is defined as a way to “describe the power of a communicating text” (Entman, 1993, p. 51). Narrowing it down, he goes on to describe framing as a selection of certain aspects of an issue and highlighting those aspects in such a way that will result in a particular reaction from those who are exposed to them. The final way he describes framing is by identifying four locations where frames can be found in

communication: “the communicator, the text, the receiver, and the culture” (Entman, 1993, p. 52). The communicator makes the decisions about how the messages are framed, the text is the context where the frame exists, the receiver decides if they want to view the frame the way it was intended, and the culture is the commonly used frames found in particular issues. His view of framing is summed up as “to select some aspects of a perceived reality and make them more salient in a communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation” (p. 52).

According to Weaver (2007), a frame can be “applied to many different aspects of message and to many different types of systems” (p. 144). Frames can be studied in various ways, including systematic content analysis or textual analysis. Although it is often thought of as “second-level agenda setting” (Weaver, 2007, p. 146), it differs in that framing includes a broader range of cognitive processes, such as moral evaluations, causal reasoning, and appeals to principle, than second-level agenda setting, which looks more at the salience of attributes of an object (Weaver, 2007, p. 146). Scheufele (2000) argues that, unlike agenda setting and priming, framing does not rely primarily on accessibility, making it inappropriate to combine framing with agenda setting and priming for the sake of parsimony (p. 298).

This study will use elements of Entman’s definition of framing, that frames highlight specific aspects while downplaying others to focus the viewer’s attention in a certain way, to identify the way scientists are framed.

## **Summary**

Few studies have looked at scientists in mass media, and even fewer have focused on scientists in End of the World films. Through this study, I hope to look at these films, in comparison to other science fiction films, to see if there is any variation in the way scientists are portrayed.

The next chapter reviews the research about science fiction, science in film, portrayals of scientists, and gender in mass media, I conducted my own study, the details of which are outlined in detail in Chapter Three, followed by the results and discussion in subsequent chapters.

## CHAPTER TWO

### LITERATURE REVIEW

The previous literature on the topic of science fiction in film is varied and often contradicting. By understanding what science fiction is, however, the audience is then able to better understand End of the World fiction. This section puts together the main areas of literature that were identified. Although there is much more still to be looked at, there are already significant themes that are emerging from the previous literature.

The following literature review will look at the defining the science fiction genre, end of the world fiction as a sub-genre, and then discussing science in film as well as the predominant stereotypes of scientists in mass media and the representations of gender in film.

#### **Defining Science Fiction**

Frederik Pohl and Frederik Pohl IV said it best when they wrote “science fiction is difficult to define, but usually possible to diagnose” (Pohl & Pohl, 1981, p. 8). There are varying definitions of science fiction as well as elements that could be considered to be included. Science fiction is thought to be one of the most flexible popular genres, and therefore one of the most culturally useful when it comes to looking at society and the future (Telotte, 2001, p. 10). Science fiction has “developed into a genre that encompasses written works (novels, magazines, and comic books) and shows and aural media (movies, TV serials, radio shows, computer games and graphic art)” (Bowater, et al., 2012, p. 4), while Kitzinger elaborates more on the definition, saying that science fiction is “a specific genre...embracing a range of fictional representations of science”

(Kitzinger, 2010, p. 74), that it often “highlights the negative impact that it (science) has on public acceptance of innovation and exploration”. Author Isaac Asimov defines science fiction as “the branch of literature that deals with the responses of human beings to change in science and technology” (Cornea, 2007, p. 2). Noonan quotes Robert Heinlein as defining “almost all” science fiction as “realistic speculation about possible future events, based solidly on adequate knowledge of the real world, past and present, and on a thorough understanding of the nature and significance of the scientific method” (Noonan, 2005, p. 11). Science fiction offers creative solutions at a time where news about the environment and the world around us is rather depressing and discouraging. Science fiction often shares characteristics with other popular genres such as westerns, war films, and Japanese samurai epics (Telotte, 2001, p. 6).

It’s due to this vast array of definitions and opinions of what science fiction is that pinpointing the exact genre is difficult. Many feel as if they know what science fiction is, but few, if any, can say that their definition is the predominant one. However, when encountering science fiction, it’s something that can easily be identified. To Pohl and Pohl, science fiction is “that thing that people who understand science fiction point to, when they point to something and say, “That’s science fiction!”” (Pohl & Pohl, 1981, p. 10).

### *Science Fiction Film vs. Science Fiction Literature*

Science fiction film is often compared to science fiction literature, but slightly varies from it. Landon is mentioned by Cornea (2007) as having said that “the two media [meaning literature and film] are frequently, if not always, driven by very different



concepts in pursuit of very different goals” (p. 4). He admits to believing that while science fiction film has had an influence on the science fiction novel, he does not believe that it goes the other way (Cornea, 2007, p. 5). While literature is more of an idea, film brings it to life to become an image, allowing for different interpretations and meanings (Cornea, 2007, p. 5). Sobchak (1987) believes that “since the written literature was there first and is more plentiful than film, the common tendency is to remember all the good SF [science fiction] literature and compare it to the worst SF films” (p. 20). The observer of a film is free to participate in the experience much more actively than with literature, with the viewer constructing the meaning from what he is being shown (Noonan, 2011, p. 13).

Other writers believe that science fiction literature and science fiction film have little, if any, common ground. Baxter is quoted in Sobchak as saying “science fiction [literature] supports logic and order; science fiction film illogic and chaos” (Sobchak, 1987, p. 20). He also believes that the basis of science fiction film is superstition, horror, and a fear of science, where literature is optimistic and positive (Sobchak, 1987, p. 20). However, as Sobchak points out, Baxter’s definition of science fiction makes too many general assumptions between science fiction literature and film (Sobchak, 1987, pp. 20 - 21). She goes on to state that Baxter’s belief that film and literature are at odds with one another “does not take into account the constantly changing attitudes and themes in both media. Not all SF [science fiction] literature is proscience and not all SF film is antiscience” (Sobchak, 1987, p. 21).

Sontag (2004), in her article “The Imagination of Disaster,” wrote that although science fiction novels and films “may share the same plot, the fundamental difference between the resources of the novel and the film make them quite dissimilar” (p. 41). She

goes on to say that films have unique strengths, including the ability to show an immediate representation of the extraordinary, however many of them are weak on science while some science fiction novels are significantly strong (Sontag, 2004, p. 41). Sontag believes that science fiction films are not about the science so much as they are about the disaster and the aesthetics of the destruction.

### **End of the World Science Fiction**

Stories of natural or supernatural challenges and their aftermath are a common monomyth. Also known as the hero's journey, the monomyth, as summarized by Campbell (2004), is a story where “a hero ventures forth from the world of common day into a region of supernatural wonder: fabulous forces are there encountered and a decisive victory is when the hero comes back from this mysterious adventure with the power to bestow boons on his fellow man” (p. 23). Campbell conceptualized 17 stages that could be divided into three separate sections: departure (also known as separation), describing the time leading up to the journey, initiation, the journey itself, and the return, the hero returning to the beginning. Other authors have modified and expanded on Campbell's structure, including Cousineau (1990) and Leeming (1981). The hero's journey has been integrated into many science fiction films from the second half of the twentieth century, including *The Time Machine*, *2001: A Space Odyssey*, *Dune*, *Back to the Future*, *The Last Starfighter*, *Logan's Run*, *Tron*, *The Matrix*, *The Terminator*, *Escape from New York*, and all of the *Star Trek* films (Palumbo, 2008, p. 413).

The journey of the protagonist in EOTW films is similar to that of the hero in monomyth. In many EOTW films, the main character leaves home or the place with

which he or she is familiar to reach an ultimate goal, possibly to save the world or create a new one.

The end of the world, while not a new popular culture phenomenon, had made its way into mass media through film, television, and books. Dixon (2003) believes that there are signs that currently exist that the end of the world is closer than we believe it to be, and those signs are waiting to be deciphered. He mentions “the worldwide proliferation of nuclear arms” which will eventually be used by humans to destroy other humans, “natural resources being depleted, the polar ice caps melting, ‘rogue states’ popping up with increasing frequency, and international politics being fraught with tension and deception” (Dixon, 2003, p. 3).

Several sub-genres can be identified within the overarching theme of End of the World fiction. These include apocalyptic and post-apocalyptic fiction, dystopian fiction, and disaster fiction.

#### *Apocalyptic and Post-Apocalyptic Fiction*

Mary Shelley’s *The Last Man*, published in 1826, is considered the first post-apocalyptic science fiction tale and although other stories of the apocalypse and the post-apocalyptic world appeared over the next 120 years, it wasn’t until after the atomic bombing of Hiroshima and Nagasaki in 1945 followed by the Cold War, that post-apocalyptic stories became significantly more popular (Booker and Thomas, 2009, p. 53) These tales followed the fears and worries of the public throughout the years: nuclear holocaust in the 1950s, pollution and overpopulation in the 1960s, all the way through the

environmental catastrophe and degradation that plague the minds of people today (Booker & Thomas, 2009, p. 60).

Interest in the potential last days of life as we know it increased dramatically throughout the second half of the twentieth century and the end of the millennium (Mitchell, 2001, p. ix). The apocalyptic sub-genre, and consequently, the post-apocalyptic sub-genre, can be broadly defined. Seed (2000) quotes David Ketterer as saying that “apocalyptic literature is concerned with the creation of other worlds which exist, on the literal level, in a credible relationship with the “real” world, thereby causing a metaphorical destruction of that “real” world in the reader’s head” (Seed, 2000, p. 4). Apocalyptic cinema can be defined as a “motion picture that depicts a credible threat to the continuing existence of humankind as a species or the existence of Earth as a planet capable of supporting human life” (Mitchell, 2001, p. xi). The general consensus is that apocalyptic literature or cinema takes place before the catastrophe happens while post-apocalyptic stories focus on the aftermath. The lines between both can be blurred with a number of stories and films being legitimately labeled as both (Mitchell, 2001, p. xi). According to Moore (2014), a defined apocalyptic film features “events in the story that detail total devastation from which there is no repair or return. The world, or greater portions of it, should look utterly destroyed and people should have little hope of survival” (p. 4). It was stated by Wintle (2013) that Mick Broderick believes that apocalyptic science fiction films have shifted their focus from the disaster itself and the thought of the disaster to narratives depicting survival after the catastrophe (p. 679). Visions of the apocalypse can have the power to shock people out of their comfort zones and command attention, bringing to the surface their deepest fears. Hughes and Wheeler

(2013) state that apocalyptic visions in film have the “power to transfix their audience with horror, to command attention and shock people out of a position of comfortable apathy, in a way that strict adherence to the data cannot” (p. 2). Although hard data might have some impact on viewers, the visualization of the data in a film may have a greater impact. They go on to say that science fiction, both writing and film, have embraced the possibilities of foretelling an apocalyptic future as they are not expected to strictly follow scientific fact, yet are still tethered to it (Hughes and Wheeler, 2013, p. 2).

According to Zepke (2012), another draw to post-apocalyptic fiction is the idea that we are able to start again. He states however, that in these films, “where a global catastrophe of Biblical proportions wipes the slate clean” it also produces a reset, which in many ways a repeat (Zepke, 2012, p. 95). The repeat that the world goes through is determined by “certain supposedly unchangeable ‘truths’ - most obviously, humankind’s inevitable drive to dominate others through violence” counterbalanced with their desire for personal freedom (Zepke, 2012, p. 95). Dixon cautions, however, that much of what we think would happen in the event of an apocalypse may not happen because “each film depiction of the apocalypse inherently projects the existence of surviving witnesses” and an apocalypse would wipe out all life forms on the planet (Dixon, 2003, p. 3). To sum up post-apocalyptic film, it could be said that these films have a mantra - that the world is a mess and mankind needs saving. By having little to work with after the devastation, humanity is allowed to begin anew (Moore, 2014, p. 4).

## *Dystopian Fiction*

Some believe that dystopian and post-apocalyptic sub-genres are interchangeable and the same. A general definition of the dystopian sub-genre is given by Chameides, who in an article for *Conservation Magazine* says that the basic plot of a dystopian novel is: “some kind of really bad or apocalyptic event or events happen that profoundly undermine the social order and humanity is left to cope in this new world” (Chameides, 2013). Booker and Thomas (2009) describe dystopia as “an imagined world in which the dream has become a nightmare...(and) are often designed to critique the potential negative implications of certain forms of utopian thought” (Booker & Thomas, 2009, p. 65). Author Rachel Tsoumbakos, however, writes on her blog that dystopian novels take place in a world “that appears perfect on the surface but is bad underneath” (Tsoumbakos, 2012). She uses *The Hunger Games* by Suzanne Collins as an example of this. Tsoumbakos goes on to define apocalyptic novels as taking place in “a world that is in the midst of crumbling” (Tsoumbakos, 2012). Famine, disease, aliens, and natural disasters are just some of the reasons that made her list. It could be argued that these events could just as easily help a world slide into the dystopian category.

Zepke uses the idea of a “novum” or a “totalizing phenomenon or relationship deviating from the author’s and addressee’s norm of reality” to describe events in a dystopian tale (2012, p. 92). He notes that in dystopian films, the novum is typically a brutal form of “socio-political domination and/or exploitation that the protagonist attempts to escape or defeat” and goes on to say that it is “consistent with current scientific knowledge, making its appearance not only conceivable in, but also critical of, the present” (Zepke, 2012, p. 92). According to Zepke, dystopias project anxieties about

increasing social control into a dystopian future, however they give explanations as to how these anxieties arose and explore strategies for overcoming them (Zepke, 2012, p. 95). From there, it falls upon the hero to either organize the resistance to that social control or escape, and in doing so, directing our judgement against the repressive elements in our own society (Zepke, 2012, p. 56).

### *Disaster Fiction*

Although disaster fiction is not primarily considered to be under the science fiction genre, and in some cases is actually considered to be its own genre, the inclusion of disaster fiction in this study is due to the overlapping themes and similarities that they have with apocalyptic, post-apocalyptic, and dystopian fiction. Many films are often labeled as a combination of any of those sub-genres and I felt that they needed to all be recognized and addressed since the lines defining each, as we have seen, can be blurred.

In many ways, post-apocalyptic films could also be categorized as disaster films. The two share many similar qualities and characteristics. Post-apocalyptic films and disaster films often subsume both the horror and science fiction genres (Telotte, 2001, p. 6). Both post-apocalyptic and disaster films are categorized by [filmsite.org](http://filmsite.org), a motion picture website owned by AMC (American Movie Classics) Networks, Inc., as sub-genres for science fiction film. Tim Dirks (2014), writer and editor for [filmsite.org](http://filmsite.org), describes disaster films as films portraying a disaster, such as accidents, natural or environmental disasters or destruction, planetary-related disasters, or technology-gone-awry, and concentrating on the events surrounding the disaster, including efforts for survival and the effects the disaster has had upon individuals and families (Dirks, 2014).

These films try to find a balance between “the desire for realism and cultural relevance and the desire for fantasy and spectacle” (Kakoudaki, 2011, p. 349). Post-apocalyptic films, however, are described as films concerning the theme of humanity’s possible demise, the end of human civilization, due to a catastrophe such as nuclear warfare, ecological collapse, climate change, or extraterrestrial attack. Although in early apocalyptic and post-apocalyptic film, it was a given that although major destruction would occur, humanity would, for the most part, be saved, this can no longer be assumed in more current films (Aston & Walliss, 2013). It needs to be noted that while disaster films can take place in the past, present, or future, post-apocalyptic films are generally set in the future or near-future. Disaster films also take the viewer through the stages of the disaster from the time leading up to it, through the disaster itself, and then to the aftermath. Post-apocalyptic films, by nature, take place after the apocalypse has already occurred, portraying the world in the time afterwards, and the efforts of the survivors to create a new world out of the chaos that is left behind.

### **Science in Film**

The use of science in film has caused debate amongst audiences and those in the film industry. There is a fine line between what’s thought of as real science and movie science. Motion pictures impact scientific culture as much as science affects motion pictures. Movies help to stir up public controversies, reveal funding opportunities, promote research agendas, and encourage the public to take political action (Kirby, 2011, p. 15). They have also been found to be an effective way to convince the public that a specific research field or scientific subject needs to have more political, financial, and



scientific attention, but this can often only be done if the science is realistic (Kirby, 2011, p. 15). The relationship between science fiction and actual science is constantly being examined. Stone (2014) believes that, “science fiction has become the *primary lens* through which a large fraction of the public learns who scientists are, what they do, and how science can shape society.” She goes on to say that “it forces us to question society’s norms and imagine how our world could be different” (Stone, 2014). In a 2012 article, Delgado, Rommetveit, Barcelo, and Lemkow, discussing how science fiction can contain information and ideas that are shared by many people, state that it “can potentially be used to enhance communication between experts and nonexperts and to allow more inclusive ethical debates” (Delgado et. al, 2012, p. 203). Science fiction “examin[es] the relationship between science, technology and society...and as a way of popularizing and disseminating scientific ideas” (Brake & Thornton, 2003, p. 32). Brake and Thornton also say that science fiction can be used “to help demystify science, highlight its social and cultural context, and act as a bridge to public consciousness” (Brake & Thornton, 2003, p. 34). It provides value to both scientists and science as a whole because they engage with the public, who otherwise might not think seriously about scientific topics (Bowater et. al, 2012, p. 8).

### *Real Science vs. Movie Science*

Perkowitz claims that the science in films “they mirror real science and its effects on society “ (Perkowitz, 2007, p. 15). He goes on to say that “films begin with basic scientific facts, and some reflect the science pretty well throughout the story” (Perkowitz, 2007, p. 83). Each film in the genre has a scientific seed, the very basics of science in the

film, and each film lets the seed develop in different ways. Some stay within the confines of science or only extend from it slightly, not moving too far away from what some would consider “real” science. Others distort the science only slightly, to create drama or excitement that may otherwise not be included. There are films that only take the most improbable parts of science and leave the rest behind, not distorting science, but not keeping it as realistic as other films. Finally, there are films that leave the science behind and create their own science as they go along. (Perkowitz, 2007, p. 89).

