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Natural Disaster Films: A Social Learning and Perceived Realism Perspective

Melissa Seipel

A thesis submitted to the faculty of
Brigham Young University
in partial fulfillment of the requirements for the degree of

Master of Arts

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ABSTRACT

Natural Disaster Films: A Social Learning and
Perceived Realism Perspective

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This study investigates the relationship between social learning and perceived realism in the context of an entertainment media text, the 2015 movie *San Andreas.* As a fictional natural disaster movie, this film depicts several safety and survival techniques that could potentially be observed and adopted by audience members should they face a similar situation (i.e. major earthquake). While the majority of these techniques align with professionally recommended behaviors, a few are misleading. This study investigates the perceptions, attitudes, beliefs, and behavioral intentions different groups of audience members hold concerning the behaviors they observed in the film. Participants were grouped by geologically-based knowledge levels and levels of perceived realism.

While the findings of this study reveal minimal differences based on knowledge and perceived realism, results clearly show that the film triggered high levels of curiosity and thinking about earthquakes and earthquake safety across the board. Furthermore, all audience members appeared to be persuaded on both a conscious and even more so on a subconscious level to behave as the characters in the film did, assuming the consequences of those actions were positive. These findings suggest that entertainment media texts can be a powerful educational and persuasive tool.

Keywords: natural disaster films, social learning, perceived realism, persuasion

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CHAPTER 1

Introduction

With each passing year, computer-generated imagery (CGI) and other advancing technologies make films more and more visually impressive and "realistic." Compare the Godzilla of the 1950's, a man bumbling about a miniature Tokyo set in a bulky costume, to the Godzilla of 2014, an impressive CGI creation that looks as real as everything else in the film. The same goes for the Batmans and Supermans of past and present, animated movies being recreated as live-action films, and the destruction in the 1974 film *Earthquake* compared to that of 2015's *San Andreas*.

With the development of CGI and other advanced filmmaking techniques, however, come many consequences—both positive and negative. As the lines between fiction and reality blend, audiences have a more difficult time determining what is real and what isn't. The perceived level of realism can have consequences for their attitudes, normative beliefs, and even learned or intended behaviors which in turn have real-world impacts for individuals, groups, and societies as a whole. The impact of perceived realism in the media has been widely acknowledged amongst scholars who have studied the phenomenon in terms of emotional impact (Rooney, Benson, & Hennessy, 2012), sexual attitudes (Baams, et al. 2015), aggression (Ward & Carlson, 2013), foreign news (Shapiro & Chock, 2004), alcohol and drug use (Cho, Shen, & Wilson, 2013), etc., in both factual and entertainment media (Fogel & King, 2014; Pouliot & Cowen, 2007; Shapiro & Kim, 2012). However, there are still many important gaps to fill, especially when it comes to learned behaviors. There is one area in entertainment media that deserves special attention as the effects of its realistic portrayals could potentially have life and death consequences: disaster movies.

In particular, there is one very important element of disaster films that has yet to be considered—the safety and survival techniques portrayed onscreen. Typically, disaster movies feature characters that have to face and try to survive a major disaster; for example, freezing temperatures, a deadly virus, a tornado, or an earthquake. As such, these films depict actions and consequences that have the potential to be incorporated into the audience members' schema. Once filed away into audience's minds, the scenarios depicted in the film have the potential to inform people's real-world decisions or actions.

While the focus of this study is on natural disaster films, this concept expanded to include how other fictional media content could lead to interesting and important findings. The results of this study will contribute to improved media literacy and a better understanding of how fictional media content affects learning and behaviors. In the case of natural disaster films, audience members may find their lives in the hands of Hollywood scripts depending on the realism and accuracy of the safety or survival techniques portrayed, particularly if they ever face a similar, yet otherwise "unexperienced," disaster in real life. But to what extent does this type of media actually affect audiences' beliefs and behavioral intentions? Do they have difficulty determining what is actually real and what isn't? An understanding of the relationship between Hollywood's disaster genre and the scientific community is a good place to start looking for the answer to these questions.

CHAPTER 2

Literature Review

This paper will first introduce the disaster film industry, along with a review of the academic literature focused on the genre. Next, the relationship between Hollywood and the scientific community will be explored in an attempt to clarify how and why these two entities interact, ultimately resulting in varying mixtures of realistic and fictional movie content. Finally, relevant theory will be explained as they contribute to the potential for disaster films to educate audiences, both intentionally and unintentionally, about natural disaster safety. These theories include social cognitive theory, media dependency theory, and perceived realism.

Impact of Disaster Films

Disaster movies have existed in the film industry as early as the 1910s (Keane, 2006). The genre includes movies that feature natural disasters, terror attacks, science experiments gone wrong, hostile alien invasions, and apocalyptic scenarios (Keane, 2006; Sanders, 2009). Historically, disaster movies have been lumped in with B-list movies that are wholly fantastical, unrealistic, and feature cookie-cutter characters (Keane, 2006). But we watch them because, like a car wreck, they are hard to look away from. Audiences like to see ordinary people do extraordinary things to survive. Additionally, there is a type of satisfaction in seeing mankind simultaneously fail and conquer. We like to be faced with the question of "What really matters?" (Campbell, 2014; Keane, 2006). Over the years, the genre has developed and diversified, landing a solid handful of films, such as *The Day After Tomorrow, Deep Impact,* and *Twister,* in top blockbuster slots (Keane, 2006). In addition, with the advancement of technology and a more focused attention on scientific factuality, the genre has captured the attention of audiences, critics, and scholars alike for its socially and environmentally active potential.

Most of the discussion surrounding disaster films has revolved around issues regarding sociopolitical issues, environmental issues, religion, morality, race, class, gender, and the human experience (Campbell, 2014; Keane, 2006; Sanders, 2009). Many filmmakers that have undertaken disaster movies have intentionally highlighted these issues not only for dramatic effect, but to make a public statement, raise awareness, or explore new elements of the human experience (Campbell, 2014; Keane, 2006; Sanders, 2009). Often times, it is these issues that help bring substance to the spectacular images featured in the disaster genre. Recently, researchers—among other groups—have begun to focus their attention on the impact these films and their statements may have on individuals and society. For instance, the film *The Day After Tomorrow* has been studied and examined in-depth by scholars, environmental groups, government agencies, the media, and other interest groups because of its blatant emphasis on the effects of global warming (Campbell, 2014; Keane, 2006; Kirby, 2011; Perkowitz, 2007; Sanders, 2009). While the science of the global warming-triggered superstorms featured in the film were wildly inaccurate, the attention this Hollywood hit brought to the issue of global warming led to many real-world implications (Kirby, 2011; Perkowitz, 2007). Audiences' attitudes and behavioral intentions changed to mirror those of the protagonists in the film, scientific organizations capitalized on the now "hot-topic" of global warming to lobby for governmental change and increased funding, and media outlets turned to real scientists who added to the dialogue and expounded upon the real-world situation (Kirby, 2011). In essence, the film dramatically framed the dangers of global warming for millions of viewers and helped place the issue on the public agenda.

Science in Movies

Movies and science have enjoyed a long, often symbiotic relationship. Hollywood directors and producers frequently hire scientific consultants to help them make their movies more realistic, or at least reasonably believable. However, as scientific ideas influence the cinematic world, those ideas pass on into the public consciousness bringing into question the accuracy of the science being portrayed (Perkowitz, 2007). Some filmmakers are more dedicated to scientific authenticity than others, and many practical factors come into play that could outweigh accuracy (e.g. budget, time constraints, dramatic needs, etc.) (Kirby, 2011; Perkowitz, 2007). As a result, most films end up with an odd mix of scientific factuality and fantasy. This concerns many people because, as Kirby (2011) argues that "audiences struggle with determining accuracy of science in a film. Where does the real science end and the fictional begin?" (p. 39). Unfortunately, there doesn't seem to be any ideal solution to this problem.

However, Hollywood has become more and more interested in creating realistic content over the years. First, they realize that their box office success depends on "sophisticated movie audiences [who] want to see scientific realism on screen" (Perkowitz, 2007, p. 218). In order to look good, both figuratively and literally, a certain level of scientific accuracy must be met. Additionally, they don't want to lose credibility or alienate groups of audiences by making obvious errors. It's simply not good for the bottom line. On a more artistic level, they also want audiences to submerge themselves in the visuals and the narrative without being uncomfortably jolted out of the experience by glaring errors or totally unrealistic elements (Kirby, 2011).

Scientists have their own motives for becoming involved in the creation of Hollywood films. They recognize the power films have to teach the public, change attitudes, raise awareness, influence policy, and even increase scientific funding (Kirby, 2011; Perkowitz, 2007).

Perkowitz (2007) explains:

> People who've never studied physics, biology, astronomy, mathematics, or geology are exposed to black holes, chaos theory, mutations, volcanism, genetic engineering, nuclear radiation, robotics, and a dozen other topics through the movies. They also encounter science-related catastrophes that could truly affect them and the world, such as the meltdown of a nuclear reactor or the appearance of a deadly virus…Both film theorists and Hollywood marketing gurus know, though, that the movies also significantly form our attitudes toward the world. Our reactions to science are partly shaped by what we see on screen. (p. 14-15)

As fictional entertainment, these movies tend to naturally bypass the more pointed cognitive processing that other, more serious media might create. Because the audiences are there to be entertained rather than taught, they don't typically consider the information presented but rather let the narrative sweep them away (Perkowitz, 2007). Green & Brock (2000) explain that in these types of narratives where transportation can occur, audiences don't centrally analyze the information presented to them but rather peripherally absorb information, which leads to subconscious persuasion. Furthermore, transported audiences are "less likely to disbelieve or counterargue story claims," especially when the audiences feel like they are experiencing something realistic.

This is not to say that movies are an all-powerful influence in the education or persuasion of their audiences. But, there have been many recorded instances in which movie science has impact real-world situations. For instance, voting intentions changed due to viewer's exposure to the film *The Day After Tomorrow* (Perkowitz, 2007). In addition, thanks to the 1998 Hollywood hit, *Deep Impact,* NASA funded an astrogeological research mission "whose methodology

mirrored the plot of the movie" and which was even named "Deep Impact" after the movie (Kirby, 2011). Most recently, the momentum and attention created by the 2015 film *San Andreas* has been used by the government to promote earthquake preparedness and safety ("Earthquakes," n.d.).

However, incorrectly portrayed scientific information can create serious problems. Just as useful science can be dispersed, incorrect science can lead to negative attitudes towards science and scientists, create overly-exaggerated fears, legitimize pseudoscience, perpetuate false ideas, etc. (Kirby, 2011). While it is impossible for filmmakers to align all their work with scientific fact, many scholars and practitioners have recognized the importance of carefully balancing science with fiction. Yet the problem of the audience members' ability to distinguish between the two still remains.

However, there exist some communication and psychology theories that help to explain why some people may be more capable of filtering movie magic from realistic portrayals while others are more susceptible to misleading content in movies. Social cognitive theory, media dependency theory, and perceived realism can explain how we build our perceptions of the world and how we might use that information to guide our attitudes, beliefs, and behaviors.

Social Cognitive Theory

Social learning theory, or social cognitive theory, has been applied to the field of communications for decades. First implemented by Albert Bandura in the 1970's, it explains that humans commonly learn through observation and vicarious experience. However, this theory does not propose a single, direct link between observation and learning and behavior. Rather than focusing on a simple stimulus-response reaction, social learning theory places the locus of power primarily (although not completely) with the viewer. Bandura himself explained that there is a

"continuous reciprocal interaction between cognitive, behavioral, and environmental determinants" (1977, p. vii). These determinants and their accompanying complexities are viewed as central to understanding behavior. Additionally, attention, retention, motivation, and self-efficacy are also recognized as key elements in social learning.