### *Science Consultants*

Science consultants have become commonplace during the production of science fiction films. According to Kirby (2003), the science expert is used quite often to legitimize the filmmaker’s visions of science (p. 264). By using the scientists as consultants, the filmmakers are able to create some idea of accuracy and legitimacy to the science they are using. There is a belief within the entertainment industry that scientific credibility equates to larger box office returns and that ties in to the reliance on science consultants to be a part of everything from examining scripts to serving as on-set advisors (Kirby, 2011, p. xii). They are brought in to comment on any scientific aspect of the film, including, but not limited to, the script, the actors, the sets, and the props (Kirby, 2011, p. xiii). Scientists also are included in the press and marketing of the film with studios encouraging them to participate in the press conferences and speak with the media about their work on the films (Kirby, 2003, p. 264). With scientists and science consultants working on films, there is an increased chance that the film will contain a higher percentage of accurate science, however, there often is an understanding between the

consultant and the director that there needs to be a balance between what is scientifically accurate and what is aesthetically pleasing (Kirby, 2011, p. 7 - 8). The demand for scientists and science consultants to be involved in the filmmaking process have led to several scientists, such as Donna Cline and Steven Kutcher, to take on consulting on a full-time basis, and several companies like Takeoff Technologies in Pasadena, California, and The Dox in Munich, Germany, to be created, dedicating their business to connecting scientists with filmmakers and television producers (Kirby, 2003, p. 264).

There are benefits for the scientists and science consultants as well, with science advocacy being one of the reasons that many of them choose to consult (Kirby, 2003, p. 264). They believe that consulting gives them the opportunity to counteract the overall negative light that science is often seen in, especially when it comes to film.

### *Bad Science*

Science fiction is often blamed for distorting science and limiting the acceptance of emerging technologies and scientific advances by the general public because it blurs the boundaries between reality and fiction (Bowater et. al, 2012, p. 4). “Bad science” refers to science in entertainment texts, such as movies and television, that is inaccurate (Kirby, 2011, p. 10). Susan Sontag believes that science fiction films “are not about science. They are about disaster” (Sontag, 2004, p. 41). They are not about keeping the science within them true and accurate, they are more about the aesthetics of the film and creating the largest visual impact. Weingart, Muhl, and Pansegrau (2003) argue that although films and television are powerful media, there is no clear explanation that they have influence on their audiences’ views about science or what kind of influence they

have (p. 280). Many movies reinforce the images, clichés, and metaphors that reflect the popular images of science through the filmmakers and scriptwriters, further supporting the misconceptions that the public may have about science (Weingart et. al, 2003, p. 281). Some scientists themselves feel that science in fictional films and television negatively affect public attitudes toward science, believing that “more often than not, the science in these texts [visually based fictional media texts, such as television and movies,] is factually wrong, that scientists are portrayed as evil or socially apathetic, and that scientific knowledge is inherently dangerous” (Kirby, 2003, p. 262).

Due to the concerns that the science community has in regards to the depiction of science and scientists in fictional media, several science advocacy organizations have developed programs to help facilitate more scientific involvement in the production of these media. The National Academy of Sciences’ Science and Entertainment Exchange, The National Science Foundation’s Creative Science Studio collaboration with the University of Southern California’s School of Cinematic Arts, and the Sloan Foundation’s Film Development Granting Program are just a few of these programs (Kirby, 2011, p. 23).

### **The Scientist**

Scientists have been looked at for many years to determine how the public view them. One of earliest studies on the perceived image of scientists was conducted by Mead and Metraux (1957) in which they originated the “Draw-A-Scientist Test.” The test asked students to draw what they believed a scientist looked like. This original study found that the typical high school student’s image of a scientist was interpreted as “an elderly or

middle-aged man who wears a white coat and glasses, and works in a laboratory, performing dangerous experiments” (Mead & Metraux, 1957, pp. 386-387). Since then, others (Sumrall, 1995; Losh, 2010) have also researched the image of scientists of both children and adults. The study conducted by Losh found that there was generally a positive image of scientists amongst adults interviewed between 1983 and 2001. Although in 1983, both men and women endorsed science careers for their children, regardless of gender, many more did so in 2001, along with considering their own possible careers in the field (Losh, 2010, p. 379). It was also found that women tended to have a more favorable image of scientists in 2001 than men (Losh, 2010, p. 379). Sumrall looked at the perceived images of scientists of students in grades 1 - 7. This was conducted by administering the DAST (Draw-A-Scientist Test) and conducting an interview with the participants. It was found that race had an effect on the way scientists were drawn, such as Euro-American boys and girls primarily drew Euro-American male scientists (81% and 53%, respectively) (Sumrall, 1995, p. 88).

Viewers of media, over time, assimilate the images they observe. When the portrayals of characters are the same in one film after another, those viewers come to unconsciously accept stereotypes (Swan, Meskill, & DeMaio, 1998). Scientists have often been looked at for the way they are portrayed in the media.

### *Portrayal of Scientists in Media*

The most common portrayal of scientists in feature films is that of a middle aged, Caucasian male. Weingart, Muhl, and Pansegrau (2003) looked at 222 films in an attempt to identify recurring patterns in the portrayal of science and scientists (p. 282). This study

found that in Hollywood films, 96% of the scientists portrayed were white/Caucasian, 82% male, and 40% estimated between 35 and 49 years of age (Weingart et. al, 2003, p. 282). In a 2010 study by Long, Steinke, Applegate, Lapinski, Johnson, and Ghosh, out of the 196 scientists identified in the television programs analyzed, 113 (58%) were male (p. 368). The study also found that 72% were white/Caucasian, and the majority (56%) were adults (Long et. al, 2010, p. 368). Despite the difference in medium, both studies showed that there are similarities in the way that scientists are portrayed.

While male scientists are often analyzed in terms of demographics, female scientists are looked at to determine which traditionally feminine attributes (such as appearance and romantic relationships) are employed in their depiction. A 2005 study conducted by Steinke looked at the depiction of female scientists in popular films. The study concluded that of the 23 films analyzed, 18 of the female scientists portrayed were depicted as attractive, while an additional 3 were initially unattractive but transformed into attractive women throughout the story (Steinke, 2005, p. 39). It was also found that twenty out of the twenty-three films showed the female scientists involved in romantic relationships or had families, a trait that was not acknowledged in any previous studies on male scientists (Steinke, 2005, p. 49). Elena (1997) concluded that standard characterization of female scientists included “a research assistant who is permanently subordinate to a male scientist” (p. 276). Weingart, et. al. study also reported that 18% of the scientists portrayed in the films analyzed were female as well as lower on the career ladders than male characters (2003, p. 283). In the study conducted by Long et. al, it was discovered that female scientists were underrepresented. In the television programs that were analyzed, programs that were not funded by the National Science Foundation had

significantly less female scientists than men, concluding that while there were 71 male scientists, there were only 31 female scientists (Long et. al, 2010, p. 369).

### *Stereotypes of Scientists*

Scientists and other members of the scientific community are often stereotyped. These stereotypes, like many that are associated with those who are considered experts in their field, can affect the credibility of the individuals who are labeled by them. According to a 2009 article on labmanager.com by Pickett, scientists are often stereotyped as socially isolated and having a unbalanced life. Those stereotypes can add to the suspicion that others may have of scientists and therefore affect the amount of support the science community may have (Pickett, 2009). However, the same article also states that there is the potential for stereotypes to work for scientists as well as against them. According to Pickett, stereotypes that convey positive characteristics and personality traits could work in the favor of scientists (Pickett, 2009).

Weingart et. al, believed that the field in which the scientist does his research will help to determine the stereotype that is reinforced. They state that “medical research, physics, chemistry, and psychology” are the fields that most predominantly portray scientists as the “mad scientist” (Weingart et. al, 2003). Others have also reinforced the idea that the mad scientist is one of the most predominant stereotypes that are used. According to Knight (2004), “in film and television, scientists are often quirky, nerdy, obsessed, reclusive, self-important, and not infrequently mad” (p. 720). Steinke discovered that few female scientists were stereotyped as “mad and maniacal” or “clumsy and absentminded” while the majority were portrayed as “professional and realistic”

(Steinke, 2005, p. 42). This leads to the idea that perhaps female scientists are linked more to gender stereotypes than stereotypes of scientists. Jackson (2011), in a study that analyzed 17 “B” horror movies for the portrayal of women scientists, found that only four of the films featured female mad scientists while another two portrayed female scientists with the potential for future madness (p. 542).

Stereotypes of scientists are known by various different names and titles depending on the study or audience of the literature. Haynes (1994) identified six definitive groups of recurrent stereotypes: the alchemist, the stupid virtuoso, the unfeeling scientist, the heroic adventurer, the helpless scientist, and the idealist scientist (p. 3). These six groups are expanded upon and renamed in a later study by Haynes, yet they contain the same basic elements. Nisbet (2010) identified four clusters of images of feature film scientists: scientists as Dr. Frankenstein, scientists as powerless pawns, scientists as eccentric and anti-social geeks, and scientists as hero. The clusters fit in with the more popularly acknowledged groups identified by Haynes and the stereotypes can be broken down into several smaller categories.

The Alchemist, or, as identified as Nisbet, the scientist as Dr. Frankenstein, are more commonly known as the Mad Scientist and is said to be “the obsessed or maniacal scientist” (Haynes, 1994, p. 3). The image of the mad scientist originated around the time when nuclear science was beginning to form at the start of the 20th century, according to Weart (1988), soon after the discovery of radioactivity (p. 28). The general stereotype of the “mad scientist” or “evil alchemist” according to Haynes is one who is “arrogant, power-crazy, secretive, and insane in their pretensions to transcend the human condition and the limits of “permitted” knowledge” (Haynes, 2003, p. 245). This stereotype is also



described as “sinister, socially irresponsible, evil and violent, and ultimately headed for failure and demise by the end of the plot” (Nisbet, 2010). Other traits of this stereotype are “paranoia, delusions of grandeur, obsessive behavior, and the belief that he or she is the instrument of God with which to punish the world” (Haynes, 2003, p. 252). A characteristic feature of the “mad scientist” film is the secret basement laboratory in which dangerous, illegitimate experiments, away from official institutions such as university laboratories or government facilities, were conducted (Weingart et. al, 2003, p. 284). The previously mentioned Weingart et. al, study also concluded that one-fifth of the sample analyzed portrayed this image, with about 42% of the scientist being shown as solitary and more than 60% of the discoveries or inventions depicted as dangerous (Weingart et. al, 2003, pp. 284 - 285). Examples of this image of scientist include Dr. Moreau, portrayed by Marlon Brando, in *The Island of Dr. Moreau* (1996), Jeff Goldblum’s Seth Brundle in *The Fly* (1986), or Gregory Peck as Dr. Mengele in *Boys from Brazil* (1978).

The Stupid Virtuoso, also referred to as the Foolish Scientist or the Absent-Minded Professor, is described as “out of touch with the real world of social intercourse” (Haynes, 1994, p. 3). They are also caricatured as “obsessed with trivial and usually bad-smelling research and duped by the sellers of fake ‘wonders’ while being totally uninterested in the study of humankind” (Haynes, 2003, p. 247). The most common stereotypes of the “absent-minded professor” are that of someone who wears unmatched socks, never remembers to cut or brush their hair, and remain oblivious to the dangers confronting those around them (Haynes, 2003, p. 248), however, they can also be seen as “so dedicated that they spend most of the day at work, they deviate from norm in dress

and looks, and have few families, friends, or romantic interests” (Nisbet, 2010). The general stereotype of the absent-minded professor is characterized as a socially awkward object of humor that has good intentions but whose “curiosity and creativity number his awareness of practical matters like time of day and social obligations” (Terzian & Grunzke, 2007, p. 411). This stereotype can be used to describe Christopher Lloyd’s Doc in the *Back to the Future* series, Ned Brainard, as portrayed by Fred MacMurray, in *The Absent-Minded Professor* (1961), and Albus Dumbledore, portrayed by Richard Harris and Michael Gambon, in the *Harry Potter* film series.

The Heroic Adventurer or the Heroic Scientist is thought to be heroic in either the physical or the intellectual world (Haynes, 1994, p. 3). He carries an unmistakable moral: “bravery, endurance, optimism, and reverence for scientific knowledge would overcome all difficulties” (Haynes, 2003, p. 250). The idea of the “heroic adventurer” can be broken up into two portrayals: the scientist as an adventurer and the scientist as a hero. Haynes often describes them with overlapping characteristics and at times suggests that they may be interchangeable. The scientist as a hero is quickly becoming a contemporary stereotype for scientists in films about science. In a recent article in the *Washington Post*, Fahy (2014) described the scientist as “Hollywood’s newest hero stereotype.” He mentions the film *Interstellar*, in which all the main characters are scientists or engineers (Fahy, 2014). According to Nisbet and Dudo (2013), there has been a trend towards presenting scientists as heroes and voices of virtue (p. 243). A common stereotype of the scientist-hero, as mentioned by Haynes, is the military hero, who is almost exclusively American and appears in stories that frequently end with the setting up of an American world empire (Haynes, 1994, p. 170). Dennis Quaid as climate scientist hero Jack Hall in

*The Day After Tomorrow* (2004) and Chiwetel Ejiofor as the geologist hero Adrian Helmsley in *2012* (2009) are examples of this stereotype (Nisbet & Dudo, 2013, p. 243), as well as Tony Stark, portrayed by Robert Downey Jr., in the *Iron Man* films and Morgan Freeman's Lucius Fox from the *Batman* films.

Haynes describes the Helpless Scientist as a "character who has lost control either over his discovery (which, monsterlike, has grown beyond his expectations) or, as frequently happens in wartime, over the direction of its implementation" (Haynes, 1994, p. 3). These scientists often did not foresee the consequences of their discoveries, and therefore, end up at the mercy of a creation of their own making, or they believed that they would be given a more authoritative or managerial role in the deployment and use of their discovery, only to find out that their hands were tied (Haynes, 1994, p. 268). This particular stereotype of the scientist arises predominantly when the story is tied to some sort of scientific testing or creation, such as atomic power, robots, medical warfare, genetic engineering, organ transplant, cloning, artificial intelligence, virtual reality, or numerous other projects (Haynes, 2003, p. 253). The scientist could also be seen as a powerless pawn in a greater plan. According to Nisbet, these scientists are "shown as easily manipulated or dominated as pawns doing dirty work for big business, the military, or a master evil figure" (Nisbet, 2010). Notable examples of this stereotype would be Dr. Griffin Weir in *The 6th Day* (2000), portrayed by Robert Duvall, and many of the scientists in the film *Jurassic Park* (1993) who work for John Hammond, CEO of InGen, as portrayed by Richard Attenborough.

The remaining two of Haynes' stereotypes, the idealist scientist and the unfeeling scientist, are less prevalent in film and have not been identified in any other previous

research. However, they deserve mention as being prominent in literature and included in the portrayals of scientists in television series.

### **Gender in Film**

Gender stereotypes traditionally place women in more domestic roles than men. Lauzen, Dozier, and Horan (2008) concluded that female characters in prime time television shows are “more likely to have identifiable marital roles whereas male characters are more likely to have identifiable occupational roles” (p. 202). It was noted by Sontag (1972) that a man’s success is often measured by what they do while a woman’s success is measured by how they look (p. 438). Many studies (Smith, Choueiti, Pieper, 2012; England, Descartes, Collier-Meek, 2011; and Powers, Rothman, Rothman, 1993) focused on female gender representation in film, while there was relatively little on the representation of males.

Gender in regards to characters with careers in science, technology, engineering, or math (STEM), was looked at by Smith, Choueiti, Prescott, and Pieper (2012) in an executive report for the Geena Davis Institute on Gender in Media. Out of the total 160 characters that were identified in family films as holding a job in STEM fields, less than a fifth (16.3%) were women, while 83.8% were men (p. 8). The study also found that there were no female protagonists or co-leads shown in STEM careers, compared to the 14 males that were found in those roles (Smith et. al, 2012, p. 9). The most frequently depicted STEM careers were within the life/physical sciences. 65.4% of females were depicted in jobs in this field, while 49.3% of males were shown (Smith et. al, 2012, p. 9). In other fields of STEM, males dominated the careers in comparison to females. It was

concluded that women and girls in the G, PG, and PG-13 rated films that were analyzed were extremely under or misrepresented, as female were shown far less frequently on screen than males (Smith et. al, 2012, p. 9). Although there were areas noted where females were more prominent than males, screen time was not one of them.

A 2011 study by England, Descartes, and Collier-Meek looked at gender roles and Disney Princesses. They defined traditionally masculine characteristics as including being athletic and brave, while traditionally feminine characteristics would include being helpful and nurturing (England et. al, 2011, p. 536). Through the analysis of the prince and princess characters of 9 Disney films, it was found that out of the total number of characteristics noted for each, 494 (49.95%) of the total characteristics for prince characters were masculine while 567 (34.68%) of the total characteristics for princess characters determined to be as such. The results for feminine characteristics showed that the princes displayed 495 (50.05%) feminine characteristics while the princesses showed 1068 (65.32%) feminine characteristics (England et. al, 2011, p. 560). The early Disney films, those produced in the 1930s and 1950s, depicted more traditional gender roles than the later films, produced after the 1980s (England et. al, 2011, p. 562). The study concluded that while gender roles have changed over time, with later princesses performing more masculine actions, such as becoming a part of the final rescue, there has yet to be a princess that has made a final dramatic rescue without the involvement of the prince (England et. al, 2011, p. 565).

Steinke (2005) stated that although the images of women in the media have changed in recent years, there still is a focus on female characters appearing to be more concerned about their appearance or romantic lives than education or careers (p. 28).

Powers, Rothman, and Rothman (1993) believe that the primary motivation of female characters in movies from the 1940s through the 1970s revolved around the quest of finding a husband or how to resolve romantic problems in their marital relationships (p. 265). Women who held traditional jobs only did so to survive, otherwise they were unemployed, were housewives, or worked in jobs that have been conventionally associated with females, such as teachers, nurses, secretaries, and waitresses (Powers et. al, 1993, p. 265). The late 1970s and the 1980s began to portray women taking on unconventional jobs and moved away from the idea that female characters only focused on relationships and their appearance (Powers et. al, 1993, p. 270). The study concluded that the representation of women in Hollywood films has shifted, declining in the traditional portrayals and ideals, such as females having greater civility than men, maternal instinct, and devotion to others, while men have become more vicious and greedy as their power and positions of authority increase (Powers et. al, 1993, pp. 280 - 281).

Smith and Cook (2008) found that out of the 3,000 individual speaking characters in the films studied, fewer than one out of three (28%) of all speaking characters were female and out of the 40 narrators identified, more than four out of five (83%) were male (p. 12), showing that women were underrepresented in the films selected. A second study by Smith and Cook, also done in 2008, examined over 15,000 speaking characters in films rated G through PG-13. It was reported that 73% of the characters (11,371) were male, which translates into 2.71 males to every female (Smith & Cook, 2008, p. 13). The final study that was reported in the article was in regards to the female leads in G-rated films. Several themes were identified in the portrayal of the female

characters: appearance was heavily focused upon; the characters often had a distinct set of focus in the films, such as romantic love, family, or adventure; almost all of the films depicted a female lead pursuing a romantic relationship; and that the stereotypical damsel in distress was not as prevalent as originally thought (Smith & Cook, 2008, pp. 17-18).

Looking at the way that female characters are represented in comparison to male characters in films can often give insight to how much influence these films could potentially have on girls and women, as we at times look to movies and television as a way to learn more about ourselves. The representations of scientists in film, however, gives a much more specialized look at gender and how male and female characters are portrayed.

## CHAPTER THREE

### METHODOLOGY

Messaris and Abraham (2001) state that the “iconic ability to seemingly reproduce nature means that visual images are capable of producing documentary evidence to support the commonsensical claims of ideology, and in turn to use the very appearance of nature (seemingly factual representations) to subtly camouflage the constructed, historical, and social roots of ideology” (p. 220). The images are able to reinforce cultural stereotypes that may not be noticeable in text. According to Zettl (1973), “the media have a great influence on the *shaping* of the message, the way the original event is clarified and intensified. Television and film speak their very own aesthetic language” (p. 10). For these reasons, I have chosen media frame analysis as the method with which to analyze EOTW films.

Media framing, the umbrella term for visual as well as textual framing of media, can be defined in multiple ways. Gamson and Modigliani (1987) defined media framing as “a central idea or storyline that provides meaning to an unfolding strip of events...The frame suggests what the controversy is about, the essence of the issue” (p. 143). The definition offered by Tuchman (1978) is similar: “The news frame organizes everyday reality and the news frame is part and parcel of everyday reality...[it] is an essential feature of the news” (p. 193). The concept of framing can be either intended or unconscious and brings focus to certain aspects of an issue within a larger story.

According to Hubenko (2006), in general, frame analysis “is a type of narrative/content analysis in which the researcher explores to identify the frame in order to pinpoint the rhetoric of the writer and/or the news organization” (p. 6).



Goffman's version of frame analysis, which was developed in 1974, was also used as part of the methodology for this project. As described by Williams (2002), Goffman presented social life as a process of negotiating frames, or "shared definitions of presently occurring social reality" (p. 154). The use of frames, therefore, would be the way that those who are exposed to the media would be drawn to be able to come to conclusions based on what they believe was going on and are able to come to some sort of understanding (Williams, 2002, p. 155).

Through the use of media frame analysis, along with Goffman's six aspects, as outlined in Chapter One, I sought to discover and analyze how frames were used to depict gender stereotypes of scientists in EOTW films. This chapter outlines data was collected and analyzed in this project.

### **Research Questions**

There was one primary research question that drove this study as well as several sub-questions that, to varying degrees, also helped to form this project. As outlined in the introductory chapter to this thesis, there are a total of four research questions.

**RQ1: How are scientists depicted in End of the World movies and how has this depiction changed over the decades?**

The basis for this study was to discover how scientists are depicted in movies about the end of the world. By posing this question first, the general portrayal of scientists could be deciphered and from there, I was able to narrow down the depictions to the more specific stereotypes used. Previous studies (Weingart, Muhl, and Pansegrau, 2003; Long, Steinke, Applegate, Lapinski, Johnson, and Ghosh, 2010) have shown that

the mostly commonly depicted scientist is an older, Caucasian, male. It was also previously reported that female scientists are underrepresented in End of the World films.

Looking at the types of films that were being released between 1950 and 2010, I predict that in years such as the 50s and 60s, where there was fear of nuclear annihilation and invasion, scientists would be portrayed as much more of the mad scientist or the cause of the end of the world. Conversely, in time periods such as the 2000s, with the interest in climate change and global warming growing, scientists would be seen as more as helping prevent the end of the world. As the prominent themes within the storylines of the films change over time, it's thought that the portrayals of the scientists will change accordingly to reflect the attitudes of the public toward scientists.

**RQ2: What are the prominent gender stereotypes of scientists, if any, that are reinforced in these films?**

Due to the common portrayal of scientists as predominantly male (as seen by Long et. al (2010) and Weingart et. al (2003)) it's believed that regardless of gender, scientists will embody primarily masculine traits and therefore also reinforce masculine stereotypes.

The term "masculine" is defined in this study as having physical strength, being more assertive and forceful, having more independence and status within the social structure of their organization, and generally having a greater implied physical presence. Those having masculine traits are also thought to not be interested in things such as cooking and taking care of others but rather have more interest in activities that involve physical activity or more analytical thought.

On the opposite side, the term “feminine” in this study is defined by commonly identified traits, such as being softer, gentler, showing more emotions, and being able to communicate in a kinder, easily relatable way. Those having feminine traits and employing feminine stereotypes are thought to have less interest in physical activity and activities that could potentially involve confrontation and more interest in activities that involve creative thinking and collaborative work.

**RQ3: Is the portrayal of scientists in EOTW films favorable or unfavorable?**

Previous research (Evans, 1996; Nisbet, 2010) has reported that there are varying opinions on whether the portrayal of scientists is favorable or unfavorable. I believe that scientists will be shown in a favorable light as current ideas of science and scientists have begun to shift towards a more encouraging viewpoint and depict scientists not as mad or out to destroy the world but as wanting to explore the limits of their chosen field and use that knowledge to potentially help others.

A favorable view of scientists would include the scientist being shown as using science and scientific knowledge to help others, such as sharing that knowledge to help teach others or to invent or create something that would either save the world or enhance it. Actions that could help to further scientific research or that would be beneficial to the general population also contribute to this favorable light.

Unfavorable views of scientists would include if the scientist was using their scientific knowledge or the science around them (such as the materials in their laboratory) to negatively impact the world, such as creating an instrument to destroy the world or using science for purely selfish reasons (like trying to take over the world or gain fame through the communication of science).

#### **RQ4: How are scientists framed in EOTW films?**

Previous literature (such as studies done by Weingart et. al, 2003; Steinke 2005; and Long et. al, 2010) have shown that male scientists are often analyzed in terms of demographics while female scientists are looked at in terms of traditionally feminine attributes. A viewing of film trailers that accompany films that were included in the population showed primarily relationships and action scenes that are parts of the storylines. This leads me to believe that scientists will be framed to focus on the human aspects of their characters rather than the scientific, focusing the attention of the viewers on the scientists as people and not so much the scientific information.

#### **Data Collection**

Several steps were taken in the data collection process for this project. (1) Creation of the coding instruments that would be used in the analysis of EOTW films; (2) Conduct a pilot study to ensure that framing stereotypes could be coded using Goffman's six aspects as well as traditional gender stereotypes and to gain a general idea of how scientists are portrayed in EOTW and regular science fiction films; (3) Determine the criteria for creating the sample, compile the sample list, and collect the films that comprise the final sample; (4) View the films and select three important scenes for closer analysis; (5) Analyze films and input the data into a database, and (6) Have additional coders analyze the same sample as a reliability check.

For the purpose of this study, a "scientist" was defined as anyone who has significant background in a scientific career field or field of study. This definition could include those who have advanced research degrees, such as biologists, chemists,

anthropologists, computer scientists, engineers, etc., or engage in scientific research, such as astronauts, field researchers, cartographers, inventors, etc.

### *Coding Instruments*

The coding instruments for this project were the coding manual (Appendix A) as well as a coding sheet (Appendix B). The creation of the coding instruments was developed from the research questions and hypotheses, and based on Goffman's (1976) *Gender Advertisements* and research done by Evans (2010) in a dissertation entitled *Ambivalent Modernity: Scientists in Film and the Public Eye*.

The coding manual served to give each volunteer a clear idea of what role they would be playing in the data collection process. The coding manual was divided into four sections: (1) Introduction/General Overview; (2) Coder/Film Information; (3) Film Scene Analysis; (4) Overall Film Analysis; and (5) Follow-up Information.

The Introduction/General Overview section of the coding manual gave the background information on the project as well as what I was hoping to accomplish by conducting the research. Including this information was intended to help the coders understand the project. The Unit of Analysis was detailed, giving information on the type of films I had chosen, as well as how the scenes that were chosen for closer analysis had been selected. This section also included a list of steps that the coder would be taking in the process. Although the steps were generally not very complicated, they were included so that the coder would be able to know what was expected of them.

The second section of the coding manual contained the general information of the film as well as the coder. It asked the coder to complete his or her first name or first

initial, whichever they feel more comfortable providing. The film's title and year of release were filled in ahead of time and included in the document's header.

The Film Scene Analysis section of the coding manual was where the individual scenes for the films were analyzed. This section detailed the basic demographics of the scientist being looked at, including gender, age, and which of the six aspects looked at by Goffman, as described in the Introduction chapter, were employed in the portrayal of the scientist. Within each film, three important scenes were selected for closer analysis.

These scenes were chosen for the following reasons: (1) They must have represented a major element of the film, for example, a point in the film where there was a resolution, discovery, or action that had a significant impact on the storyline and (2) The scene must have included at least one scientist that played a important part of the scene. Film narratives usually follow a relatively predictable arc. The reasoning for choosing three specific scenes for analysis was to be able to examine how scientists were represented during these pivotal moments. At the top of each section of questions for the individual scenes, the time codes for the beginning and end of each scene were listed along with a brief description of what the scene was about. This was to help the coder identify exactly which scene was to be analyzed.

The Overall Film Analysis section of the coding manual looked at the representation of scientists in the film as a whole. This included the ratio of male to female scientists and whether the portrayal of the scientist is overall positive or negative. Specific gender traits, commonly identified stereotypes of scientists, and possible frames were also included for analysis. 26 gender traits were used in this study to determine how scientists were portrayed in the films in terms of gender stereotypes. Out of these 26

traits, 13 were considered traditionally masculine and 13 were considered traditionally feminine. There was also a section for notes regarding the role of the scientist in the larger scope of the film, any additional coding observations, and any other observations about the portrayal of scientists.

The final part of the coding manual, the Follow-Up Information section, thanked the coder for volunteering for the project and also included contact information if the coder had questions during the coding process.

Although care was taken in creating the coding manual and the wording of the questions, possible responses, and definitions, additional clarification could possibly be required.

Data entry for the coding sheets used an online survey form created through Google Forms. Through this, the results could automatically be exported into a Microsoft Excel file for analysis. This was decided instead of the coding being done directly into the Excel file so that I would be able to insert the descriptions and information for each film and scene, allowing for greater flexibility. By limiting the coding sheets to only online, it also reduced the amount of paper that was needed for the data collection process.

At the top of each of the coding sheets were the instructions on how to complete the sheet. These were the same instructions that were included in the coding manual. These brief instructions were just for reference as coders should have already been familiar with them.

Following the instructions, the remainder of the coding sheet was broken down into the various sections, pertaining to each grouping of questions.

Once the coding instruments had been finalized, the data collection process could continue with the viewing of the films.

### *Pilot Study*

To ensure that the Coding Sheet encompassed all of the elements needed to be able to analyze the scientists within the films in terms of stereotypes, portrayals, and impact, a multi-part pilot study was conducted.

Using the initial version of the coding sheet and coding manual to code a test film that met all of the criteria to be included in the final sample (*Thor* (2011)), two coders conducted the pilot test, me and one other person. After the coding was completed, we evaluated the process, emphasizing coding categories, questions, and our responses. From there, the coding sheet and coding manual were revised. Goffman's six aspects were elaborated on further as well as the addition of the "non-human" option for the Gender attribute.

A second pilot test took the revised coding instruments and used them to code a different film (*Flubber* (1997)). The same coders viewed this new film and completed the coding sheet. Once again, discussion took place after the coding had been done and the coding sheet was revised and edited again.

This process went on until it had been determined that both the coding sheet and coding manual met the needs of the project.



### *Sample Selection*

For this project, I decided to look at both EOTW films as well as other science fiction films that portrayed scientists. The two were used in comparison to each other to determine if there was a difference in the way scientists are portrayed in the films. For simplicity purposes, other science fiction films are referred to as “regular” science fiction films, meaning they do feature the end of the world.

The sample was selected from feature films. Feature films are typically around 90 minutes to two hours in length, with some being as short as an hour or as long as three hours (Corey & Ochoa, 2002, p. 148). These films are thought to be easily accessible to everyone, both in theaters and in various media formats after the movie has left the theaters. Other types of films, such as documentaries, may not have been as readily available or have had as vast a reach as these feature films. That being said, documentary films that were released as feature films in theaters were not immediately excluded from the potential sample. They were considered feature films as they were released as such and would be required to meet the same criteria that the other films would need to meet. International films were also taken into consideration if they were released in some format in the United States (not as an imported film, but through an American distribution company) with either English subtitles or dubbed in English.

Specific criteria needed for the film to be considered.

First, the film needed to have at least one identifiable scientist portrayed in it. The scientists did not have to meet any specific requirements, however, they were needed to be able to be identified as scientists. Reading the synopsis of the film helped to determine whether or not the film met this requirement, as well as looking through cast

lists and credits for any titles that may have suggested that the character was a scientist. Because I attempted to view the stereotypes that are associated with scientists, being able to easily identify which characters are scientists greatly helped with being able to make sure that the appropriate characters were being analyzed.

The second criterion was whether or not the film had any “end of the world” elements in the storyline. This was determined by doing a search on comprehensive movie websites, including the Internet Movie Database (IMDB), rottentomatoes.com, and amazon.com, to find any films that were categorized as apocalyptic, science fiction, or futuristic. The terms dystopian and disaster were also used. The comprehensive list of films contained in the book *World Gone Wild: A Survivor’s Guide to Post-Apocalyptic Movies* by David J. Moore (2014), as well as the films contained in *A Guide to Apocalyptic Cinema* by Charles P. Mitchell (2001) were also looked at in terms of what elements were contained in them to help compile a database of potential films that were used in the sample. The Moore book is one of the most complete listings, containing over 800 reviews of apocalyptic and post-apocalyptic films, including hard-to-find films, television movies, and completed television series. All forms of End of the World films (Dystopian, Post-Apocalyptic, and Disaster, as well as Apocalyptic) were taken into consideration as long as there was either an actual end of the world or imminent threat of the world ending. (For example, a film about a natural disaster, such as a flood, it would have to threaten the entire Earth or a large portion of it to be considered.) If a film is a part of a series, each film was viewed as an individual movie and considered as long as it met the criteria.

For “regular” science fiction films, this criterion did not need to be met, however, the other two criteria needed to be fulfilled before the film was considered to be a part of the sample. For these films, the movie needed to be identified as a science fiction film the websites and databases previously mentioned, either through the tags or lists, categories, or synopses or plot summaries.

The third criterion is that the film must be available. There are many films that are listed on websites and books that are obscure or hard-to-find, only available in a format that is not easily accessible, or that was a limited release and not available for viewing, such as a television movie. The film must have been available for rent or purchase and in a format that is readily accessible, such as VHS, DVD, Blu-Ray, or streaming online. Digital files were also considered when obtaining the sample films. If a film was available for streaming online or on-demand through a cable service, log in information was provided to the coders along with the link to the film. The total number of EOTW films in the population was 259 while the population of regular science fiction films was 630.

Once all of the criteria were met, additional information on each of the remaining films was collected. First, it was verified that the film was released in the theaters. This was done through reviewing the IMDB listings for the films, along with Wikipedia entries. Films were then divided by decade and entered into a database. From there, a random number generator was used to generate a number. The number that was generated was matched with the corresponding number of the film and that was the film that was added to the final sample. Two films for each decade, 1950 - 2000, were selected for the EOTW films and one film for each decade was selected for “regular” science fiction

films, resulting in a final sample of 18 films. This was done due to time constraints that prevented the entire population of films or a larger number to be analyzed. Table 3.1 outlines the films that comprised the final sample.

<b>Decade</b>	<b>End of the World Films</b>	<b>Science Fiction Film</b>
1950s	<i>On the Beach</i> (1959)	<i>Killers from Space</i> (1954)
	<i>Invisible Invaders</i> (1959)	
1960s	<i>Dr. Strangelove or: How I Learned to Stop Worrying and Love the Bomb</i> (1964)	<i>The Nutty Professor</i> (1963)
	<i>Planet of the Apes</i> (1968)	
1970s	<i>Idaho Transfer</i> (1973)	<i>Close Encounters of the Third Kind</i> (1977)
	<i>End of the World</i> (1977)	
1980s	<i>WarGames</i> (1983)	<i>The Adventures of Buckaroo Banzai Across the 8th Dimension</i> (1984)
	<i>Akira</i> (1987)	
1990s	<i>12 Monkeys</i> (1995)	<i>Twister</i> (1996)
	<i>Deep Impact</i> (1998)	
2000s	<i>Titan A.E.</i> (2000)	<i>Avatar</i> (2009)
	<i>Ponyo</i> (2009)	

Table 3.1 - Final Sample

### *Reliability*

Once all films had been coded, and additional coder was recruited for the sake of inter-coder agreement. The coder analyzed the full final sample within the span of two weeks. Training for the coder was conducted before the viewing of the films began. The coder was given the coding manual along with a list of the films he would be analyzing and the links to where those films could be found online or where they would be accessible. Questions were addressed and answered before coding began and during the process as needed.