But before jumping into the details of social learning theory, it is necessary to understand how most behaviors are learned. According to Bandura (1977), response consequences and modeling are two of the most common ways that people learn behaviors. Response consequences refer to a direct, hands-on experience. The learner performs an action, experiences its consequence, then decides whether or not to repeat that action in the future. Modeling behavior, on the other hand, is vicarious. A learner observes, retains, and later mimics the behavior of others (if deemed appropriate and beneficial).

Social learning theory takes this understanding of behavioral learning and explores in more detail how we learn by observing others. First, it identifies several factors that help us make sense of the situation, the behavior, and whether or not the consequences are desirable. *Antecedent determinants* include expectations, pre-existing knowledge, environmental cues, and pre-existing understanding of relationships. These give the learner a context from which to begin to understand and to predict reactions and outcomes of certain behaviors (Bandura, 1977). *Consequent determinants* are the consequences and reinforcing conclusions gleaned from the outcome of an enacted behavior. Positive consequences tend to encourage repetition of a behavior, while negative consequences obviously encourage abandonment of a behavior (Bandura, 1977). *Cognitive control* refers to the individual attention, perception, and interpretation of a behavior and its consequences. It also is the processes by which a learner determines the valence and efficacy of that behavior (Bandura, 1977). Finally, this theory

acknowledges the continual interaction between each of the aforementioned factors and the affect they can have on each other.

Models for behavior can be found anywhere. Traditionally, family members (especially parents), teachers, friends, peers, and public figures provide these models (Arnett, 1995; Giles & Maltby, 2004). But perhaps one of the most important sources of behavioral models is the media. Individuals are exposed to hours and hours of media each day, and this exposure inevitably affects audiences in one way or another. Many of these media personalities become role models or providers of the social scripts for which audience members may or may not have direct experience. These social examples can become powerful influencers in the lives of many media consumers. In fact, studies have shown that as children develop into adolescents and adults, they put less weight on more traditional influencers (parents, teachers, etc.) and more on peers and media figures as models for attitudes, beliefs, and behaviors (Giles & Maltby, 2004).

Media Dependency Theory

It is worthwhile to briefly explore media dependency theory, as it helps explain how and why the media can become an important socializer or source of learning. Originally conceptualized by Ball-Rokeach and DeFleur (1976), this theory proposes that the less personal experience or contact one has with something, the more dependent they are on the media to provide information about that thing. Furthermore, the more dependent they are on the media, the more influence that media exposure will have on them.

In close proximity to media dependency theory, there are several studies that sought to identify the main factors that make someone or something in the media more or less likely to be modeled. Learning and adapting modeled behaviors are complex processes that are mediated by

several individual factors; each person's individual experiences, personal characteristics, and interpretation or perception of viewed content shapes the way they learn and adopt behaviors.

Among the most prominent factors are identification, viewer involvement, and resonance, and perceived realism. Identification is a phenomenon that occurs when an audience member draws parallels between him-or herself and the model they observe. If audiences feel they have similar backgrounds, values, beliefs, or personality traits as a media figure, it is easy to see their circumstances as comparable, which helps reduce uncertainty about the potential outcomes of modeling their behaviors (Turner, 1993). Viewer involvement, or the level of attention and investment given to media content, is another factor that can motivate audiences to pay attention to and learn from certain media scripts. High viewer involvement, whether for entertainment or education, has been significantly correlated with more traditional, stereotypical attitudes and behaviors reflected in media content (Zurbriggen & Morgan, 2006). Resonance, or the extent to which media content matches personal experience (Austin, Roberts, & Nass, 1990), can improve the source credibility of the media content and create a reassuring effect that helps learners make the leap from observation to action. Finally, perceived realism—which is the primary focus of this study—has also been linked to both social learning and media dependency theory. The following sections will outline the roles, measures, and effects of perceived realism.

Perceived Reality in Movies

Perceived reality can be simply defined as an audience member's perception of how realistic media portrayals are when compared to the real world. Sometimes perceived realism is confused or combined with perceived similarity (a narrow perception of realism compared to one's own, specific life or experiences) or identification (how much a person identifies with or wishes to be like a media figure). However, it is a unique phenomenon that has a wide-ranging

influence within communications research. For instance, perceived reality has been referenced as a significant mediating factor in studies including health practices, aggression, sexual attitudes, parasocial relationships, video game preferences, dramas, etc. (Austin et al., 1990; Baams et al., 2015; Fogel & King, 2013; Hall, 2003; Shapiro & Chock, 2004; Shapiro & Kim, 2012; Ward & Carlson, 2013). Its power to mediate the acceptance or rejection of new information has been documented in each of these studies. Shapiro and Kim (2012) aptly summarized this phenomenon:

> The average person has limited or no experience with many of the stories or people encountered in the media—from 18th century lovers, to police dramas, to conditions in a modern prison, to fantasies about time traveling doctors. Yet, people seem to have little difficulty making such realism judgments (p. 95).

Operationalizing perceived reality, on the other hand, has proven to be much more difficult. Several scholars have attempted to identify measures that could be used to test for perceived realism.

Evolution of Perceived Reality Research. Originally, perceived reality was considered only in terms of fiction versus nonfiction media. This was a very simplistic approach that ultimately did not prove to be an accurate way to judge perceived reality. Research subjects appeared to react or be affected in the same ways regardless of whether or not the media content was fictional (Konijn, Walma van der Molen, & van Nes, 2009). This led researchers to realize that perceived reality was not unidimensional.

Once the need for a multidimensional approach to perceived realism became clear, more specific measures began to appear. Some of the first included two factuality measures: syntactic and semantic (Pouliot & Cowen, 2007). The syntactic component evaluates more of a literal,

physical reality. Has the message been produced in a way that is not fabricated, distorted, or artificial? Is there little manipulation or editing involved? Next, the semantic component looks more at the psychological content. Even if a story is fictional, could it be plausible, functional, or similar to something that could happen in the real world? Are the emotions, logic, and principles applicable in real life? This concept shows how perceived reality operates on multiple levels. It also led to the eventual identification of outside influences and the development of some specific evaluation measures, which I will now explain in more detail.

Dimensions of Realism. First, there are external influences, called *dimensions of realism,* which help audiences categorize media content in a way that allows them to approach media content with an appropriate expectation for the level of realism to expect. These dimensions deal more directly with the medium and consumer rather than the contents of the media message. They also help explain why some elements of a media message are weighted more heavily under different circumstances. These dimensions include media form, genre, emotion, developmental stage, cognition, and reinforcement or similarity.

Media Form. The form of media being consumed can have an impact on how realistic the message is perceived (Hall, 2003; Shapiro & Chock, 2004). Usually, multisensory media (i.e. videos) have better chances of being taken more realistically because they create a more life-like environment which multiple sense can draw upon for cues of realism. For instance, a comic book which is a two-dimensional, static, and hand-drawn does not reflect many aspects of the real world like a TV news report, which includes images of real people talking with real voices about real events, does.

Genre. Genre is a categorization of media content into groups that contain similar features (i.e. sci-fi, hard-news, entertainment narrative, etc.). Even when the media form is the

same (i.e. video) genre can sift out realistic from unrealistic. For instance, Saturday morning cartoons simply do not carry many ties to real-life, whereas a documentary about a historical event does (Hall, 2003). However, as noted before, when people are very familiar with a topic or setting, they might be more critical of even a more factually-based genre than the general audience would (Shapiro & Chock, 2004).

Emotion. Perhaps the strongest dimension is emotion. It is clear that people experience emotional reactions regardless of whether the message is fictional or not. The way these emotions are processed is significant. Because humans only have one way of processing emotions, any emotions evoked through fictional or unrealistic media still affect us in the same way, physiologically speaking. This real, physical reaction tricks the mind into attributing more realism to the media stimulus (Konjin et al., 2009); when people are highly emotionally involved with the media stimulus, the emotional reactions can significantly increase the perceived realism of the message (Hall, 2003).

Developmental stage. Another dimension that needs to be considered, specifically when dealing with children, is the developmental stage. Very young children do not have the mental capability to distinguish between fictional and nonfictional media (Hall, 2003). However, research suggests that around age seven, children develop the capacity to do so (Pouliot & Cowen, 2007).

Cognition. Cognition is another important indicator of how media messages are processed and evaluated. There is well-supported evidence that people have limited mental resources and that we often take shortcuts or cues to understand media stimuli. Some have postulated that we start with an assumption of realism and then take cues to reevaluate that initial stance (Shapiro & Kim, 2012). Individuals that take the time and energy to evaluate more of the

subtle cues may note the probability of "editing, cutting, focal planning, and directors' choosing," therefore devaluing the realism of a piece of media (Konjin et al., 2009).

Reinforcement/Similarity. Finally, real-life comparisons with one's own personal circumstances also have a significant role in determining the level of perceived reality. When something portrayed in the media reflects personal experience, it reinforces the notion that what is seen in the media is like real-life (Austin et al., 1990). This dimension is very closely tied to some evaluators which are described next.

Evaluating Realism. When it comes to determining the level of realism of the actual media content, there are several approaches one can make to evaluate the media text. For example, from a visual perspective, most live-action movies are realistic (real actors on real locations), but many of the storylines are preposterous. While the terms have varied, most measures of perceived realism include the following concepts: validity, utility, identity, plausibility or possibility, typicality, and factuality. Each covers a facet of realism that provides unique insights into how a piece of content may or may not be considered realistic. Normally, two or more of these factors simultaneously work together at shaping one's perception of reality overall and can, for example, be illustrated through the different elements of a disaster film.

Validity. Messages are usually considered more realistic when they are found logically sound (Austin et al., 1990). Validity is a simple, straightforward measure of whether or not the message has any value, sense, or quality. For instance, if you see an earthquake depicted in a film, then it logically makes sense that you would see it cause damage to buildings and roads.

Utility. A less obvious form of realism evaluation is utility. When information is considered useful or applicable to real-life situations, it can add to the message's sense of realism (Austin et al., 1990). For instance, a clip of a character taking cover from falling objects during

an earthquake would be perceived as more realistic than if he or she was taking cover from alien lasers because the viewer can see how protecting oneself from an earthquake could be applicable to their own life.

Identity. Identification occurs when the audience member draws parallels between the media figure and themselves. Perceived realism of the media message increases when audience members feel that these characters could fit into their real-world life and experience real emotions in connection with them (Hall, 2003; Potter, 1986). As discussed earlier, people can develop relationships between media figures in much the same way they would with real people. They are attracted to and trust in people that they feel similar to (identify with) or who represent their ideal selves (Austin et al., 1990; Baams et al, 2015; Hall, 2003; Potter, 1986). Going beyond feelings of affinity between viewer and media figure, audiences can also draw parallels between the media portrayal and their own lives in the form of shared experiences or life-circumstances. However, if someone has high levels of personal experience with something they see portrayed in the media (i.e. hometown), they are more critical of the depiction and prone to rate the media's portrayal as less realistic (Shapiro & Chock, 2004). Clearly, there is a point at which media representations cross a line between similarity and identification, and misrepresentation.

Plausibility or Probability. The elements of plausibility (sometimes phrased as possibility) or probability are fairly self-explanatory. Simply put, it is the judgment of the likelihood that something portrayed in the media would happen in real life (Baams et al., 2015; Hall, 2003). For example, a film depicting a hurricane in Florida would be much more plausible than a hurricane in Kansas. Probability tends to be the stronger indicator of perceived realism because it more accurately measures the likelihood something will actually happen, not whether

or not it could (Hall, 2003). Plausibility or possibility is not as reliable a measure because almost anything could technically be considered possible— even time-travel, monsters, and zombies. This issue ties in very well with the next evaluation: typicality.