The reliability in this experiment relied on inter-coder agreement and replicability. The inter-coder agreement was measured by simple percentage reliability, determining how many differences were noted among the coders. By doing so, I was able to see any inconsistencies in the interpretation of what is included in these movies and take that into consideration when analyzing the data. To calculate the inter-coder agreement, all of the variables were combined, from the individual analysis of Scene 1 through the Overall Impression of the Scientists, and the number of disagreements for each of the major sections (The Demographics of the Scientist, The Goffman Aspects, and The Overall Film Analysis) were totaled and the percentage of the total number of attributes was determined. The multi-step pilot testing of the coding manual as well as the coding sheet helped to improve the reliability. Questions and possible responses were worded and defined with the hopes that there would be no doubt what each meant and so with small revisions due to varying media that could be analyzed the coding instruments would be able to be used for similar projects in the future. In addition, the sampling

process was intended to reduce bias towards any film, or set of films, in the selection of the movies.

### **Data Analysis**

The data for the project was inputted using the Google Forms program in Google Drive. This allowed for coders to be in different places as well as have access to their coding instruments when their schedules allowed for coding, even if they were not at their home computer. Google Forms also allowed the data to be exported and viewed in Google Sheets, which could be downloaded as a Microsoft Excel file for further analysis. Percentages for the various answers were offered in response to the questions posed as well as trends in answers could be viewed on these programs. Although the observations made by each of the coders was not part of the data analysis in terms of inter-coder reliability or statistics, they were looked at as a way to gain additional information to help connect various ideas and to help draw conclusions regarding the scientists portrayed.

## CHAPTER FOUR

### RESULTS

The portrayal of scientists in films was different in *End of the World* and “regular” science fiction films. The demographics of the scientists were relatively consistent, showing that the scientists were predominantly Caucasian males, representing a wide age range. However, there were differences in other aspects of the portrayal, such as the gender roles and stereotypes that were enforced, as well as the presence of these scientists in the films.

#### **Summary of Findings**

Using the results from the coding, along with the notes and observations collected from the additional coders, I was able to answer each of the research questions and determine whether or not the previous research noted in conjunction with the questions was in agreement with the data found in the current study. A total of 18 films were viewed, with a total of 26 individual scientists identified. Once the data was collected, the coding sheets were combined into several spreadsheets to view the data in various ways: By Decade and By Attribute. If a scientist was determined to be the focus of more than one scene, and coded as such, the demographics for subsequent scenes were deleted to isolate only the initial encounter of the scientist and the gender aspects for each scene. This was done so the same scientist would not be represented more than once in the demographics. The aspects, however, changed from scene to scene and were left intact. From there, reports were run for each of the data groups that were analyzed and the results were reported.

This chapter outlines the research questions and presents the findings of the study in terms of the data collected and analyzed.

### **Results: RQ1 - Depictions**

**RQ1:** How are scientists depicted in End of the World movies and how has this depiction changed over the decades?

Individual scientists were identified as playing a large role in the selected scenes. It was found that many of the films had either only one scientist in the entire film or there was only one primary scientist while the others did not play any significant role in any of the scenes. If in a film, the same scientist was identified in more than one scene as playing a large role, the demographics for the subsequent scenes were eliminated from the totals.

There were 12 EOTW films that were viewed for this study, with 18 individual scientists who played a large role in each important scene identified:

1. Julian Osborne – *On the Beach*
2. Dr. King – *On the Beach*
3. Adam Penner – *Invisible Invaders*
4. Dr. Strangelove – *Dr. Strangelove or: How I Learned to Stop Worrying and Love the Bomb*
5. Zira – *Planet of the Apes*
6. Cornelius – *Planet of the Apes*
7. Isa Braden – *Idaho Transfer*
8. Karen Braden – *Idaho Transfer*
9. Andrew Boran – *End of the World*
10. John McKittrick – *WarGames*
11. Stephen Falken – *WarGames*
12. Dr. Onishi – *Akira*
13. Kathryn Raily – *12 Monkeys*
14. Dr. Peters – *12 Monkeys*
15. Spurgeon Tanner – *Deep Impact*
16. Oren Monash – *Deep Impact*



17. Gune – *Titan A.E.*
18. Fujimoto – *Ponyo*

Caucasian scientists were the most frequently represented (n=13, 72.22%) while the predominant gender was male (n=14, 77.78%), with female scientists being represented with 22.22% (n=4). There was one Asian/Pacific Islander scientist identified and 3 that were portrayed as non-human. No other races or ethnicities were represented in the sample. The 19 to 35 age range was the most frequently portrayed, with 8 of the scientists identified as being within those ages. This was in contrast to the hypothesized age range of scientists, which would have been the 36 to 55 age range (n=5, 27.78%) or the 56 and older range (n=5, 27.78%). There were no scientists being identified as under the age of 18.

In comparison, the representation in regular science fiction films was very similar. Out of the six films that were analyzed, there were eight scientists identified as playing a large role in important scenes:

1. Dr. Doug Paul Martin – *Killers from Space*
2. Professor Julius Kelp – *The Nutty Professor*
3. Claude Lacombe – *Close Encounters of the Third Kind*
4. David Laughlin – *Close Encounters of the Third Kind*
5. Buckaroo Banzai – *The Adventures of Buckaroo Banzai Across the 8<sup>th</sup> Dimension*
6. Lord John Whorfin/Dr. Emilio Lizardo – *The Adventures of Buckaroo Banzai Across the 8<sup>th</sup> Dimension*
7. Dr. Jo Harding – *Twister*
8. Dr. Grace Augustine - *Avatar*

Once again, the predominant gender was male (n=6, 75%) with 2 females (25%). The most represented age range was 19 to 35 (n=4, 50%), with 36 to 55 having been identified slightly fewer times (n=3, 37.5%). There was only one scientist that was

identified as being older than 56 and none who were under 18. The only ethnicity that was portrayed in this sample was Caucasian.

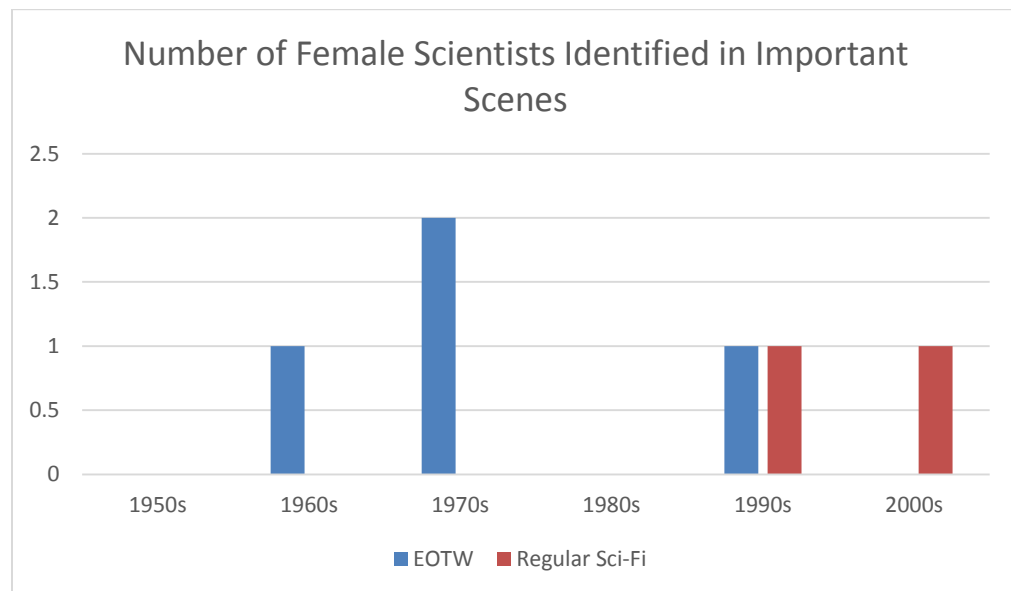


Figure 1. The Number of Female Scientists Identified in Important Scenes. This figure illustrates the number of female scientists identified in important scenes in each decade.

Female scientists in both EOTW films and regular science fiction films were underrepresented. There were four female scientists identified in EOTW films while only two were identified for regular science fiction films. However, as will be discussed later in this chapter, it was noted that the scientists in the earlier films did not play as large of a role in the films as female scientists in more recent films.

Previous research (Weingart, et. al, 2003; Long, et. al, 2010) had shown that the majority of the scientists in End of the World films would be older, white (Caucasian), males. However, only part of this was supported by the findings. The majority of the scientists that were portrayed were not older as hypothesized, but appeared to be in their late 20s to early 30s.

Thompson (2007) noted that films from various time periods tended to focus on world events, such as the 1950s and 60s focusing on concerns of nuclear war and communism, or the 2000s having concerns about climate change and technology. It was projected that these concerns would have an impact on the way the scientists were portrayed and that there would be a shift as each decade approached.

The films in the 1950s and 60s reflected the concern that society had about nuclear annihilation and also aliens. Out of the four EOTW films that were viewed for this time period, there were six scientists identified as playing major roles in important scenes: Osborne (*On the Beach*), King (*On the Beach*), Penner (*Invisible Invaders*), Strangelove (*Dr. Strangelove or: How I Learned to Stop Worrying and Love the Bomb*), Zira (*Planet of the Apes*), and Cornelius (*Planet of the Apes*). Five out of the six were male, with five falling within the 19 to 35 (n=2) and 36 to 55 (n=3) age ranges. There was one scientist identified as being 56 or older. While two of the scientists were identified as non-human (although clearly gendered nevertheless), the remaining were identified as Caucasian. It was observed that there were no traditional stereotypes by which the scientists could be identified. Science was also a large focus in these films, with many of the scientists either working in laboratories of some sort or creating and conveying scientific information. In comparison, the scientists in the two regular science fiction films that were viewed for the 1950s and 1960s were quite different. There were only two scientists identified in these films as playing roles in important scenes: Martin (*Killers from Space*) and Kelp (*The Nutty Professor*). Both were identified to be in the 19 to 35 age range, Caucasian, and male. While both Martin and Kelp are considered to be main characters in their respective films, they played different roles within the scope of

the film. Kelp was identified as comedic relief, through the use of the Absent-Minded Professor stereotype, while Martin was associated with the heroic adventurer by the coders as he alerted those around him to the impending invasion of the aliens that had landed. They both embodied predominantly masculine traits, while Kelp also employed many that were identified as feminine traits.

The 1970s and 80s brought a different view of scientists and the scientific world. The four EOTW films from this period portrayed six identified scientists and focused on a wide range of topics. The films centered on technology, medical experimentation and the use of it to destroy the world, and alien invasion. The scientists that were identified, Isa (*Idaho Transfer*), Karen (*Idaho Transfer*), Andrew (*End of the World*), Onishi (*Akira*), McKittrick (*WarGames*), and Falken (*WarGames*), for the most part did not embody any specific scientist stereotypes, however, the portrayals of each of them followed traditional assumptions of scientists. Two out of the six scientists were identified as female, with all except one being seen as Caucasian. The predominant age ranges were 19 to 35 (n=3) and 56 and older (n=2), with just one scientist being identified as between 36 and 55. All of the scientists were determined to embody primarily masculine traits and very few feminine traits. The regular science fiction films that were also viewed for this time period showed scientists that were much more focused on alien invasion. Four scientists were identified as playing large roles in important scenes: Lizardo, later known as Whorfin, (*The Adventures of Buckaroo Banzai Across the 8<sup>th</sup> Dimension*), Banzai (*The Adventures of Buckaroo Banzai Across the 8<sup>th</sup> Dimension*), Lacombe (*Close Encounters of the Third Kind*), and Laughlin (*Close Encounters of the Third Kind*). All were identified as Caucasian males with the

predominant age range being 36 to 55 (n=2). The other two age ranges, 56 and older and 19 to 35 were represented with one scientist each. It was determined that two scientist stereotypes were employed: Whorfin/Lizardo and Onishi were identified as the Mad Scientist, with both attempting to use science to further their own ambitions, and the Heroic Adventurer, which Banzai was identified as in his attempt to save humanity from Lizardo. Lacombe and Laughlin were not seen as embodying any specific stereotype.

The four EOTW films from the 1990s and 2000s identified six scientists in important scenes and reinforced the concerns about the environment as well as biological and medical concerns of society. Technological concerns were also addressed in this time period. This corresponded with the scientists identified in the regular science fiction films, who were focused on the same types of issues. Out of the six scientists, there were five males (Monash (*Deep Impact*), Tanner (*Deep Impact*), Gune (*Titan A.E.*), Fujimoto (*Ponyo*), and Peters (*12 Monkeys*)) and one female (Reilly (*12 Monkeys*)). All but one were determined to be Caucasian (Gune was identified as non-human), and the predominant age range was 19 to 35 (n=3), followed by 56 and older (n=2), and 36 to 55 (n=1). The scientists in this time period, once again were shown to embody predominantly male traits. Reilly and Gune were also determined to have quite a few feminine traits, which helped to round out their characters. Two of the scientists were seen as Heroic Adventurers (Monash and Tanner), while two were seen as Mad Scientists (Peters and Fujimoto), and one was identified as a Absent-Minded Professor (Gune). Only Raily did not fit into any of the common scientist stereotypes. The regular science fiction films from the same time period revealed one surprising result. Out of the two identified scientists, both were female (Jo (*Twister*) and Grace (*Avatar*)). The remaining

demographics were unsurprising, with both being Caucasian and the representation of age being split (19 and 35 (n=1) and 36 and 55 (n=1)). In terms of gender traits and stereotypes, while they each embodied many masculine traits, there were also quite a few feminine traits and both were seen as the Heroic Scientist.

It was believed that the stereotypes that are used to portray scientists adjust with the fears and interests of the public depending on what is going on in society at the time. While it was originally thought that the portrayal of the scientists would change significantly throughout the time periods, they were relatively static in their representation throughout each decade. There was no specific way that the scientists were portrayed in each time period, or each decade. There was no large change in the way the scientist was portrayed or in the way science was conveyed. However, the original fears, concerns, and interest of the public that were outlined by Thompson corresponded with the findings.

Through the decades, the prominence of the scientist has changed slightly, from playing a major role in the film in many of the earlier films to playing more supporting roles in recent films. The films were observed to be more about the journey of the group rather than the individual journey of the scientist.

### **Results: RQ2 – Gender Stereotypes**

**RQ2:** What are the prominent gender stereotypes of scientists, if any, that are reinforced in these films?

Gender stereotypes were looked at in terms of Goffman's six aspects being employed in the portrayal of each of the primary scientists in selected scenes from the

films. Through these aspects, it could be determined whether each was masculine or feminine and from there, it was determined which gender stereotypes were employed in the representation of the scientists. The identification of gender traits in all of the scientists in the films was also used to conclude how scientists were portrayed in terms of gender.

The selected scenes from the individual movies were analyzed for identification of any of Goffman's six aspects. More than one of the attributes for each of Goffman's aspects could potentially have been identified in each of the scenes. Coders were instructed to code for each aspect individually if they could be identified as having been employed in the scene. The results of this analysis are shown in Tables 4.1 - 4.7.

The individual tables show each of the attributes in the first column. Detailed descriptions of each of the aspects can be found in the Coding manual (Appendix A). The second and third columns indicate how many times each of the attributes was identified in the films. For instance, in Table 4.1, Height was identified in ten of the 35 EOTW scenes (there are 12 EOTW films, 11 of those films had three important scenes identified while one film only had two, for a total of 35 scenes), or 28.6% of the scenes. The total number of regular science fiction scenes was 18 (three scenes were identified for each of the 6 films). Height was identified 6 times within the 18 scenes, or 33.3%

	<b>End of the World Films (out of 35 scenes)</b>	<b>Science Fiction Films (out of 18 scenes)</b>
Height	10 (28.6%)	6 (33.3%)
Stance	5 (14.3%)	0 (0%)
Relationship to Others	33 (94.3%)	9 (50%)
None Were Employed	17 (48.6%)	6 (33.3%)

Table 4.1 - Relative Size: Number of Times Identified

	<b>End of the World Films (out of 35 scenes)</b>	<b>Science Fiction Films (out of 18 scenes)</b>
Caress	0 (0%)	2 (11.1%)
Cradle	15 (42.8%)	6 (33.3%)
Self-Touch	2 (6%)	3 (16.7%)
Other Touch	1 (3%)	0 (0%)
None Were Employed	19 (54.3%)	8 (44.4%)

Table 4.2 - Feminine Touch: Number of Times Identified

	<b>End of the World Films (out of 35 scenes)</b>	<b>Science Fiction Films (out of 18 scenes)</b>
Subordinate Role	14 (40%)	3 (16.7%)
Leadership Role	19 (54.3%)	12 (66.7%)
No Contributing Role	3 (9%)	3 (16.7%)

Table 4.3 - Function Ranking: Number of Times Identified



	<b>End of the World Films (out of 35 scenes)</b>	<b>Science Fiction Films (out of 18 scenes)</b>
Female Dominated Family Unit	4 (11.4%)	6 (33.3%)
Male Dominated Family Unit	31 (88.6%)	12 (66.7%)

Table 4.4 - The Family: Number of Times Identified

	<b>End of the World Films (out of 35 scenes)</b>	<b>Science Fiction Films (out of 18 scenes)</b>
Respectful Deference	1 (3%)	0 (0%)
Sitting	14 (40%)	3 (16.7%)
Canding Postures	16 (45.7%)	6 (33.3%)
Lying Down	1 (3%)	3 (16.7%)
Body Position	7 (20%)	0 (0%)
None Were Employed	7 (20%)	10 (55.6%)

Table 4.5 - Ritualization of Subordination: Number of Times Identified

	<b>End of the World Films (out of 35 scenes)</b>	<b>Science Fiction Films (out of 18 scenes)</b>
Using Hands to Cover Expressions	0 (0%)	1 (6%)
Anxiety Cues	6 (17.1%)	1 (6%)
Avoidance	7 (20%)	1 (6%)
Distance Gazing	1 (3%)	1 (6%)
Shift of Focus	2 (6%)	0 (0%)
Barriers	4 (11.4%)	2 (11.1%)
None Were Employed	22 (62.9%)	13 (72.2%)

Table 4.6 - Licensed Withdrawal: Number of Times Identified

The aspects that were determined to be masculine were Relative Size, Function Ranking: Leadership Role, and The Family: Male Dominated Unit. Feminine aspects were Feminine Touch, Function Ranking: Subordinate Role; The Family: Female Dominated Unit, Ritualization of Subordination, and Licensed Withdrawal. The results indicated that more masculine aspects were employed than feminine and that men were found to be more dominant than women in both sets of films.

The number of gender traits that were identified for each film was compiled to examine the portrayal of the scientists. Thirteen commonly identified feminine traits and thirteen commonly identified masculine traits were listed on the Coding Sheet. The predominant feminine traits in female scientists found in these films were: outgoing, nurturing, and compassionate, while the predominant masculine traits were: being independent, analytical, and having leadership qualities. Male scientists were similar in their representation of gender traits in that outgoing, loyal, and soft-spoken were identified as the most commonly employed feminine traits and independent, analytical, and ambitious were determined to be the most common masculine traits. Still, masculine traits were predominantly identified, regardless of gender.

The coders noted that the female scientists were often shown to be involved in romantic relationships and that personal relationships were a large part of their characterization and storylines. For example, in *Twister*, this is seen in the relationship that Jo Harding had with her estranged husband Bill. Their relationship was often a focus of their scenes together and was a central part of the storyline. Female romantic relationships were also a part of the storyline between Kathryn Raily and James Cole. Although their relationship was ill fated from the beginning, it played a large role in the

way the story played out, with Raily going as far as taking on a false identity to help Cole.

The previous belief that scientists would be portrayed as masculine was supported in that the majority of the traits that were employed through both Goffman's aspects as well as the gender traits, were identified as masculine. The female scientists represented in these films were often shown as either showing predominantly masculine traits and few feminine traits because of the way their characters were framed (as scientists trying to make a name for themselves in the scientific world) or stereotypically feminine as they were shown to be focused on romantic storylines rather than scientific. Out of the scenes featuring female scientists, there was only one scene where the scientist was dressed in a feminine way. The first selected scene in *12 Monkeys*, where Raily initially meets Cole, shows that she is wearing a dress, revealing her feminine side. However, throughout all of the films, female scientists are generally shown to be wearing similar clothing to their male counterparts. They are also shown to be more confrontational and aggressive, such as Karen Braden (*Idaho Transfer*) and Grace Augustine (*Avatar*) both have moments of assertiveness, not taking a passive role when things they disagree with are taking place, as well as showing little in the way of emotions that are typically associated with being feminine.

### **Results: RQ3 – Impression of Scientists**

**RQ3:** Is the portrayal of scientists in EOTW films favorable or unfavorable?

Gender stereotypes, as well as general stereotypes of scientists are thought to have an impact on the way the public views scientists. To answer this question, I looked at

both the gender stereotypes and the stereotypes of scientists outlined by Haynes and Nisbet.

The general impression of the scientists in the films was favorable (or, as shown in the coding instruments, positive). Out of the 12 End of the World films, ten of the films portrayed the scientists in a positive way, one was considered negative, and one in a conflicted way, meaning that the portrayal of scientists was considered to be both “good” and “evil” scientists and therefore canceled each other out or the scientists were not portrayed in a positive or negative way at all. The results for the regular science fiction films were generally the same, with four considered positive, none considered negative, and two considered conflicted.

It was determined that those scientists portrayed in a favorable way all used their scientific knowledge to enhance the world around them. Many of the scientists that were deemed “good” (such as Julian Osborne (*On the Beach*), Adam Penner (*Invisible Invaders*), Spurgeon Tanner and Oren Monash (*Deep Impact*), and Stephen Falken (*WarGames*)) were able to use their knowledge to either save the world from impending destruction or convey additional information on the end of the world to those who were equipped to help the general public better cope with it. Other scientists, such as Peters (*12 Monkeys*), used their scientific knowledge to attempt to destroy the world instead of saving it, landing them in the “evil” category or portrayed in an unfavorable way.

The scientist stereotypes as described by Nisbet and Haynes can be divided into favorable and unfavorable portrayals. Out of the four stereotypes that both studies had in common, two of the four were determined to be favorable: the Heroic Scientist/Adventurer and the Absent-Minded Professor, as their use in the portrayals of

scientists generally led to the motivations of the scientist resulting in potentially beneficial work. The remaining two, the Mad Scientist and the Helpless Scientist, were considered to be unfavorable; often resulting in the work the scientist is involved in being detrimental to society. As previously reported in response to Research Question 1, only three of the stereotypes were identified in the scientists analyzed.

Overall, there were generally more male scientists portrayed in the films than female scientists. One of the EOTW films was determined to have more female scientists than male, while eleven portrayed more male scientists than female. The numbers for regular science fiction films was similar, with two having more female scientists and four having more male.

It was believed that there would be an overall favorable view of scientists. This was supported by the data collected as the majority of the scientists were viewed favorably.

### **Results: RQ4 - Framing**

**RQ4:** How are scientists framed in End of the World films?

The framing of the scientist is what helped to put the film in perspective. As previous research has shown, framing allows the filmmakers to place emphasis on one particular aspect while de-emphasizing others. There were three specific frames I was attempting to identify in these films: scientific, humanistic, gender-specific.

The coders found that both the EOTW films and regular science fiction films were evenly split in the way that they framed scientists. Out of the 18 main character scientists that were identified in the 12 EOTW films, nine (50%) were framed to

emphasize science. The storylines involving these scientists were found to be science-focused and there was little in the way of personal stories and relationships that drove the characters. Nine (50%) of the scientists were shown in a more humanistic light, focusing on relationships and personal journeys. Finally, none of the main character scientists were framed in such a way that the focus was primarily on gender roles, enforcing stereotypes through the portrayal of the scientist. The numbers for the regular science fiction films were extremely similar, with four of the eight scientists being framed in a scientific way and four being framed in a more humanistic view. Once again, there were none that were framed as gender-specific.

All of the female scientists were framed in a humanistic light, with their storylines conveying information on their relationships and personal journeys. Grace Augustine (*Avatar*) was determined to be the only female character that could have also been framed in a scientific view. While at times the science was her focus, the coders noted that through her actions, the storyline kept coming back around to her wanting to know more about the Na'vi, not only as scientific specimens but also almost as equals to humans, encouraging Jake to form relationships with members of the Na'vi community. This was different than how many of the male characters were framed, focusing primarily on what the Na'vi could offer them in terms of land and resources rather than what they could offer the Na'vi as people.

While few of the male characters were framed as humanistic, the majority were framed in a scientific light, the science in the storyline dominating over other parts. However, it was determined that the character of Julian Osborne (*On the Beach*) could have possibly also been framed as humanistic. Although his role in the storyline of the

film was to provide scientific validation of the impending end of the world, there was very much also a focus on the relationships that Osborne had with the women in his life as well as his own journey to acceptance of the fact that he would die with the rest of the population. Two of the three coders mentioned that had the science not been such an important part of the storyline as a whole and of Osborne's personal storyline, they may have concluded that he had been framed in a humanistic view instead of scientific.

### **Inter-coder Agreement**

Inter-coder agreement was used to determine the reliability of the study through percent agreement. The coding responses for the two coders were compiled and the similarities and disagreements were identified. The inter-coder agreement was done for three areas of the code sheet: Demographics, Goffman aspects, and Overall Film Analysis. The Notes and Observations as well as identification of gender traits were not included in inter-coder agreement.

The results for the demographics of all of the films were compiled. The demographics for duplicate scientists were once again eliminated from results. There were a total of 267 attributes (five attributes per scene, three scenes per film, and there were 18 films, however, one of the films only had two scenes, resulting in 267 individual attributes that were coded), with a total of three disagreements. This resulted in an inter-coder agreement for this section as 99%. The Goffman aspects had a total of 321 attributes with 11 disagreements for an inter-coder agreement of 97%. Finally, the Overall Film Analysis had 54 attributes coded (three attributes per film, with a total of 18 films) and 2 disagreements, resulting in an inter-coder reliability of 96%.

## CHAPTER FIVE

### DISCUSSION

This study examined the portrayal of scientists in End of the World films from 1950 through 2010 using both the traditional demographics, such as age, gender, and ethnicity, but also Goffman's gender stereotypes. This chapter discusses the results in detail, addressing the results in several categories as identified through the research questions and hypotheses: demographics, stereotypes, overall impression, and time. In addition, this chapter discusses the current relevance of Goffman's study, limitations of the study and presents ideas for future research.

Feature films can often tell us much about the world around us. Not only do they potentially reflect the concerns and interests of society at the time, they can also give us insight about previous generations and possible future scenarios. This study looked at how scientists were portrayed in 18 science fiction feature films; to better understand how the role of the scientist functions in such films, and to what extent these roles are gendered, and to consider how scientists and science careers are presented to the public.

By focusing on how scientists are portrayed through gender roles and stereotypes, I hoped to gain a greater understanding of the possible impact this could have on different genders and their potential interest in scientific careers. This study also helped to determine whether or not there were any commonly identified stereotypes of scientists that were employed in the films, which would also have an impact on the impression of scientists that the public would have.



## Discussion of Results

### *Demographics*

Scientists in End of the World films from the 1950s through the 2000s have not changed much through the decades. In EOTW films, more than 75% of scientists were male. Weingart et. al (2003) reported that out of the 222 films they analyzed, male scientists represented 82% of those identified (p. 282). Their finding corresponds with the numbers found in this study.

Other demographics that were looked at were age and ethnicity. Unlike the previous studies, which estimated the age of the scientists studied as predominantly being between the ages of 35 and 49 years (Weingart et. al, 2003), the current study found that the age range in which the scientists were most frequently identified was 19 to 35. However, it was noted by at least two of the coders that the older scientists, the age of whom was estimated to be in the 36 to 55 or 55 and older range, generally had more scientific knowledge and experience than the younger scientists.

The ethnicity of the scientists identified in important scenes also corresponds with the findings of previous studies. 72.2% of the scientists were coded as Caucasian, with the only categories being non-human (16.6%) and Asian/Pacific Islander (5.5%).

There consistencies throughout the films in the way scientists were portrayed and little diversity. Few scientists of non-Caucasian ethnicities played any significant role in both the regular and EOTW films analyzed, a large percentage of the scientists were coded to be approximately in the same age range, and there were predominantly male scientists identified. Another sample may have given different results, as seen through a review of other films excluded during the sampling process (for example *Contact* (1997),

*I, Robot* (2004), *Daybreakers* (2009), and *The Andromeda Strain* (1971), which feature either non-human or female scientists). However, there are more similarities than differences between the previous studies (such as the one conducted by Weingart, et. al. (2003)) and the current study.

### *Stereotypes*

Gender roles and stereotypes, as noted by England et. al (2011) and Smith et. al (2012) and seen through traditionally gendered characteristics, were frequently employed. England et. al (2011), found that female characters displayed predominantly feminine characteristics while male characters displayed an almost equal number of masculine and feminine characteristics. The traditional view of the woman in the scope of gender roles would place them in the household, content to take care of the family and the home. However, in the films that were viewed for this study, there was little in the way of representations of home in any of them.

The conclusions that Powers et. al (1993) came to that the representation of women in Hollywood had shifted, allowing females to take on more masculine roles, correlated with the representation of female scientists in the films analyzed in the current study. Although females have taken on more masculine roles, they do so with masculine traits rather than feminine. The lack of overtly feminine traits such as emotions and clothing imply that the female scientists must take on more masculine traits such as assertiveness to be respected in their field, taking into consideration the data that shows that female scientists are often the minority.

Smith & Cook (2008), as well as Steinke (2005) and Powers et. al (1993), also found that romantic lives played a role in the characterization of female characters. Two out of the three coders noted this when it came to the representation of female scientists. Few of the male scientists had any type of romantic relationships (Andrew from *End of the World* and Kelp from *The Nutty Professor* were shown to have romantic relationships as part of their storylines), and almost all of the female scientists were shown to have a romantic relationship (Jo from *Twister*, Karen from *Idaho Transfer*, Raily from *12 Monkeys*, and Zira from *Planet of the Apes* were all involved in relationships). Romantic relationships imply that the character is more feminine than masculine, and this proved true when looking at the scientists as humans and not as scientists. When analyzing the characters as scientists, they all exhibited more masculine traits, but in terms of their outside relationships, more feminine traits were shown.

The prominence of the female characters in contrast to male characters, not specifically scientists in many cases, was also quite telling. Few female characters were identified as main characters and were often seen more as supporting characters. This was found in both the individual scenes as well as overall in each film. Only two of the female scientists in EOTW films were determined to be main characters (Karen from *Idaho Transfer* and Zira from *Planet of the Apes*) while the remaining two females were supporting characters, playing no prominent role in the films as a whole. However, both of the female scientists in the regular science fiction films were considered main characters. In several of the films (such as *Idaho Transfer*, *Deep Impact*, *WarGames*, and *Avatar*), there were female scientists, often unnamed, who were additional background characters, however they played very limited roles. Studies by Smith et al (2012) and

Smith & Cook (2008) found that female characters were underrepresented in film. Both studies found that there were a significantly larger number of male characters than female in speaking roles. This was found to be in direct correlation to the representation of female characters in the films looked at for this study. Out of the 12 EOTW films, only four of the 18 identified scientists were female, contributing just 22.22% of the total population. As for regular science fiction films, there was only a slightly higher representation, with two out of the eight identified scientists (or 25%) being female.

Through the impressions that were gauged from the films, it can be concluded that End of the World films are helpful to the view of the scientist profession. The consensus among the coders was that it was relatively difficult to determine if the scientists fit into any of the preconceived stereotypes that were laid out by Haynes (1994) and Nisbet (2010). Although I was not analyzing the films in terms of these stereotypes specifically, it was asked for the coders to note if they were able to place any of the scientists into these stereotypes. The most common stereotypes that were mentioned were that of the Absent-Minded Professor (such as Gune (*Titan A.E.*) and Kelp (*The Nutty Professor*)), the Mad Scientist (as seen in Whorfin (*The Adventures of Buckaroo Banzai Across the 8<sup>th</sup> Dimension*) and Fujimoto (*Ponyo*)), and the Heroic Adventurer (like Banzai (*The Adventures of Buckaroo Banzai Across the 8<sup>th</sup> Dimension*), Jo (*Twister*), and Grace (*Avatar*)). Other stereotypes as outlined by Haynes and Nisbet were not recognized by the coders.

## *Time*

The time span of this study's films covered a large portion of contemporary film history. It was discovered that concerns, fears, and interests did not follow a linear timeline. On the contrary, the trend was circular, with concerns and the like reemerging after some time or continuing throughout consecutive time periods. The most prominent concerns that were reflected in EOTW and science fiction films were that of extraterrestrial invasion, nuclear disaster/annihilation, natural disasters, and biological/medical experimentation and warfare. These concerns were carried throughout all time periods, not being linked to any specific area of time or to any specific events that occurred in society at the time, such as the concern of alien invasion being represented in films of the 1950s and 60s (*Killers from Space* and *Invisible Invaders*) as well as the 1970s and 80s (*Close Encounters of the Third Kind*, *End of the World*, and *The Adventures of Buckaroo Banzai Across the 8<sup>th</sup> Dimension*) or chemical and medical experimentation, shown in the 1950s and 60s (*The Nutty Professor*), the 1970s and 80s (*Akira*), as well as the 1990s and 2000s (*12 Monkeys*). This is in contrast to Thompson's (2007) belief that the predominant concerns of the time would be reflected in the films that were released in that time period.

The representation of scientists also did not have any significant change over time. As noted in the results, demographics of the scientists, along with the general impression, were rather static, and did not change much from decade to decade. This was in contrast to the initial belief that the portrayal of scientists would directly correlate with the change of concerns and fears. However, as it was noted that there was no real change in the topics addressed in the movies, it would be appropriate to not notice any significant

change in the way scientists were represented in the films. The only real change that was noted was that in the most recent time period, the 1990s and 2000s, the most female scientists were represented. They were shown in larger roles and had much more prominent status in the hierarchy of their fields. While they have retained their relatively masculine traits, these women have become more feminine and are shown more to be in touch with both sides, their masculine, professional side, and their feminine, romantic side.

### *Overall Impression*

It was important to look at the general impression of scientists that could be gained by looking at EOTW films in this study. Whether the scientist was viewed in a favorable or unfavorable light plays a role in the way the scientist is viewed in general and in turn that has an impact on the future potential of interest in the scientific field.

As previously shown in studies by Sumrall (1995), Mead and Metraux (1957), and Losh (2010), scientists are frequently viewed as male, working in a laboratory, and conducting dangerous experiments. This is reflected in the representations of them by both adults and children. One reasoning for this, which was explained in the study conducted by Sumrall was that many feel the need to be able to self-identify with the scientist (1995). The study by Losh had concluded that adults between 1983 and 2001 generally described scientists favorably and endorsed science careers for themselves or their children (2010). Although it cannot be directly concluded that the views that individuals have regarding scientists are influenced by media, specifically film, it can be seen through the previous studies and the results of the current study that there is a

increasingly positive view of scientists that is being projected to the public. This positive view of scientists in film has the potential to encourage students to consider STEM careers as well as help to dispel any fears and concerns the public may have regarding scientists and the science they communicate.

Conclusions can be drawn from the overall impression of scientists in EOTW films. The scientists in these films were found to be framed equally in a scientific and humanistic way. It can be determined that by showing that scientists are not only knowledgeable and are able to use their knowledge to help the world and that they also have lives not unlike the lives of the viewers of the films, it gives an opportunity to move away from the traditional views of scientists that many have had since the time they were young. No longer are scientists simply (generally) men, dressed in lab coats, who are in a laboratory conducting experiments. They are actual people who have relationships and journeys through life who just happen to have the scientific knowledge to contribute to society.

Differences between EOTW films and “regular” science fiction films were minimal. While it wasn’t expected that there would be much variation between the two areas of film, it was originally thought there may be a wider range of representations in “regular” science fiction films because of the larger range of films included in the population. Many factors may have played a part in this conclusion, including the size of the sample, the way the sample was chosen, and the films that were included in the original population.