Typicality. While similar to possibility and probability, typicality is a little narrower in scope. Typicality incorporates the frequency in which an event would occur under a specific circumstance. It is not a measure of an occurrence in comparison to all other events that happen in the world or in one's personal life (Hall, 2003; Shapiro & Chock, 2004). Shapiro and Chock (2004) give the example of how very few people have experienced a bank robbery themselves, but could still provide a judgment on how typical the use of guns during a bank robbery would be. If an occurrence is perceived as typical under the specified circumstances, it is much more likely to be perceived as realistic. In addition, typicality of *outcomes* can be considered as a measure for perceived reality. Not only do people judge the reality level of events happening, but they also judge how typical the consequences of those actions or events may be (Hall, 2003). For instance, one might assume, regardless of personal experience, that getting caught in a flash flood could lead to death.

Factuality. Finally, the factuality of a media message is essential in evaluating its level of perceived reality. The evaluation of factuality hints back to the original conception of perceived reality as fiction vs. nonfiction, although with important differences. Like the fiction vs. nonfiction approach, factuality is based on the viewer's perception of how factually correct or representative something portrayed in the media is (Hall, 2003; Pouliot & Cowen, 2007). However, factuality can be applied to both fictional and nonfictional content. It is most commonly cited when considering documentaries, reality TV shows, talk shows, or historical films (many of which are fictional). Usually, judgments are based off of previous knowledge

gleaned from other sources (Hall, 2003). For example, a film about the destruction of Pompeii by the volcano Vesuvius might be perceived as more realistic or less realistic based upon how factually correct the historical events, timeline, locations, language, costumes, or even the nationality of the actors are based on history classes, personal research, etc.

Clearly, all of the reality evaluators and dimensions are interlinked, and often share similar assumptions. They demonstrate the complexities tied to understanding, evaluating, and measuring perceived reality. Before moving on, it is worthwhile to note that sometimes it is more effective to think of perceived realism as perceived un-realism. In fact, perceived realism is sometimes considered an asymmetrical construct, where people are only aware of its existence in its absence. Research suggests that people only become aware of realism when discrepancies between the portrayed world and the real world become evident (Busselle & Bilandzic, 2012). Additionally, considering that many scholars believe our default approach to media content is understood realism, this could skew audience's perceptions of content that they are unfamiliar with towards higher levels of realism (Busselle & Bilandzic, 2012). Media dependency theory supports this premise, arguing that people become more dependent on the media and its information when there is a lack of direct, personal experience with or knowledge about the subject being portrayed; this is why foreign audiences more readily believe that another country's media content is more realistic (Hall, 1999).

A study conducted by Cho, Shen, and Wilson (2013) developed a valid and reliable scale for measuring different aspects of perceived realism for narrative media content. The scale included three of the aforementioned measures—plausibility, typicality, and factuality—and a two additional measures that are commonly used to evaluate narrative media content—narrative consistency (the coherency of the story) and perceptual quality (the quality of the visual effects,

acting, etc.). The first three measures rely upon pre-existing knowledge about the subject matter. In other words, they can be confirmed by existing factual data, which suggest that audience members who have knowledge about a given subject would be able to determine that media content's level of realism more accurately. Narrative consistency and perceptual quality, on the other hand, are more dependent upon personal interpretation of the media content. This study is interested in exploring how fictional Hollywood disaster films (this study uses *San Andreas* as a case study) influence audiences' learning and behavioral intentions. The first step in understanding this process is to recognize that audience members with different knowledge bases will judge the realism of the movie differently. Therefore, I propose the following hypothesis and research question:

H1 – Participants with a low geological knowledge will perceive the highest levels of realism in terms of terms of plausibility, typicality, and factuality, followed by the medium-knowledge participants, with the high-knowledge participants perceiving the lowest levels of realism.

RQ1- Which knowledge group(s) will rate the narrative consistency and perceptual quality as most realistic?

Effects of Perceived Reality. Perceived realism has been proven over and over to increase the likelihood of certain attitudes and behaviors being accepted and incorporated into one's life including health practices, aggression, sexual attitudes, etc. (Austin et al., 1990; Baams et al., 2015; Fogel & King, 2013; Hall, 2003; Konjin et al., 2009; Potter, 1986; Pouliot & Cowen, 2007; Shapiro & Kim, 2012; Ward & Carlson, 2013). As Austin et al. (1990) put it, "Theory suggests that television images perceived as more realistic are more likely incorporated into images of social reality and acted upon" (p. 546). Here we turn full circle to the concept of social

learning, which teaches that people observe behaviors and determine if they are worthy of future adaptation in their own life. This determination is based on a variety of factors, including perceived realism. When audiences attribute higher levels of realism to their media content, they are more persuaded to take the information as valid, useful, and reliable, and thus plan to adapt those behaviors should the need arise. Therefore, the following research question and hypotheses are posed:

H2 – Participants that perceive the film as more realistic will have higher intentions to adopt the safety techniques depicted in the film.

RQ2 – How do each of the knowledge groups differ in their behavioral-related intentions and beliefs in terms of earthquake response safety techniques?

Next, considering the literature on social learning which argues that people learn appropriate or useful behaviors by observing the actions of others—including media figures—we would expect audience members to note and analyze the behaviors of the characters in the film. Of course, the extent to which audience members attend to, analyze, and adopt those behaviors is mediated by factors like identification, environment, pre-existing knowledge, etc. Even though entertainment narratives discourage critical thinking and encourage peripheral learning, especially when the media content comes off as realistic, we still expect a certain level of cognitive arousal, even if it occurs on a sub-conscious level (Green & Brock, 2000; Perkowitz, 2007). The transportation that could occur for audiences who report higher levels of perceived realism would also encourage them to align their attitudes with that of the characters. Therefore, when the characters consider a natural disaster a major threat and exert great efforts protect themselves from that disaster, audiences who vicariously experience those emotions and attitudes would react similarly. In other words, those audience members' attention will be drawn to the

information the characters consider most important: safety and survival. As such, the following hypothesis was formed:

H3 – Participants that perceive the film as more realistic will be more interested in thinking/learning more about earthquakes and recommended earthquake safety techniques.

Finally, Konjin et al. (2009) and Rooney, Benson, and Hennessy (2012) contribute one more important element to perceived realism specifically in fictional, narrative content. They suggest that emotions, especially positive ones like enjoyment, can enhance the levels of realism and information value even in fictional media content. In their studies, high levels of perceived realism predicted higher levels of information value even more than genre (fiction vs. reality-based) did. As such, I propose one final hypothesis:

H4 – Those who perceive the film as more realistic will enjoy the film more than those who perceive the film as less realistic.

Through these hypotheses and research questions, this paper will attempt to better understand the role Hollywood has played in shaping perceptions of natural disasters, their risks, and safety and survival techniques.

CHAPTER 3

Methodology

For this study, an experimental design was used to understand the levels of perceived realism and behavioral intentions and beliefs in regards to the Hollywood film *San Andreas*. This study focused on the overall realism of the film as well the perceived reality of safety techniques as presented in the film. Differences in perceptions of reality were examined between those who have higher, average, and lower levels of knowledge about earthquakes and earthquake safety.

Ninety-one participants were pretested for levels of earthquake knowledge one week prior to viewing the film *San Andreas* in an on-campus media center. Participants were assigned to a knowledge group based on the results of a pre-test survey that included six earthquake-related questions ranging from easy (i.e. what can be triggered by an earthquake?) to difficult (i.e. How do particles move during a P wave?). Participants who correctly answered 0-2 questions were placed in the low-knowledge group (N=33), those who correctly answered 3-4 questions were put in the medium-level group *(*N=28), and those who got 5-6 questions correct were placed in the high-knowledge group (N=30). Approximately one week after the pretest, participants viewed the film and completed a posttest survey. All participants were given a candy bar before the film began and compensated with ten dollars immediately after completing the final survey.

Film Selection

The film *San Andreas* was selected for this study for several reasons. First, it has a fictional premise. As a fictional film, *San Andreas*'s main purpose is to entertain, not educate. Therefore, most learning would primarily be done peripherally or subconsciously (Perkowitz, 2007). Second, as a full-length film, it has good immersive potential (Kirby, 2011). The film

provides its audiences with a highly linear, immersive experience. Again, this draws attention away from specifics and encourages peripheral learning. Next, *San Andreas* has relevance to the sample population because earthquakes are a major risk factor for their current geographical location along the Wasatch fault line. The fault is "overdue" for a predicted 7.0 to 7.5 magnitude earthquake (Utah Natural Hazards Handbook, 2008). It also neighbors large bodies of water that could create a seiche (a wave on a lake) (Gee, 2000) as a side effect of an earthquake, which is also featured in *San Andreas*—although on a larger scale. In addition, *San Andreas* was released in 2015, one year previous to the collection of data for this study. Therefore, the film features familiar and relatable characters, environments, technologies, and a current understanding of contemporary science—although its accuracy may be in question—which should increase the relatability of the film for the participants.

Finally, the film features several scenes that depict safety techniques such as "duck, cover, and hold on," that could be easily learned and mimicked by audiences if confronted by a similar situation during an earthquake. As confirmed by two doctors of geology at a large western university, these depictions include both recommended behaviors as well as some misleading ones. Among the correct are "duck, cover, and hold on," favoring a sturdy table over a doorway, seeking high ground during a tsunami, and driving seaward during a tsunami if at sea. The incorrect include taking shelter in a doorway (although one character corrects this behavior), trying to escape a building during an earthquake, and getting up against a building if outdoors during an earthquake (although this technique is debatable). It also includes other helpful and misleading information that could influence the behavioral intentions and beliefs of the audience. For example, the main character references water pulling out of the harbor as a sign

of an impending tsunami, which is factual. However, the film also depicts people running full-speed during major earthquake shaking, which would not be possible in real life.

Participants

Students and young adults aged 18 and older who are current residents of Utah were sought to participate in this study. This helped to ensure that that earthquake risk and safety was a relevant subject of interest to them personally. Only those who have never seen the film *San Andreas* were considered eligible to participate. In order to determine their level of knowledge of earthquakes and earthquake safety, they were given a pretest survey which included several measures which will now be discussed.

First, familiarity with earthquake-related geological science as well as familiarity with emergency response were tested using 24 multiple-choice questions aimed at assessing the participant's knowledge. All of these questions were adapted from online educational website quizzes obtained from Quizlet.com, Space.com, and Proprofs.com. Each question included an "I do not know" answer option in order to minimize guessing that could skew actual knowledge measurement. All correct answers were coded as "1" while any incorrect answer, including the "I do not know" option was coded as "0." There were six earthquake-related questions which ranged from easy to difficult. The remaining eighteen questions were foil questions regarding other geological phenomenon and natural disasters (i.e. tornados, volcanoes, etc.). Again, participants were grouped into knowledge-levels based on their answers to these earthquake-related questions.

Next, the participants' perceived risk of experiencing an earthquake was measured along with perceived risk of six other natural disasters, which served as foils (blizzard/avalanche, flood, forest fire, hurricane/typhoon, tornado, volcanic activity). Perceived risk was measured by

the following two questions: 1) To what extent to you believe you are likely to experience the following in your current residential area? 2) To what extent do you believe you are likely to experience the following in your hometown? For all seven disasters, a 7-point Likert scale ranging from 1 (not at all likely) to 7 (very likely) measured participants' responses for each of these seven natural disasters: blizzard/avalanche, earthquake, flood, forest fire, hurricane/typhoon, tornado, and volcanic activity.

Following the perceived risk measures, first-hand experience with natural disasters was measured by the following yes/no item: "Have you personally experienced a natural disaster?" If they answered "Yes," they were directed to indicate which disaster they have experienced with a fill-in-the-blank item. Participants' educational and professional backgrounds were also gathered using four questions. Professional backgrounds were measured using the question, "What disaster relief/safety training/education have you had?" Answer options included the following six items: basic training in formal education; certified disaster relief organizational training; medical training; other professional training; none; other. Participants were instructed to check all that apply. Educational background was measured by a question asking participants to indicate their highest level of education completed (high school; associate degree; bachelor degree; master degree; professional degree). The final two measures for educational and professional background were fill-in-the-blank questions asking, "What is/was your area of study?" and "What is your occupation?" Finally, participants were asked to provide their gender, age, and confirm their place of residence.