## Relevance of Goffman

In the process of conducting this study, I began to question whether or not Goffman could be relevant despite the more than 30 years that have passed since the original study was conducted. Goffman's (1976) *Gender Advertisements*, although still relevant in print advertisement, needed to be revised and edited to fit the purposes of this study. Recent studies (Wallis, 2010; Rose et. al, 2012) have used Goffman's six aspects to analyze images in music videos and on social media. Wallis (2010) drew from Goffman's initial study and revised the aspects, using what was relevant and disregarding the rest, while Rose et. al (2012) used the study to help define gender displays. The six aspects were kept intact for the sake of using the complete study in this project, however, several of the aspects (Relative Size, Licensed Withdrawal, The Family, and Function Ranking) were found to be less relevant to the current study than other aspects. Despite this, the use of Goffman is relevant to this study and in the field of media and gender studies because his research helped to define non-verbal cues that assisted in the identification of feminine and masculine traits. Although not all aspects of Goffman may be appropriate for this study, the basic premise of his research can still be used as a basis for looking at gender in visual media.

Goffman's aspects may still be relevant to media studies but some of his other ideas could be considered out of date. For instance, when writing about cross-gender affectional gestures, Goffman states that they "choreograph protector and protected, embracer and embraced, comforter and comforted, supporter and supported, extender of affection and recipient thereof; and it is defined as only natural that the male encompass and the female be encompassed" (1976, p. 9) implying that women are subordinate to



men and need to be taken care of. He goes on to describe domination as being able to be used in all moments, even the most gentle and loving, without causing apparent strain (Goffman, 1976, p. 9), further enforcing the idea of one gender needing to be above the other. A gender-neutral or more balanced view of the relationship between men and women needs to be taken in order to not come across as partial and to take into consideration that in the years since Goffman's initial study, women have chosen to take an increasingly independent stance in their lives. Men and women of all ages are influenced by media and therefore the ideas set by Goffman regarding the hierarchical differentiation between the genders could possibly lead to the reinforcement of gender stereotypes and roles that are slowly changing and evolving and may not be accurate in today's society.

### **Problems and Limitations**

Throughout this project, it was attempted to limit the problems and limitations as much as possible, however, during the course of the data collection process, several issues occurred that needed to be addressed before continuing.

#### *Problems*

The first challenge was accessing accurate synopses of the films before selecting the final sample. While many of the films that were included in the population were categorized as End of the World in both synopses and plot summaries available, several of them were chosen for the final sample, and on the initial viewing, found that they did not contain any EOTW characteristics at all (such as *Millennium* (1989)). This was also

discovered with several films that, in the synopses, were said to contain scientists. For those films, it was discovered that the scientists were only mentioned by other characters and did not appear in the films, or had such a passive role that you were not able to determine anything from their characters. These films were removed from the final sample, as well as the population, and sample selection was done again. Similarly, several films, primarily from the 1950s to the 1970s, were listed on the sites and in books as films, but were, in reality, miniseries or television movies that were not available on DVD or in any other digital format. This was discovered when the titles were being located for viewing. The solution to this issue was to remove the titles from the population before determining the final sample. Another problem that needed to be addressed was difficulty in obtaining enough films that met all of the criteria to have an adequate population to select the final sample from. There was a relatively inconsistent representation of films for each of the decades, with fewer films meeting all of the criteria being found for the 1960s, 1970s, and 1980s. Large numbers of films in the other three decades were compiled while less than 15 films each decade were found for the 1960s through 1980s. This was addressed and resolved by broadening the scope of the search from specifically the world ending or having ended to include the imminent threat of the world ending. The final problem that I had with the collection of the sample was that many of the older films were not available for rent, online streaming or purchase (and if they were for purchase, quite a few of them were rather expensive to buy). This was found to be true for many of the films from the 1960s and 1970s. When it came time to collect the films for viewing, they were ultimately found to be unobtainable, leading me to remove them from the population and run the final sample selection again. Despite

these problems, the data collection went relatively smoothly once the final sample was able to be determined and the films were collected.

### *Limitations*

There are several limitations that should be addressed. The first limitation dealt primarily with the relatively narrow sub-genre of film that was analyzed. Science fiction film, specifically End of the World film, is quite specific and thus resulted in a fairly small population of films when only the films that portrayed scientists were taken into consideration. EOTW films were chosen for this study because of personal interest as well as relevance to concerns and fears of the public in recent years. This limitation can be resolved in a future study by broadening the sub-genre of film to either an entire genre or looking at a greater range of films.

The second limitation had to do with the viewing method for the films. Although I did run several pilot tests before collecting the data and the viewing method was fine for those specific films due to the fact that they were available for on-demand viewing, we ran into difficulties when it was discovered that many of the films needed to be streamed online or were only available for online viewing. Because the data collection was to be done through Google Forms, this caused an issue when there was only one computer. This was resolved by borrowing a second computer for data collection or using the coding manual as a guide and writing the selections down on a piece of paper and inputting the data into the forms at a later date. A wide range of films may have eliminated this limitation as there could potentially have been more films that were available in various formats other than strictly online.

The sample size for this project was fairly limited. Due to time constraints for both myself and my additional coders, I was not able to include as many films as I would have originally liked. In total, viewing the films took each coder approximately 65 hours, which included the viewing of the films, revisiting important scenes, and completing the coding sheets. Another limitation was challenges in finding films that met all of the criteria in each decade. While the more recent decades, such as the 1980s through the 2000s had long lists of films that met the criteria, there were significantly fewer in the 1960s and 1970s. This may have been because records of films may have been more easily accessible for the more recent years, or that there were not as many films that fit the criteria that were made in the earlier years.

The final limitation was that many films in the final sample only contained one primary scientist that was the focus of the important scenes in the film. Although this was not a major cause of concern, it did limit the variation in the representation of the scientists in terms of demographics. Many of the films, in the synopses or summaries, identified several scientists; however, most of these characters were not central and were only named in the credits.

### **Future Research**

There were several areas that were not addressed in the present study. Based on these, I would like to offer suggestions for future research.

First, although this study explored science fiction films in general as a part of the sample and discussion of this study, in comparison to EOTW films, they were not a primary focus in the data that was collected, nor was it an area that was spent looking at

in depth. A broader view of the genre as a whole in terms of portrayal, both racial and gender, would be beneficial in understanding the way not only scientists are depicted, but also in helping to encourage students, young and old, of various ethnicities and genders, to become more involved in science and show them that there are opportunities for everyone. The present study focused on only a small portion of what could potentially be looked at in terms of the depiction of scientists.

Second, the depiction of scientists in films from other genres of film could also be examined. For example, Russell Crowe's character in *A Beautiful Mind*, John Nash, was a mathematician. Another would be Eddie Redmayne's Stephen Hawking in *The Theory of Everything*. While neither of these films is considered science fiction, they both depict a scientist as well as general science information. Science fiction is not the genre for everyone and through the examination of the portrayal of scientists in films from other movie genres, there may be a difference in the way scientists are seen.

A third area that deserves future exploration is gender of all characters, not just scientists in End of the World films. While the current study focused on the scientists, analyzing the depictions of gender and gender stereotypes in the sub-genre as a whole would emphasize how men and women differ or are the same in their reactions and survival techniques in speculative storylines. Traditional gender roles have women taking a much more passive role in a group setting while the men take a larger leadership role, however, this may change or be reinforced when the characters are placed in a situation where the survival or rebuilding of the world is at stake.

Another area of research that was not addressed in this current study was how the gender of the director and screenwriters impact the way scientists are portrayed in films.

Many screenwriters and directors are male, which could influence the predominant portrayal of scientists and also the way that female scientists are characterized.

A cursory search for studies on model minorities, or, as defined by Shim (1998,) a blanket term used to describe originally Japanese and Chinese Americans, but has since been expanded to encompass all Asian American groups (p. 393), netted little results. The term “model minority” has been used to describe Asian Americans who had used their Asian family values to attain the often sought-after American Dream (Shim, 1998, p. 394). Further research on the role of minorities in science fiction film deserves to be done, as it is shown through the findings of this current study that there was a lack of minority representation in the sample.

Finally, future research could examine how these portrayals of scientists in films, of all genres, influence how students view the science profession. The current study only looked at the general impression that was given of scientists and the scientific field, but did not go into the actual impact these films have on whether or not there is any significant impression that is left on those who view them. Although previous research has looked at the way scientists have been portrayed in media and how they impact the audience’s conception of scientific topics (Gerbner, 1987; Barnett, Wagner, Gatling, Anderson, Houle, and Kafka, 2006; Bates, 2005), and also the way television has impacted the way students view the science profession (Potts and Martinez, 1994; Schibeci, 1986; Long, Steinke, and Applegate, 2010), there has been no identifiable study done on looking at the impact science fiction film has on the impression students develop of science and science careers.

## Conclusion

Through the analysis of scientists in End of the World films from 1950 through 2010, it can be concluded that there is little in the way of diversity in the portrayal of these scientists. The hypotheses for each of the research questions posed varied in the support that each had through the data that was collected when the films were viewed. However, although there has been a recent of female scientists being much more engaged in the science and in the primary storyline of the film, they are still shown as being portrayed as masculine.

In the majority of End of the World films, scientists are not shown as the main character or, in many cases, play a significant part in the storyline of the film. The films from the earlier part of the time span showed the scientists in a larger role than more recent films.

Scientists, regardless of gender, were shown in a favorable light, being more helpful than harmful and using their scientific knowledge for good rather than evil. These portrayals have a positive influence on those who may be interested in a scientific occupation or have concerns about the scientific community in general.

School-aged children are the scientists of the future and continued encouragement of STEM fields, along with continuing improvement of classroom instruction in regards to eliminating stereotypes and exposing students to possibilities in science careers could help to open the doors for many. Film can play a large role in that. In the years since 2010, which was the last year included in the sample for this present study, there has been an increase of science fiction films that portray strong female scientists, such as *Gravity* (2013), *Interstellar* (2014), and *Thor* (2011), as well as EOTW films such as *Contagion*

(2011), and these portrayals of scientists can only help to encourage girls to explore science careers.

Recent films have not only shown female scientists in more prominent roles, but have also framed the scientist in an increasingly balanced view. Not only are scientists shown to have outside relationships and go through personal journeys in the storylines of these films, but they are also shown to be able to have a place in the scientific community. Throughout the years, female scientists have often had to be complex enough as to show both aspects of their lives, being characterized as balancing life and work, however, films since 2010 have begun presenting male scientists in the same way. Several films, including *Iron Man 3* (2013) (along with the other two *Iron Man* films), *Big Hero 6* (2014), and *X-Men: First Class* (2011) all involve a male scientist not only being shown as having a life outside of science, but also learning to accept themselves and go on personal journeys that are just an integral part of their storylines as the science is.

Through the results of this present study, I am able to conclude that End of the World films, along with regular science fiction films, are a good way to introduce the science field to students, encouraging them to start discussions about science and begin to explore various possibilities. It is important to look at the way science and scientists are represented in film, not only through gender and stereotypes, but in the way they are characterized. These films are often one of the first places that children are exposed to scientists and could quite possibly have a larger impact on their future aspirations in the scientific field that we would ordinarily believe.



While looking at specific genres does provide information on how groups of people are portrayed in film, one thing that stood out was that regardless of who or what was being analyzed, the relationships between people in the films (between scientists, scientists and others around them, or the relationships that people have with each other) seemed to be an important part of the storyline.

End of the World films have a way of allowing us to enter “What if” situations where we could visualize what would happen if the world as we know ended or if the threat of the end of the world looms closer. They are an effective tool to use to begin conversations and dialogue about the future of the planet, of humanity, and of everything we currently know. The scientists in these films, while often not the focus of the storyline, contribute scientific knowledge that could easily be identified, often times giving a sense of reality to the situations and giving the viewing audience a glimpse into a field we may otherwise be unable to understand.

## **Coding Manual**

**(Final Draft)**

**Thank you for volunteering to help collect data for this thesis project! This Coding Manual contains all of the information you will need to be able to code the films as part of the data collection process.**

### **Project Overview**

The purpose of this study is to determine what gender stereotypes are used in the portrayal of scientists in films about the end of the world.

Through the identification of these stereotypes and other attributes that are associated with scientists in these films, I also hope to be able to identify if there is an overall negative or positive light that the scientist are shown in and whether or not there is the potential to use these films as a way to encourage interest in science and the scientist profession in the educational classroom.

### **Unit of Analysis**

The unit of analysis for this project will be the motion pictures about the End of the World (EOTW) containing portrayals of scientists released from 1950 - 2010. For comparison purposes, other science fiction films containing scientists (those not specifically about the EOTW) were also chosen. Two films from each decade were selected for EOTW films and one was selected for each decade for regular science fiction films.

Three pivotal scenes from the film in each film will be coded in terms of the portrayal of the scientists involved in the scene. Although the three scenes will be individually focused on, the entire film will also be looked at as a whole for the overall representation of the scientist.

Through the sample selection process, only films with identifiable scientists were chosen and we are coding only for those scientists.

### **Steps to Coding**

The following steps are not set in stone. Please review them and follow them as best as possible.

1. Review the Coding Manual
2. Familiarize yourself with the Coding Sheets and instructions.
3. Access the films through the links provided. Please be aware that each of the films has a different Coding Sheet that is specific to that film.
4. Complete the Coding Sheet using the Google Forms link provided to you through e-mail.
5. Submit all completed Coding Sheets within a 2-week period.

### **Coding Sheet Instructions**

1. Please finish sheet as completely as possible.

2. Each question will have a set of instructions that are specific for that question. Please read all instructions before answering question.
3. If you have any questions about any of the components of this coding sheet or your role in the data collection process that cannot be answered by the Coding Manual, please ask.

### **Components of the Coding Sheet**

Descriptions of the possible answers, as well as each of the sets of instructions, are also included. The coding sheet for both End of the World (EOTW) films and “regular” science fiction films are identical. For each of the films, there will be a total of 5 sections of the coding sheet. The top section contains general information about the coder, while the next three sections are in regards to the individual scenes that were chosen. The final section is in regards to the film as a whole.

### **Top of the Coding Sheet**

The top section of the Coding Sheet pertains to information about you, as the Coder, as well as the information for identifying the film.

- **First Name of Coder:** Please write your first name in this space. If you feel more comfortable doing so, you can also just write your first initial.

### **Film Analysis - Scenes 1 - 3**

Each of the films will have three pivotal scenes that will be analyzed individually as well as part of the film as a whole. The top of each section will identify the scene number as well as the time codes for the beginning and end of the scene.

Unless otherwise noted, please select the number or letter that corresponds with your selection.

1. **Name of Scientist Being Analyzed** - Please identify the name of the primary scientist who is playing the largest role in the scene and write it in the space provided. If there is more than one primary scientist that is being portrayed in the scene, please complete a different coding sheet for each.

2. **Gender** - Identify the gender of the scientist. This is the gender that the scientist chooses to identify as through their appearance, mannerisms, and speech, not necessarily the physical gender that the scientist was born as.

A. **Male**

B. **Female**

C. **Cannot be Determined** - If you are unable to determine the gender of the scientist for any reason, please choose this option.

3. **Age** - Please identify the age range of the scientist. Please note that this is not the age of the actor portraying the scientist, but the scientist character. If the main focus of the

scene is a flashback, the age of the individual should be determined from the portrayal during the flashback.

- A. **18 and younger**
- B. **19 - 35**
- B. **36 - 55**
- F. **56 and older**

4. **Race/Ethnicity** - Please identify the ethnic background or race of the scientist.

- A. **African**
- B. **Caucasian**
- C. **Hispanic**
- D. **Asian/Pacific Islander**
- E. **Middle-Eastern**
- F. **Non-Human**

5. **Goffman Traits** (Please choose all applicable traits) - The following traits were employed by Goffman in his book *Gender Advertisements*. Please identify if any of these poses or behaviors was used in the portrayal of the scientist in this scene.

A. **Relative Size** (Goffman believes that “social weight - power, authority, rank office, renown - is echoed expressively in social situations through relative size, especially height” (Goffman, 1976, p. 28). Through this, it is thought that you are able to understand the story at a glance. Relative size could be how the individuals are placed in relation to one another, height differences, and stance.)

1. **Height** - There is an obvious height difference between the scientist and others in the scene. Examples of this could be that the individual is physically taller than the others in the scene (this could be done through footwear, headwear, hair, etc.), the individual standing on a step above the others, the individual standing higher on an incline, or the individual being placed at a higher level physically than the others in the scene.

2. **Stance** - The scientist is positioned or posing to make them seem larger than they really are. Examples of this could be the individual standing tall with their feet placed firmly apart and their hands on their hips, or the individual is wearing items that would give the impression that they are larger, such as layers of clothing. Could also include the individual in relation to the things immediately around them, such as a car or other vehicle, as well as the individual adjusting their pose or position to show strength.

3. **Relationship to Others** - The scientist is placed centrally in the scene in relation to others. This does not have anything to do with the social structure of the relationship, but the physical layout of the scene. Examples of this could be that the individual is shown to be in the center while others are fanned out on either side, the individual is shown to be slightly in front of the others in the scene as the focal point to make them seem larger, or that the individual is standing while others are sitting. Does not include screen time or other aspects that do not directly relate to the size or implied size of the individual.

**B. The Feminine Touch** (According to Goffman, “women, more than men, are pictured using their fingers and hands to trace the outlines of an object or to cradle it or to caress its surface” (Goffman, 1976, p. 29). The Feminine Touch is distinguished from utilitarian touches such as grasps or manipulative holds. Touch does not have to strictly be limited to fingers and hands. The face and self-touching can also be used to demonstrate Feminine Touch.)

1. **Caress** - The scientist uses their hands to caress an item. Examples of this could be an individual gently rubbing another’s cheek, hand, shoulder, or other body part, an individual smoothing the hair away from another’s face or the wrinkles from a piece of clothing, or that the individual is gently running their hand over an item. This only takes into consideration the individual using their hands or fingers to touch another person or an item and only done in a gentle way, not to coerce another.

2. **Cradle** - The scientist uses their hands to cradle an item. Examples of this could be an individual holding a piece of equipment (like a bottle or a thermometer) or other item (such as a rock or book) or an individual cradling a child or an animal. The act of cradling an item, child, or animal, must be shown as being done carefully, without force or aggression (such as gripping, twisting, or squishing).