Participant Recruitment. In order to include participants with varying levels of geological knowledge, some participants were recruited specifically from the geology department at a major western university, with the rest being recruited from general education

courses and snowball sampling. Family and friends of participants were also allowed to participate as long as they met the qualifications as mentioned above.

Procedures

Once qualification had been established and the first survey completed, participants were asked sign up for a time to view the film *San Andreas,* which runs 1 hour 54 minutes. All participants were given time options that began at least one week after the date they took the initial survey. Immediately after watching the movie, they completed a posttest survey, which measured film enjoyment, desire to learn, perceived realism, and behavioral intentions and beliefs. The data was then inputted into SPSS and analyzed to determine what trends exist and if realism perceptions or behavioral-related intentions and beliefs differed between groups.

Perceived realism and behavioral intentions and beliefs are the two main variables of this study and were measured as follows.

Variables

Perceived realism was measured using five dimensional scales created by Cho, Shen, and Wilson (2013)— plausibility, typicality, factuality, narrative consistency, and perceptual quality. These measures are a modified version of the perceived realism scale established by Cho, Shen, and Wilson (2013) and utilized 7-point Likert scales (1 = disagree, 7 = agree):

- *Plausibility* was measured using the following five items: the film showed something that could possibly happen in real life; the film portrayed possible real-life situations; the story in the film could actually happen in real life; never in real life would what was shown in the film happen; real people would not do the things shown in the film ($\alpha = .74$, $M = 3.88$, $SD = 1.17$).

- *Typicality* was measured using the following three items: not many people are likely to experience the event portrayed in the film; the film portrayed an event that happens to a lot of people; what happened to the people in the film is what happens to people in the real world (α = .72, *M* = 3.04, *SD* = 1.44).
- *Factuality* was measured using three items: the science depicted in the film was based on facts; the disaster relief tips presented in the film were based on facts; the safety and survival techniques recommended in the film were based on facts. The results of the Chronbach's alpha showed that these three items not similar enough to be collapsed into a single measure.
- *Narrative consistency* was measured using the following five items: the film showed a coherent story; the story portrayed in the film was consistent; parts of the film were contradicting each other; the story portrayed in the film made sense; the events in the film had logical flow (α = .84, *M* = 4.47, *SD* = 1.22).
- *Perceptual quality* was measured using six items: the visual elements of the film were realistic; the audio elements of the film were realistic; the characters in the film were realistic; the acting in the film was realistic; the scenes in the film were realistic; I felt the overall production of elements in the film were realistic (α = .855, *M* = 3.79, *SD* = 1.17).

Finally, questions regarding behavioral-related intentions and beliefs were based off of questionnaire-building guidelines for the theory of planned behavior provided by Ajzen (2002). First, participants were asked, "If I were in a similar situation, I believe I should do what the characters did in order to increase my safety/chance of survival in the following scenarios: During an earthquake, take shelter in a doorway; During an earthquake, take shelter under a

desk/table; During an earthquake, duck down and cover my head/neck; During an earthquake, move to another room/try to leave the building; During an earthquake, drop, cover, and hold on; During an earthquake, if outdoors, get up against a building and protect my head/neck; If a building collapses nearby, causing debris to blow through the street, take cover behind something sturdy; During a tsunami, drive my boat seaward rather than inland (if at sea); During a tsunami, get as high up as possible (if on land); If impaled by a small object (e.g. a piece of glass), pull out the object and tie it with a bandage." Each of the ten scenarios was rated on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree).

Second, an additional three 7-point Likert items, also ranging from 1 (strongly disagree) to 7 (strongly agree), measured the following behavioral intentions and belief about their ability to perform those behaviors. These items were created in accordance to the guidelines set by Ajzen (2002) for constructing questionnaires for the theory of planned behavior: 1) Because of what I saw in this film, I intend to behave differently in the event of an earthquake than I would have had I not seen this film; 2) Because of this film, I feel better prepared for a potential earthquake; 3) I believe I would be able to run towards safety during a major earthquake; 4) I believe I would be capable of protecting myself during a major earthquake. These questions were not collapsed into a single measure, but considered separately due to the significance of each unique behavior.

Overall film enjoyment was measured on 7-point Likert scales with answers ranging from 1 (strongly disagree) to 7 (strongly agree). Prompts included: I enjoyed the premise of the film; I enjoyed the story of the film; I enjoyed the work of one or more of the actors in the film; I enjoyed the visual effects; I enjoyed the film overall. Responses ranged from *disagree* (1) to *agree* (7) ($\alpha = .873$, $M = 4.70$, $SD = 1.32$).

Desire to learn or think more about earthquakes and earthquake safety was also measured using 7-point Likert scales with answers ranging from 1 (strongly agree) to 7 (strongly disagree). Prompts included: I am curious about what might happen in the event of a major earthquake; I want to consider how I might react in a similar situation; I am interested in the San Andreas fault and/or earthquakes in general; I want to learn more about earthquakes; I want to learn more about earthquake safety. Responses ranged from *disagree* (1) to *agree* (7) ($\alpha = .893$, $M = 5.49$, $SD = 1.10$).

Data Analysis

To answer hypothesis 1 and research questions 1 and 2, one-way ANOVAs were run comparing knowledge groups to the dimensions of perceived reality and behavioral-related intentions and beliefs. Hypotheses 2, 3, and 4 used multiple regressions to compare levels of perceived realism with behavioral-related intentions and beliefs, thinking and learning, and enjoyment.

CHAPTER 4

Results

Of the 91 participants, 47 (51.6%) had experienced a natural disaster, 27 (30%) of which had experienced an earthquake, and 75 (82.4%) had had some kind of disaster training. In terms of education, 26 (28.6%) of the participants had completed at least a bachelor's degree, while the remaining 65 (71.4%) had not. The areas of study (for both current and graduated participants) ranged widely, with the largest group coming from the physical sciences, primarily geology (19 participants, 21%). The final sample was composed of 37 (40.7%) males and 54 (59.3%) females, with ages ranging from 18 to 32. The average age was 23.

In order to test hypothesis one and answer research question 1, a one-way ANOVA was run to determine what differences exist between high-, medium-, and low-knowledge level participants in terms of their perception of realism for each of the five realism dimensions. As can be seen in Table 1, there were no differences found between any of the groups for plausibility, typicality, narrative consistency, or perceptual quality. Of the three measures of factuality, two revealed no statistical difference (disaster relief tips were based on facts; safety and survival techniques were based on facts). However, the question regarding whether or not participants believed that the science was based on facts showed a significant difference, $F(2,88) = 3.49$, $p < .05$. A Tukey post hoc showed that this difference was found between low- and high-knowledge groups. Participants in the low-knowledge group ($M = 4.18$, $SD = 1.40$) rated the film's scientific factuality higher than the high-knowledge participants ($M = 3.23$, $SD = 1.48$).

Research question 2 asked whether there was a difference in behavioral-related intentions and beliefs (adopting safety and survival techniques shown in the film) between participants in the low-, medium-, and high-knowledge groups. As shown in Table 2, a one-way ANOVA

revealed statistically significant differences in only one of the ten behaviors shown in the film: if impaled by a small object, pull out the object and tie it with a bandage, $F(2,88) = 3.11$, $p = .05$. A Tukey post hoc did not reveal where the difference lay due to relatively high standard deviations, but we can see some differences in the means between low- ($M = 5.06$, $SD = 1.82$), medium- ($M = 4.04$, $SD = 1.88$), and high-knowledge ($M = 4.07$, $SD = 1.87$) groups for this behavior. There were no differences for taking shelter in a doorway; taking shelter under a desk/table; ducking down and covering the head/neck; trying to get out of a building during an earthquake; dropping, covering, and holding on; if outdoors, getting up against a building; if a building collapses, taking cover behind something sturdy; during a tsunami, if at sea, driving seaward; or during a tsunami, if on land, get up as high as possible. However, one, more general question asking if participants intend to behave differently because of what they saw in the movie revealed a significant difference, $F(2,88) = 4.33$, $p < .05$. Those in the medium-knowledge group ($M = 4.14$, $SD = 1.84$) had much higher intentions to change their behavior because of the film whereas those in the high-knowledge group ($M = 2.83$, $SD = 1.84$) did not.

Finally, three questions regarding participants' belief about their preparedness or ability to protect themselves during an earthquake showed mixed results. The question asking if participants believed they could run to safety during a major earthquake revealed a significant difference, $F(2,88) = 5.89$, $p < .01$. Again, those in the medium-knowledge group ($M = 4.82$, $SD = 1.81$) held stronger beliefs about their ability to run to safety, whereas those in the high-knowledge group ($M = 3.23$, $SD = 1.91$) believed they would be less able to run during a major earthquake. The results for the question regarding the participants' ability to protect themselves during a major earthquake showed no significant differences. Similarly, there were no

differences between groups when asked if they felt their preparedness for a major earthquake was improved because of the film.

Hypothesis 2 stated that participants who perceived the film as more realistic would be more likely to adopt the safety techniques depicted in the film. A multiple regression was run for each major safety behavior as depicted in the film as well as the additional behavioral intention measures. In conjunction with perceived levels of realism, demographic variables (gender, age, education, perceived earthquake risk, disaster relief training, personal experience with earthquakes) were controlled for. Gender (0 = male, 1 = female) and personal experience (0 = no, 1 = yes) were both dichotomous variables. Education was recoded into a dichotomous variable (0 = less than bachelor degree, 1 = bachelor degree or more), as was perceived earthquake risk (0 = no, 1 = yes) and disaster relief training (0 = no training, 1 = training).

Bivariate correlations were examined the predictors that motivate each behavior, thinking/learning, and enjoyment. As Table 3 shows, the relationships range from weak to strong, positive correlations. The higher correlations were amongst the perceived realism items, with plausibility and typicality (.69) and narrative consistency and perceptual quality (.65) showing the highest correlations.

As shown in Table 4, the multiple regressions revealed that factuality, plausibility, and narrative consistency, predicted certain intended behaviors from weak to moderate levels. Gender, age, training, perceived risk (for hometown), and experience with earthquakes also predicted some intended behaviors from weak to moderate levels. Of the perceived reality dimensions, typicality and perceptual quality did not predict behaviors. Neither did level of education or perceived risk (current area).

Preparedness. The more factual the science of the film was perceived to be, the more prepared participants felt that they would be in the event of an earthquake ($\beta = .38$, $p < .01$).

Behavioral Change. Training in disaster relief was a weak, negative predictor of intent to change behaviors in the event of an earthquake based on the content of the film. Those who had less training were more likely to learn from and adopt earthquake safety behaviors depicted in the film ($\beta = -.26$, $p < .05$)

Ability to Run. Participants who had not personally experienced an earthquake were more likely to believe that they would have the ability to run during a major earthquake, like many of the characters did in the film ($\beta = -.29$, $p < .05$). However, it should be noted that the general model is not significant ($F > .05$).

Ability to Protect Oneself. A participant's perceived risk of experiencing an earthquake in their hometown was positive, weak predictor of a participant's belief that they would be able to protect themselves during an earthquake. Those who believed that they were at greater risk in their hometown believed they would be better able to protect themselves ($\beta = .26$, $p < .05$).

Standing in a Doorway. Participants who perceived the film as more realistic in terms of narrative consistency held stronger intentions to stand in a doorway during an earthquake ($\beta = .38$, $p < .05$). However, it should be noted that the general model is not significant ($F > .05$).

Getting Under a Desk. Perceived realism in terms of the factuality of the safety and survival techniques was a positive, moderate predictor of intentions to get under a desk during an earthquake. Those who believed the film was more factual intended to protect themselves under a desk as the characters in the film did ($\beta = .36$, $p < .01$). Similarly, those who perceived the film as more realistic in terms of narrative consistency held higher intentions of getting under a desk during an earthquake ($\beta = .29$, $p < .05$).

Duck Down and Cover Head. Gender showed to be a positive, moderate predictor of the intention to duck down and cover their heads during an earthquake. Females held higher intentions to do so ($\beta = .41$, $p < .01$).

Get Out of a Building & Duck, Cover, and Hold On. The multiple regressions for each of these behaviors showed no predictors. No significant differences were found for any condition of either behavior.

If Outdoors, Get Up Against a Building. Perceived factuality of the safety and survival techniques depicted in the film was a positive, weak predictor of the intent to get up against a building if outdoors during an earthquake. Those who perceived the film as more factual in terms of safety and survival techniques had higher intentions to mimic this behavior ($\beta = .28$, $p < .05$).

If a Building Collapses, Take Cover Behind Something Sturdy. Two elements of reality, factuality of safety and survival technique predicted intentions to take cover behind something if a building collapses. Those who perceived the safety and survival techniques of the film as more factual had higher intentions to behave this way ($\beta = .43$, $p = .000$), as did those who perceived the film as more plausible ($\beta = .29$, $p < .05$).

If at Sea, Drive Seaward. Again, perceived factuality of the safety and survival techniques was a positive, weak predictor of the intent to drive seaward during a tsunami if at sea. Those who perceived higher levels of factuality hold higher intentions to drive seaward ($\beta = .29$, $p < .05$). However, it should be noted that the general model is not significant ($F > .05$).

Get as High as Possible. Participants who had more disaster relief training held higher intentions to get as high as possible during a tsunami if on land ($\beta = .27$, $p < .05$). However, it should be noted that the general model is not significant ($F > .05$).

If Impaled, Pull Out the Object. Finally, perceived factually of the disaster relief tips was a positive, moderate predictor of the intent to pull out a small object if impaled. Those who perceived the disaster relief tips as more realistic held higher intentions to do so ($\beta = .36$, $p < .01$)

Hypothesis 3 stated that participants who perceived the film as more realistic would be more interested in thinking or learning about earthquakes and earthquake safety. The results of a multiple regression partially supported this hypothesis, as shown in Table 4. Of the five dimensions of reality, only narrative consistency predicted the desire or intent to learn more about earthquakes and earthquake safety—narrative consistency. Those who perceived the film as more narratively consistent were more interested in thinking or learning about earthquakes and earthquake safety ($\beta = .33$, $p < .05$).

Hypothesis 4 predicted that those who perceive the film as more realistic would enjoy the film more than those who thought it less realistic. Multiple regressions showed that this was the case for three dimensions of reality, scientific facts ($\beta = -.29$, $p = .05$), narrative consistency ($\beta = .33$, $p < .05$) and perceptual quality ($\beta = .61$, $p = .000$). See Table 4.

CHAPTER 5

Discussion

This study explored the effect of perceived reality on the social learning and intentional behaviors of audiences who watched the natural disaster film *San Andreas*. In order to test hypothesis 1 and answer research questions 1 and 2, participants were divided into groups based on their pre-existing knowledge concerning earthquake-related geology to see it knowledge affected perceptions of reality and behavioral intentions or beliefs.

Of the five dimensions of reality, only the factuality of the science in the film showed any significant differences between knowledge groups. Considering knowledge-groups were assigned based primarily on participants' geologic or scientific knowledge, it makes sense that the scientific factuality item would show such differences. However, it is slightly surprising that knowledge did not affect any other dimension of realism as hypothesis 1 predicted. These results suggest that one type of knowledge does not predict levels of perceived reality across all dimensions, and stands as further evidence that each dimension of perceived reality is indeed unique. As such, we can conclude that each dimension of perceived realism is reliant on disparate background variables and the effects of each dimension can also be expected to be diverse. The results of this study show that judging the realism of media content is a much more complex matter than many previous studies have assumed, especially when it comes to fictional entertainment media.

Furthermore, knowledge only influenced three of fourteen behavior-related measures—pulling out an impaled object, intent to change behaviors based on the content of the film, and belief about the ability to run to safety during an earthquake. Here, the differences were seen between those with medium- and high-knowledge levels. Those with a medium knowledge had

higher intentions to adopt the behaviors in the film than those with a high-knowledge. While there is no definitive reason for this difference, it could be because high-knowledge group participants became more skeptical of behaviors they saw because they recognized and focused on the inaccuracies in the film's science. This tendency has been supported by studies that show that people with higher knowledge or familiarity of a subject become more skeptical of content about that subject, especially when it differs from their pre-existing knowledge (Shapiro & Chock, 2004).

On the other hand, medium-knowledge participants may have recognized accuracies in the film that aligned with their pre-existing knowledge and assumed that the remaining behaviors, with which they were not as familiar, were accurate as well. This group of participants appeared to be more open to filling in the gaps in their earthquake-related knowledge with new information presented in the film. Hearkening back to the idea that audiences approach a text with an assumption of realism, only to be considered unrealistic by the raising of red flags, any question marks could be assumed to be accurate considering that they exist amongst so many green flags (Busselle & Bilandzic, 2012). This indicates that when fact and fiction mingle, the fact has potential to sway average audiences towards believing that some fictional content could be more accurate than it actually is. Perhaps with a medium-level knowledge, these audience members became overconfident in their assessment of the accuracy of the film and allowed that to sway their perception. Transportation and peripheral learning would also contribute to this assumption of accuracy. With a decrease in critical criticism, audiences would be less likely to acknowledge possible inaccuracies and let them slip through their filters unnoticed. This notion is supported by the extremely high rating the medium-knowledge group attributed to the safety

and survival techniques (*M*=6.04). While some of those techniques were highly recommended, others were not. Yet, the medium level group exhibited a high level of trust for all the behaviors.

Perhaps the most interesting finding of this study lies in the patterns of the means presented in Table 2 concerning knowledge-level and behavioral measures. Across all knowledge-groups, we see the same trends (higher or lower means) in behavioral intentions for each specific behavior. What is most interesting is that the behaviors with the lowest means were the behaviors that either resulted in negative consequences in the film or were pointedly corrected in the film. For example, when characters in the film tried to escape a building during an earthquake, many of them (although not all) were killed or injured trying to do so. This behavior received lower means in comparison to other behaviors that consistently showed a positive outcome. Furthermore, a character took shelter in a doorway (which was once commonly taught as a correct safety behavior in real life), but was immediately instructed not to do so by a character who was an expert in seismology. This behavior also received lower means than other safety behaviors. This finding is a classic example of how social cognitive theory works. Simply put, behaviors are observed and labeled as appropriate or inappropriate based on the resulting consequences. Future behavioral intentions are then based on those assessments (Bandura, 1977). However, it is difficult to say if these intentions or beliefs actually changed because of what was shown in the film or if they simply reinforced pre-existing beliefs. Without having measured beliefs about each specific behavior before participants viewed the film (this study did not pre-test these specific behaviors in order to avoid priming), it is impossible to say conclusively.

Nevertheless, the drop in means for each of the behaviors associated with negative consequences or corrections seem to suggest that the film may have influenced participants in all

knowledge groups more than they realized. Even though the majority of participants did not report high intentions to alter intended behaviors based on what they observed in the film, the patterns discussed above indicate otherwise. Social learning did occur, but not as critically as social cognitive theory might suggest. Given the narrative, immersive nature of fictional entertainment content, this type of subconscious persuasion was expected and stands as further evidence that entertainment narratives can be a quiet, yet powerful persuasive tool (Kirby, 2011; Perkowitz, 2007). Therefore, the results of this study stand as further evidence that entertainment media can and does have an often unrecognized effect on society (Keane, 2006; Kirby, 2011; Perkowitz, 2007). This raises a red flag for issues concerning entertainment media content and media literacy. Both filmmakers and audience members need to be aware of the potential consequences of mingling fact and fiction, considering that changes in attitudes and behaviors do occur on both a subconscious and conscious level for many audience members. Audiences should be aware of this influence and guard themselves against making assumptions of accuracy in entertainment media. Even when their conscious motivation for watching a movie may be as simple as having fun, they should be aware that they may walk away with more than they bargained for.

While this subconscious persuasion is an important finding, it is also important to recognize that 35% of all participants consciously acknowledged their intent to act differently in the event of an earthquake based on what they observed in the film. Again, this included participants from all knowledge groups. Clearly, some fictional media content is treated as a trusted source of information by many people, both consciously and subconsciously. This contributes to the growing line pop-culture literature that indicates that entertainment media is used as a viable source of valid information.

This is slightly concerning, considering that a look at the behavioral-related means also show that most participants were unable to differentiate between the recommended and non-recommended behaviors. While the non-recommended behaviors did result in lower means than the other behaviors, the means still fell above the midpoint (see Table 2); this indicates that most participants did agree (at least to a certain extent) that those behaviors were correct and intended to follow them in the event of an earthquake. Perhaps this can be explained by the abundance of commonly-recognizable or commonsensical correct behaviors which were depicted, causing participants to attribute a higher source credibility to the film and leading them to believe that all the behaviors were correct. Alternatively, participants may have also been influenced by pre-existing beliefs. For example, if participants were trained as children to take shelter in a doorway (which was a commonly taught practice), but then saw this behavior corrected in the film, the means may have dropped somewhat as they questioned this behavior, yet remained moderately high because participants were hesitant to throw out their pre-existing training from a source that is traditionally considered more reliable.

Perceived reality also appeared to have a varying effect on behavioral intentions and beliefs of self-efficacy. Factuality—which was split into three separate measures—had the highest impact (5 behaviors), followed by narrative consistency (2 behaviors), then plausibility (1 behavior). However, as can be seen in Table 4, there seems to be no clear pattern to these findings. Again, the results were surprising. Perceived realism was expected to have a more consistent effect on behavioral intentions. As such, the only conclusion that can be made is that while perceived realism certainly played a part in predicting certain behavioral intentions and beliefs, the variance in the results indicates the existence of other variables that may have similar or even stronger influences. This study did take into account several outside factors (gender, age,

education, risk, training, experience) and found that all (except level of education) influenced at least one behavior. Yet, the remaining inconsistencies and gaps call for further attention in future research.

Hypothesis 3 predicted that those who perceived the film as more realistic would be more interested in learning or thinking about earthquakes and earthquake safety. This hypothesis was supported—although only in terms of narrative consistency. Perhaps the best explanation for this finding is that the narrative consistency led to higher levels of transportation and identification, which would cause participants to imagine themselves in a similar situation and consider what they would do should they experience a major earthquake. This would naturally cause them to wonder about earthquakes and earthquake safety and motivate a desire to think and learn more about them so they would be prepared should an earthquake occur.

Regardless of the relatively small effect perceived realism had on thinking and learning, the results of hypothesis 3 clearly showed that entertainment media content can motivate real thinking and learning that could prove useful in real life. The average rating participants gave their desire to think and learning more about earthquakes and earthquake safety was quite high (M=5.49), indicating a peaked interest in the subject matter of the film and a curiosity about how a similar situation might affect themselves. This level of interest could lead participants to seek out accurate information about earthquakes and earthquake safety viewing the film, leading to improved awareness and preparedness. Or, at the very least, it brought the issue of earthquake risks to the tops of participants' minds, allowing time and energy to be spent considering the topic. If this was indeed the case, even though the accuracy of the facts presented in the film may have been in question for some, the resulting awareness would certainly be considered a positive effect of disaster film viewing.