3. **Self-Touch** - The scientist uses their hands or fingers to touch some part of their own self. This could include the individual brushing their hands over their head, the individual smoothing their clothing, the individual running their fingers through their hair, or the individual running their hands over their arms. Self-Touch is defined by Goffman as being able to be read as “conveying a sense of one’s body being a delicate and precious thing” (Goffman, 1976, p. 31).

4. **Other Touch** - The scientist uses their face or another body part to touch another individual. This could include the individual pressing their face against another or the individual leaning against another. This does not include any touch that could be considered forceful, manipulative, or violence, such as kicking, biting, or the like.

**C. Function Ranking** (There is a hierarchy of functions when portraying an occupational frame. This arrangement, as described by Goffman, is represented in the way that the individuals in the image are placed and represented. This could include the teacher/student relationship, doctor/nurse, or, in more general terms, one individual clearly taking a leadership role over the other. Gestures, body placement, images of one person taking a subordinate role (such as being fed or helped into clothing) could be taken into consideration as part of Function Ranking. Goffman also points out that placing the male in a traditionally female space, such as the kitchen, the nursery, or the living room as it is being cleaned, also lends to Function Ranking as they may “picture the male engaged in no contributing role at all, in this way avoiding either subordination or contamination with a “female” task” (Goffman, 1976, p. 36). He goes on to say that often male characters are engaged in these tasks in an unrealistic way or as almost a joke to show that it should not be taken seriously or in a way that would show that he is being subordinate.)

1. **Subordinate Role** - This would indicate that the individual is not taking a leadership role in the scene. Examples of this would be that the individual is looking up at another individual (while the other is taking a leadership role, not due to height difference), that the individual is being led through the scene, or that the individual is being taught.
2. **Leadership Role** - This would indicate that the individual is the superior in the scene. Examples of this would be that the individual is teaching others, the individual is explaining something to others, or that the individual is pointing something out to others.
3. **No Contributing Role** - This would indicate that the individual is neither subordinate or superior and that he or she is taking a passive role in the scene. Examples of this would be that the scene shows a male scientist in a clearly female environment but has him engaged in the role in an unrealistic way such as the male sitting on the side while the others around him are working or having the female cleaning and organizing piles of things while the others in the scene are involved in a discussion. Another example would be if there is simply a conversation going on whether there is no clear leader or subordinate. All parties in the scene are at the same level.

D. **The Family** (Goffman states that “the nuclear family as a basic unit of social organization is well adapted to the requirements of pictorial representation” (Goffman, 1976, p. 37). Through the positioning of the family members, the image of The Family can “serve as a symbolization of the family’s social structure” (Goffman, 1976, p. 37). Often, the way the images are posed, there is a clear relationship between the mother and daughter and father and son. When there is no son (or father) present, the male is pictured to be set apart from the others in the image. This family structure can be represented in the films as the scientist’s family being in the scene or a shot of a family photograph that is focused on.) Family could include the scientist’s personal family structure or work family structure. If there are parts of the scene where the scientist is the focus and parts when the scientist is part of the larger group, use the parts of the scene where the scientist is the most involved with the scene to answer this question. If it is unclear from the scene which gender dominates the family unit, please think of it in terms of which gender is taking a bigger role in the scene, this could be that the others in the scene clearly support one gender more positively.

1. **Female Dominated Family Unit** - The female scientist is clearly the head of the family unit. Examples of this could be that the female scientist is a higher rank than the others and they defer to her, or that there is a strong camaraderie between the female scientists in the scene. This only is applicable in scenes where the female scientist is the focus of the scene and not when someone who is not in the scientific community is the focus.
2. **Male Dominated Family Unit** - The male scientist is clearly the head of the family unit. This could be shown through the male scientist being a higher rank than the others, a strong camaraderie among the male scientists, or the male scientist, although standing apart from the others, giving a sense of protectiveness. This only is applicable in scenes where

the male scientist is the focus of the scene and not when someone who is not in the scientific community is the focus.

E. **The Ritualization of Subordination** (“A classic stereotype of deference is that of lowering oneself physically in some form or another of prostration. Correspondingly, holding the body erect and the head high is stereotypically a mark of unashamedness, superiority, and distain” (Goffman, 1976, p. 40). The Ritualization of Subordination can be shown through one individual sitting on the floor while the other is standing, or someone lying on the bed or another surface. Bowing, curtsying, and other forms of respectful deference is also considered, as are shoulder holds, difference in height due to the composition of the scene, the way that one individual is held by another (such as a male putting his arm around the female in a gesture that could be considered protective and possessive,) and hand holding where one individual could be seen as leading the other. Other aspects of The Ritualization of Subordination that could be taken into consideration are “canding postures,” such as the bending of a knee, the level of the head being lowered relative to that of others, or the slight tilt to the side of the body. These postures can be considered “an acceptance of subordination, an expression of ingratiation, submissiveness, and appeasement” (Goffman, 1976, p. 46).)

1. **Respectful Deference** - The scientist consistently shows respectful deference to another person. This could entail bowing, curtsying, or kneeling.
2. **Sitting** - The scientist shows subordination through sitting while others are standing.
3. **Canding Postures** - The scientist is seen standing in a position that subtly implies subordination. Canding postures include the bending of a knee, the level of the individual’s head being lowered in relation to that of others, the slight tilt of the body to the side, or slouching.
4. **Lying Down** - The scientist is seen lounging or lying on a surface. This could be a bed, couch, lounge chair, or other piece of furniture, but could also include desks, tables, counters, or other.
5. **Body Position** - The scientist is seen in relation to others as subordinate. This could be seen as someone having their arm around the individual in a possessive or protective way, or the hand of the individual being held in a way in which it is implied that he or she is being led. Another aspect could be that the scientist is lower than others in terms of height or placement.

F. **Licensed Withdrawal** (This is considered to be when the subject of the scene or the image emotionally or physically withdraws. One of the ways this could be done is a character covering their mouth or face with their hands, turning away from others, or generally concealing emotions. Finger biting or other suggestions of anxiety, such as finger-to-finger hand placement (generally when the subject’s fingertips are touching) are also considered representations of Licensed Withdrawal. Aversion to eye-contact, such as head canting (as mentioned previously), gazing off into the distance or a unseen destination as if mentally distancing themselves, speaking on the phone instead of focusing on the situation

at hand, placing objects in front of their face as a barrier or shield, or placing themselves physically behind an object or a person is also representations of Licensed Withdrawal.)

1. **Using Hands to Cover Expression** - The scientist is seen as emotionally withdrawing by using their hands to cover either their mouth, eyes, or entire face to conceal their facial expression.
2. **Anxiety Cues** - The scientist is seen as showing anxiety. This could be done physically, such as through finger biting or wringing of hands.
3. **Avoidance** - The scientist is seen as avoiding eye contact with others either obviously, with not looking at the other person, or in less obvious ways, by glancing away or looking down.
4. **Distance Gazing** - The scientist is seen as emotionally withdrawing by gazing off into the distance or at an unseen destination as if mentally distancing themselves. A blank look in their eyes or a steady gaze at something other than the focus of the scene could be cues of this.
5. **Shift of Focus** - The scientist is seen as avoiding the situation at hand by focusing their attention on something else. Examples of this could be that the individual is talking on the phone rather than paying attention to others speaking, reading, or engaging in another activity that draws their attention away.
6. **Barriers** - The scientist is seen as physically withdrawing by placing an item in front of themselves as a barrier or shield. Examples of this could be the individual holding up a book or other form of reading material, partially concealing themselves with a wall or piece of furniture (like hiding behind a computer screen), or placing another person in front of them. Does not include an item that would serve a normal function in the scene (such as a steering wheel or weapon) unless it is deliberately placed in front of the individual to separate them from others.

### **Overall Film Analysis**

This section of the coding sheet will address the film as a whole. Please choose the most appropriate selection from the choices given.

1. **Representation of Male and Female Scientists** - There is often a difference in the representation of gender when it comes to various social groups and occupations. Please choose which is the most applicable to the film you are analyzing.
  - A. **More Female Scientists than Male** - There were more female scientists portrayed than male scientists.
  - B. **More Male Scientists than Female** - There were more male scientists portrayed than female scientists.
  - C. **Approximately Equal** - The number of male and female scientists were relatively equal. There was no significant difference in the representation of either gender.
2. **Overall Impression of Scientists** - The overall impression of the scientists portrayed in the film is what light they are being shown in.



A. **Favorable** - The representation of the scientist was overall favorable. This could include that the science was shown in a favorable light and the scientist was shown as wanting to do good in his or her field. Other examples could be that the scientist was seeking to solve a problem that could have otherwise badly affected the population and the world as a whole. This should not be confused with a good winning over evil situation.

B. **Unfavorable** - The representation of the scientist was overall unfavorable. This could include that the science was shown in an unfavorable light and the scientist was shown as wanting to destroy the world or use the science to cause damage to the world or to individuals.

C. **Neutral** - The representation of the scientist was overall neutral. There were no favorable or unfavorable qualities to the science or the scientist or the good and bad cancelled each other out.

3. **Gender Traits** - Specific traits are commonly associated with each gender. This list of traits was compiled through conversations with University of Nevada, Las Vegas students as well as easily accessible websites online. Please select any of the traits that you believe were employed in the characterization of any of the scientists at any point in the film. For this question, you do not need to focus on any particular scientists, but all scientists represented. **Note:** This question is broken up into two sections: Gender Traits - Female Scientists and Gender Traits - Male Scientists. If there were no female scientists at all represented in the film, please choose No Female Scientists. If there were no male scientists represented at all in the film, please choose No Male Scientists.

- A. Dependent
- B. Independent
- C. Shy
- D. Aggressive
- E. Outgoing
- F. Gentle
- G. Assertive
- H. Tough
- I. Nurturing
- J. Quiet
- K. Sensitive
- L. Emotional
- M. Athletic
- N. Compassionate
- O. Analytical
- P. Ambitious
- Q. Graceful
- R. Loyal
- S. Reserved
- T. Accepting
- U. Strong
- V. Soft spoken
- W. Self sufficient
- X. Leader

- Y. Competitive
- Z. Decisive

5. **Frame** – Please determine the primary way that scientists in the film are framed. A frame, as defined by Entman, is a selection of certain aspects of an issue and highlighting those aspects in such a way that will result in a particular reaction from those who are exposed to them (Entman, 1993, p. 51). In other words, please identify the primary way the filmmakers are trying to highlight the scientist.

A. **Scientific** – The focus of the scientist is on the science. There is little in the way of anything else within the storyline of the scientists in the film. Little is told about the individual in terms of personal stories or relationships.

B. **Humanistic** – The focus of the scientist is on the human side of the character. Much of the storyline involving the scientist is on relationships, personal journeys, and showing that the individual is a person first and a scientist second.

C. **Gender-Specific** – The focus is primarily on the reinforcement of gender roles and stereotypes in the portrayal of the scientist. There is little in the way of any of the other framing categories.

4. **Notes/Observations** - Please note any interesting observations you may have had in regards to the scientist in the larger scope of the film. This may include things like the scientist's prominence in the storyline, his/her relationships with other scientists or individuals, or camera angles (if the scientist is only shown through close-ups or full-body shots, if the scientist is primarily shown on his/her own or with another, etc.).

#### **Additional Information**

- If you need any clarification on any part of this Coding Manual during or after the training, or any part of the Coding Sheet at any time, please call/text me (808) 989-0457, send me an e-mail at [luij@unlv.nevada.edu](mailto:luij@unlv.nevada.edu), or Yahoo Messenger me at jeni\_lui.

Thank you once again for helping me collect data for this thesis project!

## APPENDIX B – CODING SHEET

Edit this form

### Coding Sheet

**\*Coding Sheet Instructions\***

Please finish sheet as completely as possible.

Each question will have a set of instructions that are specific for that question. Please read all instructions before answering question.

If you have any questions about any of the components of this coding sheet or your role in the data collection process that cannot be answered by the Coding Manual, please ask.

**\* Required**

### General Information

This section pertains to information about you, as the Coder, as well as the information for identifying the film.

Title of Film:

Release Year:

Link to Film:

**First Name \***

If you do not feel comfortable using your full first name, please put your first initial.

### Film Analysis - Scene #1

Time Code Start:

Time Code End:

Description of Scene:

**Name of Scientist Being Analyzed \***

Please identify the name of the primary scientist who is playing the largest role in the scene and write it in the space provided.

**Gender \***

Please identify the gender of the scientist. This is the gender that the scientist chooses to identify as through their appearance, mannerisms, and speech, not necessarily the physical gender the scientist was born as.

- Male
- Female
- Cannot be Determined

**Age \***

Please identify the age range of the scientist. Please note that this is not the age of the actor portraying the scientist, but the character.

- 18 and younger
- 19 - 35
- 36 - 55
- 56 and older

**Race/Ethnicity \***

Please identify the ethnic background or race of the scientist.

- African
- Caucasian
- Hispanic
- Asian/Pacific Islander
- Middle-Eastern
- Non-Human

## Goffman Traits

For each question, please choose all of the applicable traits that were employed in the portrayal of the scientist in the scene.

**Relative Size \***

- Height
- Stance
- Relationship to Others
- None Were Employed

**Feminine Touch \***

- Caress
- Cradle
- Self-Touch
- Other Touch
- None Were Employed

**Function Ranking \***

- Subordinate Role
- Leadership Role
- No Contributing Role

**The Family \***

- Female Dominated Family Unit
- Male Dominated Family Unit

**The Ritualization of Subordination \***

- Respectful Deference
- Sitting
- Canding Postures
- Lying Down
- Body Position
- None Were Employed

**Licensed Withdrawal \***

- Using Hands to Cover Expression
- Anxiety Cues
- Avoidance
- Distance Gazing
- Shift of Focus
- Barriers
- None Were Employed

## Film Analysis - Scene #2

Time Code Start:

Time Code End:

Description of Scene:

**Name of Scientist Being Analyzed \***

Please identify the name of the primary scientist who is playing the largest role in the scene and write it in the space provided.

**Gender \***

Please identify the gender of the scientist. This is the gender that the scientist chooses to identify as through their appearance, mannerisms, and speech, not necessarily the physical gender the scientist was born as.

- Male
- Female
- Cannot be Determined

**Age \***

Please identify the age range of the scientist. Please not that this is not the age of the actor portraying the scientist, but the character.

- 18 and younger
- 19 - 35
- 36 - 55
- 56 and older

**Race/Ethnicity \***

Please identify the ethnic background or race of the scientist.

- African
- Caucasian
- Hispanic
- Asian/Pacific Islander
- Middle-Eastern
- Non-Human

## Goffman Traits

For each question, please choose all of the applicable traits that were employed in the portrayal of the scientist in the scene.

**Relative Size \***

- Height
- Stance
- Relationship to Others
- None Were Employed

**Feminine Touch \***

- Caress
- Cradle
- Self-Touch
- Other Touch
- None Were Employed

**Function Ranking \***

- Subordinate Role
- Leadership Role
- No Contributing Role

**The Family \***

- Female Dominated Family Unit
- Male Dominated Family Unit

**The Ritualization of Subordination \***

- Respectful Deference
- Sitting
- Canding Postures
- Lying Down
- Body Position
- None Were Employed

**Licensed Withdrawal \***

- Using Hands to Cover Expression
- Anxiety Cues
- Avoidance
- Distance Gazing
- Shift of Focus
- Barriers
- None Were Employed

## Film Analysis - Scene #3

Time Code Start:

Time Code End:

Description of Scene:

**Name of Scientist Being Analyzed**

Please identify the name of the primary scientist who is playing the largest role in the scene and write it in the space provided.

**Gender**

Please identify the gender of the scientist. This is the gender that the scientist chooses to identify as through their appearance, mannerisms, and speech, not necessarily the physical gender the scientist was born as.

- Male
- Female
- Cannot be Determined

**Age**

Please identify the age range of the scientist. Please not that this is not the age of the actor portraying the scientist, but the character.

- 18 and younger
- 19 - 35
- 36 - 55

- 56 and older

### **Race/Ethnicity**

Please identify the ethnic background or race of the scientist.

- African
- Caucasian
- Hispanic
- Asian/Pacific Islander
- Middle-Eastern
- Non-Human

## **Goffman Traits**

For each question, please choose all of the applicable traits that were employed in the portrayal of the scientist in the scene.

### **Relative Size**

- Height
- Stance
- Relationship to Others
- None Were Employed

### **Feminine Touch**

- Caress
- Cradle
- Self-Touch
- Other Touch
- None Were Employed

### **Function Ranking**

- Subordinate Role
- Leadership Role
- No Contributing Role

### **The Family**

- Female Dominated Family Unit
- Male Dominated Family Unit

### **The Ritualization of Subordination**

- Respectful Deference



- Sitting
- Canding Postures
- Lying Down
- Body Position
- None Were Employed

#### **Licensed Withdrawal**

- Using Hands to Cover Expression
- Anxiety Cues
- Avoidance
- Distance Gazing
- Shift of Focus
- Barriers
- None Were Employed

## **Overall Film Analysis**

This section of the coding sheet addresses the film as a whole. Please choose the most appropriate selection from the choices given.

#### **Representation of Male and Female Scientists \***

- More Female Scientists Than Male
- More Male Scientists Than Female
- Approximately Equal

#### **Overall Impression of Scientists \***

- Favorable
- Unfavorable
- Neutral

#### **Gender Traits - Female Scientists**

Please check the traits that were used in the characterization of any female scientists in the film. This includes all female scientists, whether or not they were named. If there were no female scientists in the film, please select "No Female Scientists"

- dependent
- independent
- shy
- aggressive
- outgoing
- gentle
- assertive

- tough
- nurturing
- quiet
- sensitive
- emotional
- athletic
- compassionate
- analytical
- ambitious
- graceful
- loyal
- reserved
- accepting
- strong
- soft spoken
- self sufficient
- leader
- competitive
- decisive
- No Female Scientists

**Gender Traits - Male Scientists**

Please check the traits that were used in the characterization of any male scientists in the film. This includes all male scientists, whether or not they were named. If there were no male scientists in the film, please select "No Male Scientists"

- dependent
- independent
- shy
- aggressive
- outgoing
- gentle
- assertive
- tough
- nurturing
- quiet
- sensitive
- emotional
- athletic
- compassionate
- analytical

- ambitious
- graceful
- loyal
- reserved
- accepting
- strong
- soft spoken
- self sufficient
- leader
- competitive
- decisive
- No Male Scientists

**How were scientists in the film framed?**

- Scientific
- Humanistic
- Gender-Specific

**Notes/Observations \***

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## APPENDIX C – FILM SCENE SUMMARIES

This section contains summaries of the selected scenes for each of the films that were in the final sample. They are arranged with each decade grouped together, the EOTW films first and then the “regular” science fiction film. The scientist that was identified as the focal point in the scene is emphasized.