Finally, enjoyment of the film increased significantly when participants reported higher levels of narrative consistency and perceptual quality, and lower levels of scientific factuality. These findings partially support hypothesis 4, which predicted greater enjoyment for those who perceived the film as more realistic. High narrative consistency and perceptual quality can contribute to a more fully immersive experience and increase transportation, leading to increased enjoyment. Furthermore, audiences who saw the film as less realistic in terms of its scientific accuracy enjoyed the film more. This is a logical result, considering that the film's primary purpose was to entertain. The film wouldn't be able to achieve that goal without some sense of exaggeration and/or sensationalism. Rather, it would feel more like an educational documentary, not a thrilling disaster movie. In addition, those who perceived the film as more scientifically factual might have experienced greater anxiety or fear if they believed the events in the film could actually occur in the same dramatic way. Regardless of the reason, increased enjoyment can, in turn, increase the film's credibility and motivate behavioral changes. Enjoyment was significantly correlated with a desire to learn, intent to change behaviors, and feelings of improved preparedness, all of which lend support this idea.

In conclusion, even though the results of this study showed that perceived realism had a less-than-expected influence on social learning via entertainment narratives, the fact remains many audience members do learn from and alter behavioral intentions and beliefs based on what they see in movies. Entertainment media texts can be a powerful persuasive tool. Therefore, when it comes to film content that depicts life-saving (or life-threatening) behaviors, care must be taken in the production of such films. The film *San Andreas* did a relatively good job at sticking to recommended behaviors, although a few non-recommended or debatable behaviors were also included. This means that audiences need to be self-aware while consuming

entertainment media. They need to recognize that misrepresentations are often included in the midst of many accurate facts. On the other hand, while filmmakers should retain creative and artistic license in their endeavors to create top-notch entertainment for our enjoyment, high priority should be given to ensure the factuality of key behaviors. Even though filmmakers do not necessarily have an obligation to always ensure accurate information, where a recommended behavior can be depicted, it should. Someone's life may depend on it.

CHAPTER 6

Limitations and Future Research

This study contained some inherent limitations. Knowledge about earthquake related science and safety response was difficult to measure without priming audiences to these topics before watching the film. As such, only a limited number of questions were asked during the pre-tests survey concerning earthquake-related knowledge. Because the number of questions was limited, it is possible that participants with alternative knowledge (i.e. structural design, medicine, etc.) may have been grouped into lower-knowledge groups even though they could have more accurately gaged the realism of other, non-geological elements of the film.

Furthermore, it would have been useful to gather pre-existing beliefs about each specific behavior that was measured in the post-test survey. Again, this was not done in an attempt to minimize priming. However, future research might consider doing so in order to gain a more accurate picture of what specific beliefs were altered due to the film's content.

Finally, there were several additional factors that were not measured in this study that certainly deserve future attention, especially considering the inconsistent effect perceived realism had on behavioral intentions and beliefs, learning, and enjoyment. Among these are identification, transportation, emotional arousal, and resonance. While these factors fell outside the scope of this study, future research focusing on those factors would help add to the discussion on the persuasive effect of entertainment narratives on social learning.

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APPENDIX A: TABLES

Table 1
Difference Between Knowledge Level and Perceived Realism

Dimension of Realism	Low-Knowledge	Mid-Knowledge	High-Knowledge	
	M(SD)	*M(SD)*	*M(SD)*	*F*(df,df)
Plausibility	3.99 (1.02)	3.98 (1.34)	3.66 (1.17)	.78 (2,88)
Typicality	3.13 (1.25)	3.12 (1.25)	2.88 (1.81)	.29 (2,88)
Narrative Consistency	4.58 (1.22)	4.29 (1.28)	4.52 (1.19)	.46 (2,88)
Perceptual Quality	3.77 (1.17)	4.01 (1.14)	3.62 (1.20)	.84 (2,88)
Disaster Relief Facts	4.97 (1.31)	4.79 (1.42)	5.07 (1.20)	.34 (2,88)
Science Facts	4.18 (1.40)[b]	3.82 (1.42)[ab]	3.23 (1.48)[a]	3.49 (2,88)*
Safety & Survival Facts	5.61 (1.25)	6.04 (0.96)	5.39 (1.17)	1.20 (2,88)

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

Note. Superscripts indicate Tukey post hoc differences among groups by row.

Table 2
Difference Between Knowledge Level and Intended Behaviors

Behaviors	Low-Knowledge	Mid-Knowledge	High-Knowledge	
	M(SD)	*M(SD)*	*M(SD)*	*F*(df,df)
Shelter in doorway	4.61 (1.77)	4.11 (2.10)	4.17 (1.70)	.68 (2,88)
Shelter under desk	5.85 (1.48)	6.04 (1.11)	6.10 (1.40)	.30 (2,88)
Duck and cover head/neck	6.45 (.71)	6.29 (1.12)	6.27 (1.14)	.34 (2,88)
Get out of building	4.97 (1.79)	5.14 (1.60)	4.10 (2.38)	2.42 (2,88)
Drop, cover, hold on	5.73 (0.94)	5.75 (1.51)	5.70 (1.82)	.01 (2,88)
Get up against building	5.52 (1.66)	5.50 (1.45)	5.17 (2.07)	.38 (2,88)
Building collapse, get behind something	6.00 (1.09)	6.29 (0.85)	6.20 (1.06)	.65 (2,88)
Drive boat seaward	5.58 (1.40)	5.57 (1.49)	5.67 (1.49)	.04 (2,88)
Get up high	6.76 (0.61)	6.64 (0.83)	6.90 (0.31)	1.28 (2,88)
Impaled, pull out	5.06 (1.81)	4.04 (1.88)	4.07 (1.87)	3.11 (2,88)*
B/c of film, change behavior	3.88 (1.76) [ab]	4.14 (1.84) [b]	2.83 (1.84) [a]	4.33 (2,88)*
Able to run	4.06 (1.58) [ab]	4.82 (1.81) [b]	3.23 (1.91) [a]	5.89 (2,88)**
Able to protect self	3.94 (1.30)	4.33 (1.47)	4.37 (1.73)	.79 (2,88)
B/c of film, feel more prepared	3.58 (1.39)	3.54 (1.55)	3.17 (1.66)	.66 (2,88)

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

Note. Superscripts indicate Tukey post hoc differences among groups by row.

Table 3
Bivariate Correlations for All Variables

	1	2	3	4	5	6	7	8	9	10	11	12
1 Age	1	-.35**	.17	.04	.62**	.04	.16	.00	-.00	.01	-.14	-.06
2 Gender		1	-.10	-.21	.08	-.08	.14	.07	.14	.06	.29**	.25*
3 Experience			1	-.24*	-.09	.11	.08	.26*	-.04	.04	.01	.02
4 Training				1	.03	-.16	-.17	-.31**	.02	-.00	.16	.05
5 Education					1	-.09	.12	.09	-.01	.02	-.01	-.02
6 Knowledge						1	.15	-.11	-.12	-.07	-.03	-.05
7 EQ Risk – Utah							1	.38**	.05	.11	.01	.06
8 EQ Risk - Home								1	.13	.08	.00	.11
9 Plausibility									1	.69**	.49**	.60**
10 Typicality										1	.43**	.50**
11 Narr Consist											1	.65**
12 Percep Qual												1
13 ReliefFact												
14 ScienceFact												
15 SafetyFact												
16 PrepfromFilm												
17 BehaveDiff												
18 Doorway												
19 Desk/Table												
20 Duck & Cover												
21 Get outside												
22Drop,Cover,Hold												
23Outside-building												
24Collapse-behind												
25 Seaward												
26 High up												
27 Impaled												
28 Can Run												
29 Can Protect												
30 Learning												
31 Enjoyment												

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

	13	14	15	16	17	18	19	20	21	22	23	24
1 Age	-.19	-.15	-.07	-.05	-.14	-.07	-.07	-.24*	-.12	-.20	-.27*	-.14
2 Gender	.36**	.25*	.22*	.16	.14	-.06	.28**	.45**	.11	.30**	.35**	.15
3 Experience	.08	-.01	.13	-.04	-.12	.09	.17	-.05	-.12	-.13	.02	.12
4 Training	.02	.02	.04	.17	.27*	-.06	.03	-.13	.00	-.19	.05	-.13
5 Education	-.07	-.01	.11	-.00	-.13	-.07	.06	-.12	-.09	.00	-.09	-.07
6 Knowledge	.03	-.27*	.12	-.11	-.23*	-.10	.08	-.08	-.18	-.01	-.08	.09
7 EQ Risk – Utah	.07	.07	.05	.09	-.01	.04	.24*	-.04	.09	.05	-.06	.02
8 EQ Risk – Home	.12	.15	.12	.09	-.06	.20	.24*	.13	-.02	.17	-.3	.22*
9 Plausibility	.23*	.55**	.17	.49**	.36**	.06	.09	.24*	.08	.24*	.12	.34**
10 Typicality	.08	.45**	.14	.44**	.19	-.01	.10	.18	-.03	.13	.04	.22
11 Narr Consist	.44**	.45**	.48**	.43**	.31**	.23*	.42**	.30**	.00	.19	.29**	.32**
12 Percep Qual	.42**	.54**	.36**	.53**	.38**	.10	.25*	.23*	.02	.20	.14	.29**
13 ReliefFact	1	.46**	.45**	.32**	.20	.10	.33**	.32**	-.05	.18	.42**	.39**
14 ScienceFact		1	.36**	.61**	.39**	.15	.28**	.21*	.09	.21*	.25*	.31**
15 SafetyFact			1	.32**	.23*	.18	.53**	.19	.05	.22*	.41**	.50**
16 PrepfromFilm				1	.61**	.09	.35**	.10	.06	.14	.17	.19
17 BehaveDiff					1	.09	.18	.02	.27**	.09	.32**	.20
18 Doorway						1	.03	-.17	.14	-.04	.15	.11
19 Desk/Table							1	.23*	-.01	.10	.17	.26*
20 Duck & Cover								1	-.12	.71**	.29**	.39**
21 Get outside									1	-.03	.13	-.01
22Drop,Cover,Hold										1	.41**	.43**
23Outside-building											1	.55**
24Collapse-behind												1
25 Seaward												
26 High up												
27 Impaled												
28 Can Run												
29 Can Protect												
30 Learning												
31 Enjoyment												

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

	25	26	27	28	29	30	31
1 Age	-.04	-.06	-.09	.02	.21*	-.16	-.06
2 Gender	.06	.02	.05	-.08	-.04	.27*	.17
3 Experience	-.07	-.07	-.02	-.14	.14	-.02	-.02
4 Training	.03	-.16	.02	-.04	-.18	.01	-.04
5 Education	.07	-.08	-.11	-.07	.03	-.02	.05
6 Knowledge	.02	.09	-.22*	-.18	.12	-.06	.19
7 EQ Risk – Utah	-.01	.05	-.09	-.03	.08	.17	-.04
8 EQ Risk – Home	.04	-.06	.13	.11	.28**	.08	-.02
9 Plausibility	.19	.16	.28**	.17	.20	.34**	.44**
10 Typicality	.08	.05	.12	.15	.15	.33**	.33**
11 Narr Consist	.21*	.14	.32**	.06	.20	.47**	.60**
12 Percep Qual	.26*	.04	.24*	.22*	.31**	.41**	.66**
13 ReliefFact	.13	.08	.42**	-.00	.17	.31**	.33**
14 ScienceFact	.07	.05	.29**	.14	.12	.37**	.28**
15 SafetyFact	.29**	-.00	.26*	.15	.23*	.15	.33**
16 PrepfromFilm	.24*	.00	.22*	.31**	.26*	.43**	.41**
17 BehaveDiff	.20	-.05	.39**	.39**	.09	.30**	.32**
18 Doorway	-.02	-.09	.06	.01	.14	.04	.12
19 Desk/Table	.13	-.07	.20	.02	.16	.22*	.22*
20 Duck & Cover	.10	.31**	.21*	-.05	.02	.38**	.18
21 Get outside	-.09	-.12	.06	.25*	-.13	-.16	-.02
22Drop,Cover,Hold	.35**	.38**	.13	.13	.20	.39**	.10
23Outside-building	.27**	.10	.34**	.06	.07	.14	.19
24Collapse-behind	.29**	.17	.29**	.06	.05	.33**	.30**
25 Seaward	1	.25*	.31**	.19	.20	.17	.11
26 High up		1	.20	-.05	.04	.14	.13
27 Impaled			1	.32**	.16	.08	.12
28 Can Run				1	.57**	-.00	.01
29 Can Protect					1	.04	.13
30 Learning						1	.41**
31 Enjoyment							1

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

Table 4
Perceived Realism and Behavioral Intentions/Beliefs

	Enjoyment			*Learning*			*Feeling of Increased Preparedness b/c Film*			*Intention to Act Differently b/c Film*		
Predictor Variables	*B*	SE_B	β	*B*	SE_B	β	*B*	SE_B	β	*B*	SE_B	β
Gender	-.35	.29	-.12	.10	.28	.04	.15	.34	.05	.44	.48	.12
Age	-..07	.06	-.16	-.05	.06	-.14	.04	.07	.09	.03	.09	.05
Education	.58	.37	.19	.20	.35	.08	-.27	.43	-.08	-.81	.60	-.20
Risk (Current Area)	-.08	.27	-.03	.37	.26	.15	.16	.32	.05	.15	.45	.04
Risk (Hometown)	-.28	.27	-.10	-.04	.25	-.02	.12	.31	.04	-.13	.43	-.04
Training	.32	.33	.09	.02	.31	.01	-.70	.38	-.18	-1.27	.53	-.26*
Experienced EQ	.02	.28	.01	.04	.26	.02	-.14	.32	-.04	-.26	.45	-.06
Disaster Relief Facts	.09	.11	.08	.09	.11	.11	-.00	.13	-.00	-.17	.18	-.12
Science Facts	-.20	.10	-.21*	.08	.10	.11	.40	.12	.38**	.31	.17	.24
Safety/Survival Facts	.05	.12	.04	-.17	.11	-.17	.12	.14	.09	.22	.19	.13
Plausibility	.20	.15	.17	-.00	.14	-.00	.08	.17	.06	.36	.24	.22
Typicality	-.06	.11	-.06	.08	.11	.10	.13	.13	.12	-.21	.18	-.16
Narrative Consist.	.33	.14	.29*	.30	.13	.33*	-.01	.16	-.01	-.05	.22	-.03
Perceptual Qual.	.61	.14	.50***	.08	.14	.09	.24	.17	.18	.29	.23	.18
	R	R^2	*Adj* R^2	*R*	R^2	*Adj* R^2	*R*	R^2	*Adj* R^2	*R*	R^2	*Adj* R^2
	.74	.54	.46	.57	.33	.20	.69	.48	.38	.57	.32	.20
ANOVA	$F(14,76) = 6.37$, $p=.000$			$F(14,76) = 2.63$, $p<.01$			$F(14,76) = 4.93$, $p<.001$			$F(14,76) = 2.58$, $p<.01$		

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

Table 4 Cont.

	Ability to Run During Earthquake			*Ability to Protect Self During Earthquake*			*Take Shelter in a Doorway*			*Take Cover Under a Desk/Table*		
Predictor Variables	*B*	SE_B	β	*B*	SE_B	β	*B*	SE_B	β	*B*	SE_B	β
Gender	-.24	.52	-.06	-.18	.39	-.06	-.75	.52	-.20	.45	.31	.17
Age	.13	.10	.22	.19	.08	.39*	-.03	.10	-.05	.02	.06	.05
Education	-1.08	.65	-.27	-.76	.49	-.23	-.15	.65	-.04	-.14	.39	-.05
Risk (Current Area)	-.41	.48	-.10	-.24	.36	-.07	-.01	.49	-.00	.44	.29	.15
Risk (Hometown)	.63	.47	.17	.78	.35	.26*	.72	.47	.19	.44	.28	.16
Training	.38	.57	.08	.71	.43	.18	.48	.58	.10	-.36	.35	-.10
Experienced EQ	-1.15	.49	-.29*	-.26	.37	-.08	.01	.49	.00	.27	.30	.09
Disaster Relief Facts	-.17	.19	-.12	.06	.15	.05	-.10	.20	-.07	-.03	.12	-.03
Science Facts	.06	.18	.05	-.10	.14	-.10	.17	.18	.14	.09	.11	.10
Safety/Survival Facts	.39	.21	.24	.23	.16	.18	.10	.21	.06	.42	.13	.36**
Plausibility	.02	.26	.01	.01	.20	.01	-.00	.27	-.00	-.17	.16	-.15
Typicality	.06	.20	.05	.00	.15	.00	-.25	.20	-.19	-.01	.12	-.01
Narrative Consist.	-.21	.24	-.14	.09	.18	.07	.57	.24	.38*	.32	.14	.29*
Perceptual Qual.	.38	.25	.24	.31	.19	.24	-.14	.25	-.09	-.09	.15	.08
	R	R^2	*Adj* R^2	*R*	R^2	*Adj* R^2	*R*	R^2	*Adj* R^2	*R*	R^2	*Adj* R^2
	.43	.19	.04	.54	.29	.16	.41	.17	.01	.65	.42	.32
ANOVA	$F(14,76) = 1.25$, $p>.05$			$F(14,76) = 2.23$, $p<.05$			$F(14,76) = 1.09$, $p>.05$			$F(14,76) = 3.99$, $p<.001$		

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

Table 4 Cont.

	Duck Down and Cover Head			*Try to Get Out of Building*			*Drop, Cover, and Hold On*			*If Outdoors, Get up Against a Building*		
Predictor Variables	*B*	SE_B	β	*B*	SE_B	β	*B*	SE_B	β	*B*	SE_B	β
Gender	.83	.25	.41**	.40	.58	.10	.36	.39	.12	.74	.44	.21
Age	.04	.05	.12	-.03	.12	-.05	-.06	.08	-.13	-.06	.09	-.10
Education	-.50	.32	-.23	-.47	.73	-.11	.13	.49	.04	-.16	.55	-.04
Risk (Current Area)	-.39	.23	-.18	.63	.54	.14	-.07	.37	-.02	-.25	.41	-.07
Risk (Hometown)	.36	.23	.18	-.25	.53	-.06	.30	.36	.10	-.20	.40	-.06
Training	.17	.28	.07	-.09	.65	-.02	.71	.44	.19	-.25	.49	-.06
Experienced EQ	-.27	.24	-.12	-.37	.55	-.08	-.54	.37	-.17	.14	.41	.04
Disaster Relief Facts	.12	.10	.16	-.30	.22	-.20	.01	.15	.01	.32	.17	.24
Science Facts	-.06	.09	-.08	.16	.20	.12	-.01	.14	-.01	.03	.15	.02
Safety/Survival Facts	.04	.10	.04	.21	.24	.12	.21	.16	.16	.42	.18	.28*
Plausibility	.05	.13	.06	.34	.30	.20	.27	.20	.22	.14	.22	.09
Typicality	.09	.10	.13	-.26	.22	-.19	-.05	.15	-.05	-.01	.17	-.01
Narrative Consist.	.10	.12	.13	-.11	.27	-.07	.01	.18	.01	.09	.20	.06
Perceptual Qual.	-.08	.12	-.09	-.04	.28	-.02	-.01	.19	-.01	-.31	.21	-.21
	R	R^2	*Adj* R^2	*R*	R^2	*Adj* R^2	*R*	R^2	*Adj* R^2	*R*	R^2	*Adj* R^2
	.57	.33	.20	.31	.10	-.07	.47	.22	.07	.57	.33	.21
ANOVA	$F(14,76) = 2.62$, $p<.01$			$F(14,76) = .59$, $p>.05$			$F(14,76) = 1.50$, $p>.05$			$F(14,76) = 2.66$, $p<.01$		

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

Table 4 Cont.

	If a Building Collapses, Hide Behind Something			*During Tsunami, Drive Seaward (At Sea)*			*During Tsunami, Get as High as Possible (Land)*			*If Impaled by Small Object, Pull it Out*		
Predictor Variables	*B*	SE_B	β	*B*	SE_B	β	*B*	SE_B	β	*B*	SE_B	β
Gender	-.12	.24	-.06	-.27	.44	-.09	-.18	.18	-.14	-.42	.49	-.11
Age	-.02	.05	-.05	-.06	.09	-.12	-.01	.04	-.04	.07	.10	.11
Education	-.15	.31	-.07	.41	.55	.12	-.04	.22	-.03	-.67	.62	-.16
Risk (Current Area)	-.14	.23	-.06	-.05	.41	-.01	.14	.16	.10	-.64	.46	-.15
Risk (Hometown)	.24	.22	.12	.03	.39	.01	-.20	.16	-.16	.63	.44	.16
Training	.34	.27	.13	.11	.49	.03	.44	.20	.27*	.22	.55	.05
Experienced EQ	-.00	.23	-.00	-.28	.41	-.08	-.13	.17	-.10	-.52	.46	-.13
Disaster Relief Facts	.15	.09	.19	.00	.16	.00	.05	.07	.10	.53	.19	.36**
Science Facts	-.04	.09	-.06	-.23	.15	-.22	-.02	.06	-.04	.03	.17	.03
Safety/Survival Facts	.38	.10	.43***	.39	.18	.29*	-.03	.07	-.05	.12	.20	.07
Plausibility	.25	.12	.29*	.29	.22	.22	.14	.09	.26	.34	.25	.21
Typicality	.02	.09	.03	-.12	.17	-.11	-.05	.07	-.12	-.09	.19	-.07
Narrative Consist.	-.01	.11	-.01	-.04	.20	-.03	.13	.08	.26	.30	.23	.19
Perceptual Qual.	-.08	.12	-.09	.30	.21	.23	-.09	.09	-.17	-.23	.24	-.14
	R	R^2	*Adj* R^2	*R*	R^2	*Adj* R^2	*R*	R^2	*Adj* R^2	*R*	R^2	*Adj* R^2
	.63	.39	.28	.41	.17	.01	.37	.14	-.02	.54	.30	.17
ANOVA	$F(14,76) = 3.50, p<.001$			$F(14,76) = 1.09, p>.05$			$F(14,76) = .88, p>.05$			$F(14,76) = 2.28, p<.05$		

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

APPENDIX B: PRETEST SURVEY

1. The amount of ground displacement in an earthquake is called the. . .
   a. Epicenter
   b. Dip
   c. Slip
   d. Drift
   e. I don't know
2. The shock waves produced by an earthquake are called…
   A. seismic waves
   B. sonar waves
   C. laser waves
   D. magnetic waves
   E. I don't know
3. Earthquake A has a Richter magnitude of 7 as compared with earthquake B's 6.
   a. A is 10X more intense than B
   b. A is 100X more intense than B
   c. A is 2X more intense than B
   d. Richter magnitude does not measure intensity
   e. I don't know
4. How do rock particles move during the passage of a P wave through the rock?
   a. Back and forth parallel to the direction of wave travel
   b. Perpendicular to the direction of wave travel
   c. In a rolling elliptical motion
   d. In a rolling circular motion
   e. I don't know
5. Transform plate boundaries move in which way?
   a. Slide past each other horizontally
   b. Pull apart
   c. Push together
   d. One plate submerges under the other
   e. I don't know
6. Which of the following can be triggered by an earthquake?
   a. Tsunami
   b. Intense ground shaking
   c. A landslide
   d. All of these
   e. I don't know
7. If there is no table or desk near you during an earthquake?
   a. Go to another room with a table or desk

b. Go outside
c. Get to the inside corner of the room and say low
d. Get to the first available door and stay in the doorway
e. I don't know