### 1950

#### *On the Beach* (1959)

Scene 1 – At a party thrown by Peter and Mary, **Julian Osborne** gets into a heated argument with another guest. He emphatically states that he believes the war that had ended just a few years prior had been carefully planned by the government, but the imminent threat of nuclear annihilation of the world due to fallout from the nuclear bombs that were deployed was an accident. This causes everyone in attendance to drop silent and realize the gravity of what he had said.

Scene 2 – It was discovered by the military that the previous theory that had been offered by (unnamed) scientists in an earlier scene (that the radiation would disperse in the atmosphere before reaching the Southern Hemisphere) was incorrect and that in fact the radiation levels were intensifying. **Julian Osborne**, the scientist onboard the military submarine concludes, to the horror of the sailors also onboard, that there is no way to stop the end from coming.

Scene 3 – One of the crew members under the command of Commander Towers falls ill. He is examined by **Dr. King**, who tells him and Commander Towers that it is the first case of the radiation sickness that is slowly going to wipe out the world. Dr. King tells

Towers in private that it is not a freak incident and that the radiation has arrived sooner than they expected it to.

*Invisible Invaders* (1959)

Scene 1 – In the middle of the night, an unnamed alien, inhabiting the recently buried Noymann's body, visits **Dr. Penner**, informing him that if the Earth does not surrender to an alien force within 24 hours, they will begin to take over the planet by inhabiting the bodies of the dead and causing chaos. The alien then demonstrates to Penner that they are able to make things invisible, preventing humans from stopping them.

Scene 2 – In an underground bunker with his daughter, Phyllis, John, a family friend, and Major Bruce Jay, **Dr. Penner** reveals that he has a plan to capture an alien to study how they are able to combat the fact that they are invisible when not inhabiting the body of a human. It is the first viable plan that any of them has come up with.

Scene 3 – **Dr. Penner** reveals to the others his sound machine that he plans to use to defeat the invaders. The machine would create a sound that would disrupt whatever mechanism the aliens were employing to make themselves invisible. The device would also kill the alien in the process. Penner was inspired to create the machine when he recalled a similar machine the alien had shown him on that first night.

*Killers from Space* (1954)

Scene 1 – **Dr. Martin** is presumed dead after his plane crashes while surveying the damage from an atomic test. Although his body is not found with the wreck of the plane and the remains of the pilot, he is thought to have also perished. Suddenly he arrives on

foot to the air base, seemingly unhurt, with no recollection of what happened to him but with a strange scar on his chest.

Scene 2 – Placed under a truth serum, **Dr. Martin** tells a story of how he was abducted by aliens who seek to inhabit the Earth after the destruction of their own world. The aliens are seeking refuge in a mountain close to where Dr. Martin's plane crashed after the atomic test and use the energy that is released by the bombs to power to power their technology. They have erased Dr. Martin's memory and hypnotized him into getting them the information they desire about upcoming atomic tests.

Scene 3 – Remembering everything he had endured, **Dr. Martin** escapes the military base where he is being held for his own safety (because they believe that he has had a traumatic event and had gone a little crazy) and heads to the electrical power plant where he believes that if he shuts off the power for just a few seconds, he will be able to destroy the alien base.

## 1960

### *Planet of the Apes* (1968)

Scene 1 – Taylor and the other astronauts are captured by apes that are not unlike human beings in our present time. When he awakes, he finds that he is in a hospital. **Zira** is the doctor that is taking care of him and she finds him interesting as she watches him attempt to communicate with them.

Scene 2 – Taylor realizes that if he is unable to communicate verbally with the apes, he could attempt to communicate through written communication. He takes **Zira's** pen and

paper, writing a note to her telling her his name. Zira gets excited when she realizes that he is not the animal that they believed humans to be.

Scene 3 – **Cornelius**, after taking Taylor, Zira, and Dr. Zaius into the cave in the Forbidden Zone where he had found artifacts from a non-simian civilization a year earlier, proves to the others that there had been a civilization before theirs. It was a civilization that was much like theirs, and that is the civilization Cornelius believes Taylor may have come from.

***Dr. Strangelove or: How I Learned to Stop Worrying and Love the Bomb*** (1963)

Scene 1 – The Russian ambassador reveals that they have created a Doomsday device that could destroy all living things. **Dr. Strangelove** confirms that such a device could do the damage that the ambassador is warning of. He also states that the Doomsday device would only be an effective deterrent if everyone knew about it.

Scene 2 – **Dr. Strangelove** describes what would happen if the Doomsday device did detonate. He recommends that the President gather several hundred thousand people, with a high female to male ratio, to live in deep mineshafts underground where the radiation would not penetrate, then institute a breeding program that would help to repopulate the Earth.

Scene 3 – There was no scene three identified for this film. Dr. Strangelove, the only scientist portrayed in the film, was only in the two scenes above.

*The Nutty Professor* (1963)

Scene 1 – **Professor Kelp** is working in his lab when he creates a potion that initially turns him into a monster. However, we find that it eventually turns him from a geeky scientist into the handsome, smooth, Buddy Love.

Scene 2 – Wondering what would happen if he ever lost the formula, forgot it, or someone tried to steal it, **Professor Kelp** makes a copy of the formula, deciding to send it to his parents for safe keeping because there is no one else he can trust with a copy of it.

Scene 3 – **Professor Kelp's** bird, Jennifer, destroys his copy of the formula, preventing him from being able to create the potion so he can turn into Buddy Love for a student dance. However, he calls his parents and asks his father to read the formula to him over the phone. Professor Kelp is able to make a little of the potion, but in the middle of the dance he turns back into himself, revealing his secret.

**1970**

*Idaho Transfer* (1973)

Scene 1 – Karen joins **Isa** at a government facility near lava fields in Idaho. Isa takes her through the steps of how they would travel into to the other matter transfer unit in the lava fields, where they conduct field studies. It's in the lava fields that Karen learns that a mysterious ecological disaster has wiped out civilization in the future.

Scene 2 – The government closes the facility, cutting off power to the transfer units. Anyone over the age of 20 is trapped in the future, where they had sent the young scientists, including **Karen**. However, it's revealed that anyone over 20 would not



survive very long after using the matter transfer units. Karen and some of the others plan to leave the lava fields in search of any other people and help.

Scene 3 – **Karen** returns to the transfer station where she is attacked by another researcher. She is able to transfer back to present time to get away, however is almost caught in the facility by government officials who had been posted there. Karen transfers back out to the surprise of the officials, but somehow ends up in a different time than she anticipated.

***End of the World*** (1977)

Scene 1 – **Andrew** is able to decode a message from space warning of a great earth disruption. However, before he is able to look more into it, he leaves for a banquet with his wife. Hours later, news reports of an large earthquake in China make Andrew believe that it could not be a coincidence.

Scene 2 – **Andrew** intercepts a message to space from Earth describing him and his wife. Concerned, they return to the convent where they had originally had strange feelings about the occupants and are captured. Andrew and his wife discover that the inhabitants of the convent are aliens and he is asked to help get them what they need to be able to return home before the Earth is destroyed or he will lose his wife.

Scene 3 – The aliens reveal that they are going to destroy Earth using a series of natural disasters, the first being the earthquake in China. **Andrew** and his wife are invited to go to the alien planet instead of being destroyed with the planet because they feel his scientific knowledge could help them. The aliens leave and Andrew follows with his wife.

*Close Encounters of the Third Kind* (1977)

Scene 1 – **Lacombe** goes to the desert in India with a group from the United Nations to investigate reports that the strange UFOs that have been seen around the world make an unusual five-tone musical phrase. As Lacombe looks more into it, he is able to recreate the sound using Curwen hand signs.

Scene 2 – The aliens respond to the broadcasting of the 5-note phrase using a series of seemingly meaningless numbers. However **Laughlin** is able to use his skills as a cartographer to decipher the numbers and discovers that they have been receiving geographic coordinates.

Scene 3 – When the UFOs arrive in Wyoming, **Lacombe** is able to communicate with them through the musical phrase. This prompts more ships to arrive, including the Mothership, who returns all of the missing people that were taken over the decades.

**1980**

*Akira* (1988)

Scene 1 – Tetsuo is examined by **Dr. Onishi** who discovers that he possesses psychic abilities similar to Akira, who caused nuclear-like destruction of Tokyo 31 years prior. Dr. Onishi claims that Tetsuo may be key to solving a problem they had with Akira years before, however the government feels that there is too much of a risk because Tetsuo's powers may get out of hand.

Scene 2 – Tetsuo begins having hallucinations and goes to confront the three young espers who are responsible for them. His anger grows as he begins to realize how much

power he has and **Dr. Onishi** attempts to calm him down before he is able to cause more damage.

Scene 3 – Tetsuo’s mental abilities reach their peak and he goes to the stadium where Akira’s remains are housed. Colonel Shikishima arrives only to find out that **Dr. Onishi** has still been monitoring and experimenting on Tetsuo despite orders to stop.

### ***WarGames*** (1983)

Scene 1 – **Dr. McKittrick**, in a meeting with two US government officials and the NORAD commanding officer, suggests that they replace the humans in the nuclear missile command bunker with computer software. This is to ensure that there would be no hesitation when it came time to press the proper commands to launch a nuclear attack.

Scene 2 – David is taken into custody by the FBI and taken to NORAD. **Dr. McKittrick** meets with the agents and learns how David was able to get into the system using Dr. Falken’s password. David is then grilled by Dr. McKittrick, who believes that he deliberately hacked into the system.

Scene 3 – David, Jennifer, and **Dr. Falken** arrive at NORAD to attempt to convince them that Joshua is coordinating the “attack” and that it is not real. Dr. Falken convinces them to ride out the attack and not cause WWIII. As the time to the “attack” ticks down, Dr. Falken and David realize that Joshua keeps going because he does not know that certain games are unwinnable so they teach him to lose.

*The Adventures of Buckaroo Banzai Across the 8<sup>th</sup> Dimension* (1984)

Scene 1 – **Dr. Lizardo**, while watching the news that Buckaroo was able to drive a car through a mountain, has a flashback of when he and his colleagues tried to create an overthruster to do the same thing. Dr. Lizardo was stuck halfway into the 8<sup>th</sup> dimension, his mind being taken over by Lord Whorfin, causing him to go crazy.

Scene 2 – **Buckaroo** participates in a press conference where he announces that there are aliens living among the humans in disguise. He holds up an alien organism that had been stuck to the undercarriage of his car when he went through the mountain as proof of the existence of aliens.

Scene 3 – **Buckaroo** enters an escape pod attached to Lord Whorfin's ship in an attempt to stop him from taking over Planet 10, whose inhabitants had contacted him asking for help. When the pod is set free from the ship, Buckaroo uses the laser on the pod to destroy Lord Whorfin's ship.

**1990**

*Deep Impact* (1998)

Scene 1 – The President of the United States announces there is a comet heading towards Earth that will potentially cause mass extinction and wipe out humanity.

**Monash** introduces the team that will be heading into space with him with the mission to divert the comet using nuclear weapons.

Scene 2 – The Messiah team leans on the surface of the comet and attempts to plant nuclear bombs under its surface. When Monash is injured due to unfiltered sunlight, **Tanner** takes over as leader of the team.

Scene 3 – **Tanner** and the other astronauts formulate a plan to destroy the larger of the two comets that are heading towards the Earth and give the planet a chance of survival. They decide that they are going to go on a suicide mission with the remainder of the nuclear bombs and accept the fact that they will die. Tanner ensures that as many of the crew members are able to say goodbye to their loved ones.

### *12 Monkeys* (1995)

Scene 1 – **Dr. Raily** is called in to see a prisoner who assaulted 5 police officers. Cole tries to tell her that he needs to be released so that he can collect the data he was sent to get. When she tells him that the year is 1990, he tells her that it's the wrong time. Raily tries to understand what is going through his mind but is forced to hospitalize him.

Scene 2 – Cole kidnaps **Raily** and forces her to take him to Philadelphia. She recognizes him when he mentions something he had said when he first encountered her in 1990. Cole tells her his story about why he was there from the future and she begins to believe him.

Scene 3 – Cole and Raily arrive at the airport where they see **Dr. Peters**, who is on a multi-city trip that matches up with the locations where the virus that destroyed the planet was released. Going through the security check, Dr. Peters is shown to have biological samples in his carry on, which he eventually is able to take on the plane with him.

Presumably the samples contain the virus.

*Twister* (1996)

Scene 1 – When her estranged husband Bill shows up to have divorce papers signed, **Jo** attempts to distract his attention by explaining to his fiancée how some of the equipment they are using to track tornadoes work. She shows the Dorothy, a piece of equipment that she had made based on Bill's design, that would allow them to study the inside of a tornado, giving them information on how to create a more advanced warning system.

Scene 2 – The team encounters an F3 tornado and attempt to beat Jonas, a rival, there. **Jo** drives Bill's truck trying to get ahead of the tornado and launch Dorothy. However, they are unable to because a telephone pole crashes into the bed of the truck, disabling the unit.

Scene 3 – Bill and **Jo** are able to deploy Dorothy by using the truck as an anchor. This leaves them on their own with the approaching tornado. They tie themselves to irrigation pipes using leather straps and ride out the tornado together.

**2000**

*Titan A.E.* (2000)

Scene 1 – Cale is brought into Korso's team and learns how he can help to save the galaxy from the Drej. **Gune** takes a liking to him and although Cale thinks he's a little strange, there is no animosity between them.

Scene 2 – Cale tells the team that the Drej have copied the map to the Titan while he was their captive. Korso wants to get there before the Drej do and **Gune** deciphers the map, showing them the way to the ship.

Scene 3 – **Gune** and Stiff are left behind on the ship while Korso and Preed follow Cale to the Titan. After they leave, Gune voices his distrust of Korso to Stiff and Preed attempts to blow them up. Both Gune and Stiff survive the blast.

*Ponyo* (2008)

Scene 1 – While **Fujimoto** is standing outside their submarine, Ponyo, then known as Brunhilde, floats away on the back of a jellyfish. Fujimoto is shown gathering essence from the environment around him under the water, although at the time it was unknown what he was collecting it for.

Scene 2 – Ponyo and **Fujimoto** argue when he will not allow her to return to land to be with Souske. She voices her desire to become human and stay with Souske but Fujimoto believes that Ponyo belongs in the ocean with her siblings. When she uses Fujimoto's magic to become human, Ponyo inadvertently unleashes a large amount of magic into the ocean, creating an imbalance of nature and causing a tsunami which covers most the town.

Scene 3 – When he realizes how much Souske and Ponyo mean to each other, **Fujimoto** allows Ponyo to remain with Souske and asks him to take care of her. Although the water has not receded, it's shown that there are many people who rode out the tsunami in their homes.

*Avatar* (2009)

Scene 1 – Despite her dislike for Jake, **Grace** brings him into the lab where he is synced to his avatar for the first time. She explains to him how the avatar works and how it can be used.

Scene 2 – Jake reports to Commander Quaritch on the Sacred Tree he had asked about.

**Grace** decides to move the team and the avatar program into the mountains. It's implied that she knows that Jake is working with the military and business people.

Scene 3 – **Grace** tries to reason with the commander and the others, trying to get them to stop destroying the forest. After they destroyed the hometree, she finds out that Jake has been working with Quaritch as originally thought. She dies when the commander shoots her.



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## CURRICULUM VITAE

Jennifer Naoko Lui  
3241 Key Largo Drive, Apt. 103, Las Vegas, NV 89120  
(808) 989-0457 / luij@unlv.nevada.edu

### EDUCATION

- Master of Arts – Journalism and Media Studies 2015  
University of Nevada, Las Vegas Las Vegas, Nevada
- Thesis: *The End of the World (EOTW) Scientist and the Framing of Science in Science Fiction Films from 1950 – 2010*
  - Committee: Chair, Julian Kilker, Ph.D., Gary Larson, Ph.D., Olesya Venger, Ph.D., David Vallett, Ph.D.
- Bachelor of Arts – Communication 2010  
University of Hawai‘i at Hilo Hilo, Hawai‘i
- Bachelor of Arts – English 2009  
University of Hawai‘i at Hilo Hilo, Hawai‘i
- Concentration: Cultural Studies
  - Academic Certificate: Women’s Studies

### PRESENTATIONS

- Lui, J.** “The Portrayal of Women in Selected Japanese Science Fiction Films” FWPCA/ACA 27th Annual Conference 2015, Las Vegas, NV, February 20 – 22, 2015.
- Lui, J.** “The First Amendment and Virtual Worlds: A Look at the Current Issues” FWPCA/ACA 26th Annual Conference 2014, Las Vegas, NV, February 21 – 23, 2014.
- Lui, J.** “Just Add Milk: A Content Analysis of Homogenized Money Shots” FWPCA/ACA 26th Annual Conference 2014, Las Vegas, NV, February 21 – 23, 2014.
- Lui, J.** “Outside These Four Walls: The Potential of Social Media in Higher Education” FWPCA/ACA 26th Annual Conference 2014, Las Vegas, NV, February 21 – 23, 2014.

### PUBLICATIONS

- Lui, J.** (2008). Literature in Hawai‘i: Who Gets to Write It?. *Hohonu: A Journal of Academic Writing*. 41 – 43.
- Lui, J.** (2008). Strange Love in Frankenstein and *The Murders in the Rue Morgue*. *Hohonu: A Journal of Academic Writing*. 83 – 85.