8. 70% of all injuries that occur in earthquakes are caused by
   a. people being hit by or stumbling over fallen objects
   b. collapsing buildings
   c. fires from gas line breaks
   d. car accidents caused by the shaking
   e. I don't know
9. Roughly, how old is Earth
   a. 4.54 billion years
   b. 4.54 million years
   c. 4,540 years
   d. 6,000 years
   e. I don't know
10. Since the early 19th century, which of these has moved northward more than 600 miles?
    a. Earth's magnetic pole
    b. The equator
    c. The Sahara Desert
    d. Antarctica
    e. I don't know
11. Roughly, how often does lightning strike somewhere on Earth?
    a. 100 times per day
    b. 100 times per second
    c. 100 times per hour
    d. 100 times per minute
    e. I don't know
12. The ____ forms the relatively cool, brittle plates of plate tectonics?
    a. Asthenosphere
    b. Lithosphere
    c. Astrosphere
    d. Eosphere
    e. I don't know
13. Which type of rock is formed by crystallization and consolidation of molten magma?
    a. Sedimentary
    b. Indigenous
    c. Metamorphic
    d. Igneous
    e. I don't know

14. What causes the most erosion on Earth?
    a. Wind
    b. Water
    c. Friction
    d. Chemicals
    e. I don't know
15. Which of the following erupt from volcanoes?
    a. Lava
    b. Hot gases
    c. Rock fragments
    d. All of the above*
    e. I don't know
16. Hot melted rock within the earth is called
    a. Lava
    b. Magma
    c. Melted sediment
    d. All of the above
    e. I don't know
17. The Hawaiin islands are a result of
    a. Divergent plate boundary
    b. Hot spot
    c. Erosion of larger land mass
    d. Manmade islands
    e. I don't know
18. The Pacific Plate is surrounded by a phenomenon called
    a. The Volcanic Circle
    b. The Volcanic Arch
    c. The Ring of Fire
    d. The Ring of Ash
    e. I don't know
19. A Volcano that is no longer active is
    a. Extinct
    b. Dead
    c. Sleeping
    d. Completed
    e. I don't know
20. What type of storm most commonly produces tornados?
    a. Single cell
    b. Multi-cell cluster
    c. Multi-cell line

d. Supercell
e. I don't know

21. What is the strongest rating a tornado can receive?
    a. EF-4
    b. EF-5
    c. EF-6
    d. EF-7
    e. I don't know
22. What cloud form is a sign of tornado formation?
    a. Wall cloud
    b. Outflow band
    c. Stratus
    d. Underside clouding
    e. I don't know
23. In the event of a tornado, which of the following is the safest place to take shelter?
    a. Upper-floor bathroom
    b. Under kitchen table
    c. Bedroom
    d. Inner closet
    e. I don't know
24. What should do you do if you are caught in the open during a tornado?
    a. Find a nearby tree
    b. Lay in an open field
    c. Get into a car
    d. Lay in a ditch
    e. I don't know

For Questions 25-26, please indicate on a scale of 1 (not at all likely) to 7 (very likely) your belief about the next two questions.

25. To what extent to you believe you are likely to experience the following in your current residential area?

    a) Blizzard/Avalanche

    1 2 3 4 5 6 7

    b) Earthquake

    1 2 3 4 5 6 7

    c) Flood

    1 2 3 4 5 6 7

    d) Forest fire

    1 2 3 4 5 6 7

    e) Hurricane/Typhoon

    1 2 3 4 5 6 7

f) Tornado
1 2 3 4 5 6 7
g) Volcanic activity
1 2 3 4 5 6 7

26. To what extent to you believe you are likely to experience the following in your hometown?
    a) Blizzard/Avalanche
    1 2 3 4 5 6 7
    b) Earthquake
    1 2 3 4 5 6 7
    c) Flood
    1 2 3 4 5 6 7
    d) Forest fire
    1 2 3 4 5 6 7
    e) Hurricane/Typhoon
    1 2 3 4 5 6 7
    f) Tornado
    1 2 3 4 5 6 7
    g) Volcanic activity
    1 2 3 4 5 6 7

27. Have you personally experienced a natural disaster?
    - Yes
    - No
28. If so, what type? (fill in the blank)

    _____
29. What disaster relief/safety training/education have you had? (check all that apply)
    - Basic training in formal education (i.e. earthquake drills, unit on emergency response in health class, EMT guest speaker at an assembly, etc.)
    - Certified disaster relief organizational training (i.e. Red Cross, CERT, etc.)
    - Medical training
    - Other professional training
    - None
    - Other _____
30. What is the highest level of education you have completed?
    - High school
    - Associate Degree
    - Bachelor degree
    - Master Degree
    - Professional Degree
31. What is/was your area of study? (fill in blank)

_____

32. What is your occupation? (fill in blank)

_____

33. What is your age? (dropdown)
34. Are you a current resident of Utah or Salt Lake Valley?
    - Yes
    - No

If you answered "No" to question number one, please indicate your current residential area below:

_____

35. What is your gender?
    - Male
    - Female

APPENDIX C: POSTTEST SURVEY

Please answer the following questions based on your perceptions of the film *San Andreas*.
Please indicate on a scale of 1 to 7 to what extent you disagree (1) or agree (7) with the following statements:

1. I enjoyed the premise/concept of the film.
   1 2 3 4 5 6 7
2. I am curious about what might happen in the event of a major earthquake in Utah.
   1 2 3 4 5 6 7
3. The disaster relief tips presented in the film were based on facts (i.e. landline phones will work when cell service is out, fire trucks have supply boxes, etc.)
   1 2 3 4 5 6 7
4. The story portrayed in the film was consistent.
   1 2 3 4 5 6 7
5. I am interested in the San Andres fault/and or earthquakes in general.
   1 2 3 4 5 6 7
6. The film showed something that could possibly happen in real life.
   1 2 3 4 5 6 7
7. The events in the film had a logical flow.
   1 2 3 4 5 6 7
8. This film makes me more carefully consider what I would do in the event of an earthquake here in Utah.
   1 2 3 4 5 6 7
9. I enjoyed the work of one or more of the actors in the film.
   1 2 3 4 5 6 7
10. The story in the film could actually happen in real life.
    1 2 3 4 5 6 7
11. Because of this film, I feel better prepared for a potential earthquake.
    1 2 3 4 5 6 7
12. The characters in the film were realistic.
    1 2 3 4 5 6 7
13. The film portrayed an event that happens to a lot of people.
    1 2 3 4 5 6 7
14. I enjoyed the visual effects.
    1 2 3 4 5 6 7
15. What happened to the people in the film is what happens to people in the real world.
    1 2 3 4 5 6 7
16. The science depicted in the film was based on facts.
    1 2 3 4 5 6 7
17. I felt that the overall production elements of the film were realistic.
    1 2 3 4 5 6 7

18. The film showed a coherent story.
    1 2 3 4 5 6 7
19. Real people would not do the things shown in the film.
    1 2 3 4 5 6 7
20. The film portrayed possible real-life situations.
    1 2 3 4 5 6 7
21. I am curious how I might react in a similar situation.
    1 2 3 4 5 6 7
22. The acting in the film was realistic.
    1 2 3 4 5 6 7
23. Never in real life would what was shown in the film happen.
    1 2 3 4 5 6 7
24. The safety and survival techniques recommended in the film were based on facts (i.e. drop, cover, and hold on; get up against something sturdy and protect yourself, etc.)
    1 2 3 4 5 6 7
25. Parts of the film were contradicting each other.
    1 2 3 4 5 6 7
26. I want to learn more about earthquake safety.
    1 2 3 4 5 6 7
27. The story portrayed in the film made sense.
    1 2 3 4 5 6 7
28. I enjoyed the film overall.
    1 2 3 4 5 6 7
29. The visual elements of the film were realistic.
    1 2 3 4 5 6 7
30. I enjoyed the story of the film.
    1 2 3 4 5 6 7
31. I enjoyed the film because of a personal connection to and/or interest in the featured locations in the film (i.e. Los Angeles, San Francisco, etc.).
    1 2 3 4 5 6 7
32. The audio elements of the film were realistic.
    1 2 3 4 5 6 7
33. Because of what I saw in this film, I intend to behave differently in the event of an earthquake than I would have had I not seen this film.
    1 2 3 4 5 6 7
34. Not many people are likely to experience the event portrayed in the film.
    1 2 3 4 5 6 7
35. I want to learn more about earthquakes.
    1 2 3 4 5 6 7
36. The scenes in the film were realistic.
    1 2 3 4 5 6 7
37. In general, I consider disaster films to be realistic.

1 2 3 4 5 6 7

38. I enjoy disaster films like *San Andres* in general.
    1 2 3 4 5 6 7
39. To me, this film fits well into the stereotypical disaster film genre.
    1 2 3 4 5 6 7
40. This film makes me want to learn more about earthquakes and earthquake safety.
    1 2 3 4 5 6 7

Please indicate on a scale of 1 to 7 to what extent you disagree (1) or agree (7) with the following statements:

41. If I were in a similar situation, I believe I should do what the characters did in order to increase my safety/chance of survival in the following scenarios:
    a) During an earthquake, take shelter in a doorway.
       1 2 3 4 5 6 7
    b) During an earthquake, take shelter under a desk/table.
       1 2 3 4 5 6 7
    c) During an earthquake, duck down and cover my head/neck.
       1 2 3 4 5 6 7
    d) During an earthquake, try to get out of the building.
       1 2 3 4 5 6 7
    e) During an earthquake, drop, cover, and hold on.
       1 2 3 4 5 6 7
    f) During an earthquake, if outdoors, get up against a building and protect my head/neck.
       1 2 3 4 5 6 7
    g) If a building collapses nearby, causing debris to blow through the street, take cover behind something sturdy.
       1 2 3 4 5 6 7
    h) During a tsunami, drive my boat seaward rather than inland (if at sea).
       1 2 3 4 5 6 7
    i) During a tsunami, get as high up as possible (if on land).
       1 2 3 4 5 6 7
    j) If impaled by a small object (e.g. a piece of glass), pull out the object and tie it with a bandage.
       1 2 3 4 5 6 7
42. I believe I would be able to run towards safety during a major earthquake.
    1 2 3 4 5 6 7
43. I believe I would be capable of protecting myself during a major earthquake.
    1 2 3 4 5 6 7

Name: _____

E-mail Address: _____

APPENDIX D: IMPLIED CONSENT FORM

My name is Melissa Seipel, I am a graduate student at Brigham Young University and I am conducting this research under the supervision of Professor Pamela Brubaker, from the School of Communications. You are being invited to participate in this research study of Natural Disaster Films. I am interested in finding out about your perceptions of the 2015 natural disaster film, San Andreas.

Your participation in this study will require the completion of the attached questionnaire, which should take approximately 10-15 minutes of your time. You will then sign up for a time and place to watch the 1hr 54min movie San Andreas, immediately after which you will complete a final survey. The final survey should take approximately 10-15 minutes. Your participation will be confidential. You will be provided with snacks during the film and paid $10 at the conclusion of this study. This study involves only minimal risk to you. Potential risks may include discomfort/anxiety at the content of the film, which has been rated PG-13 for "intense disaster action and mayhem throughout, and brief strong language." More specific details about the content of the film can be provided upon request. The benefits, however, may impact society by helping increase knowledge about perceptions of natural disaster films.

You do not have to be in this study if you do not want to be. You do not have to answer any question that you do not want to answer for any reason. Your participation is voluntary and you have the right to withdraw participation at any point during the study. We will be happy to answer any questions you have about this study. If you have further questions about this project, or if you have a research-related problem you may contact me, Melissa Seipel, at msanny17@gmail.com or my advisor, Dr. Pamela Brubaker, at pamela_brubaker@byu.edu.

If you have any questions about your rights as a research participant you may contact the IRB Administrator at A-285 ASB,

Brigham Young University, Provo, UT 84602; irb@byu.edu; (801) 422-1461. The IRB is a group of people who review research studies to protect the rights and welfare of research participants.

The completion of this survey implies your consent to participate. If you choose to participate, please complete the attached survey and sign up for a time to view the film. Thank you!