SHAKY DECISIONS: EXPLORING HUMAN RESPONSES TO EARTHQUAKE VIDEO FOOTAGE ON SOCIAL MEDIA

by

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Earthquakes are unpredictable natural disasters that can cause serious damage, disrupt communities, and threaten safety. This project explores the video-based information college students encounter on social media depicting human behavior in response to major earthquake shaking and their interpretations of what they see and hear in such footage. Through the UO General Survey, our survey asks participants to find three earthquake videos from a social media site of their choice and answer a set of questions regarding their earthquake knowledge and protective action. By probing individuals after watching the videos from their social media algorithms, we are able to identify gaps in their knowledge of correct protective action and what they may remember about earthquakes in general. We are interested in learning more about to what extent previous earthquake experiences and social media exposure of earthquake content affect an individual's beliefs and attitudes about earthquakes. We hypothesize that people's knowledge of earthquakes and earthquake safety is limited, and that individuals who have experienced an earthquake will be less likely to judge behavior as the safest possible action. Acknowledging the vast diversity of earthquake education in the United States, the overarching goal of this project is to better understand individuals' beliefs, knowledge, and attitudes surrounding earthquake risks and safety measures.

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Introduction

Earthquakes are extremely unpredictable natural disasters capable of inflicting long-term social disruptions, significant property damage, and injury, as well as loss of life. There has been an increased prevalence of powerful earthquakes in some regions (*Induced Earthquakes Overview*, 2022), like the catastrophic Turkey and Syria quakes in 2023, which killed over 56,000 people (*Turkey-Syria Earthquake*, 2024). These devastating earthquakes emphasize the urgency for communities to become well-prepared and informed about the correct steps to take to mitigate the impact of a major quake. Although some American residents are well trained in earthquake protection, many have never been exposed to earthquake readiness programs at all. While this may be region-dependent, it is imperative that those residing in the United States are properly trained to protect themselves in the event of an earthquake.

Despite extensive studies on proper human earthquake response and earthquake structural damage, there remains a significant gap in the research literature regarding how individuals perceive and respond to earthquake events. Understanding human behavior during seismic activity is necessary for improving public safety and emergency preparedness. The overarching goal of this research is to better understand individuals' beliefs, knowledge, and attitudes surrounding earthquake risks and safety measures. As social media platforms become more popular, this thesis will investigate how videos of earthquake-related behavior on these platforms may serve as an important information resource for individuals who otherwise have limited access to earthquake-related knowledge. More specifically, this thesis will explore the video-based information college students encounter on social media depicting human behavior in response to major earthquake shaking, and will examine their interpretations of what they see and hear in such footage.

Earthquake Prevalence

While people across the country flock to the Pacific Northwest (Oregon, Washington, and parts of Idaho and California), many of these individuals may have never been exposed to earthquakes or earthquake protection programs. Underneath the Pacific Northwest's surface lies a complex grid of latent fault lines, which hold the capacity to displace thousands of people if reawakened (Schulz, 2016). Scientists currently predict that there is a 33% chance of the "Big One" happening in the next 50 years (Schulz, 2016). The Big One is a massive earthquake predicted to strike the Cascadia subduction zone, which runs for seven hundred miles off the coast of the Pacific Northwest, from California to Canada (Schulz, 2016). With a predicted magnitude of between 8.7 and 9.2 (Schulz, 2016), the Big One is estimated to become the worst natural disaster in the history of North America, affecting around seven million people (Schulz, 2016). For context, the devastating 1906 San Francisco earthquake had a magnitude of 7.9 (Encyclopedia Britannica, 2025). The University of Oregon (UO) happens to be located in one of the most vulnerable areas in the proposed destruction radius of the Big One. As the likelihood of the Big One increases over the next few years, the need for proper earthquake education increases as well, especially for the population of UO students who are from non-seismic zones. Individuals in the Pacific Northwest especially would benefit from learning correct protective actions to minimize damage inflicted by the Big One, and other major earthquakes in coming years.

Protective Action

The United States Geological Survey (USGS) is a bureau of science in the U.S. Department of Interior which produces information about natural hazards, natural resources, ecosystem health, and climate change (*What does the USGS do?*, 2024). Currently, the USGS distributes data on worldwide earthquake activity, produces assessments of earthquake hazards, conducts research on earthquake activity, and prepares educational resources on earthquake safety (*What is the USGS doing?,* 2025). The USGS is also working to distribute rapid notification of earthquakes to government officials and the public through an early warning system.

Notably, the USGS is developing their ShakeAlert® technology, which will send out an early warning alert for especially strong (> 4.0-5.0 magnitude) earthquakes in the states of Oregon, California, and Washington. The purpose of the earthquake early warning system is to recognize earthquakes that have already started by detecting primary waves (P-waves), estimate the location, magnitude, and shaking intensity, and then deliver a ShakeAlert® message to people's phones that instructs them to "Drop, Cover, and Hold On" (*Earthquake Early Warning*, 2022) before destructive shaking caused by secondary waves (S-waves) begins. While an alert up to fifteen seconds prior to feeling any shaking may not sound like a lot of time, these seconds could be the difference between life or death. Fifteen seconds is enough time to evacuate a building, pull one's car over, or safely get under a secure table before destructive shaking begins.

Currently, the USGS has defined the safest earthquake response as "Drop, Cover, and Hold On", which advises individuals to drop to the ground, cover oneself under a table or solid structure, and hold onto the structure for stability. The USGS also advises individuals to avoid windows and glass, and to evacuate if necessary and safe. To be prepared for an earthquake, the USGS advises creating disaster and evacuation plans, organizing disaster supplies (i.e. food and water), and securing copies of important documents and medications. (*What can I do?*, 2024).

Research indicates that a broader range of information is necessary to enhance public knowledge and understanding of earthquakes and aftershocks (Becker et al., 2019), as well as earthquake safety and preparedness. Many people lack adequate knowledge about how to respond safely during an earthquake. Despite living in areas prone to seismic activity, individuals often underestimate the importance of preparation and quick, informed action. This gap in awareness can lead to panic, injuries, and preventable damage. Improving public education on earthquake safety measures, such as "Drop, Cover, and Hold On”, is critical to reducing risks and saving lives. As the USGS continues to develop life-saving technology, understanding how well people comprehend early warnings- and how to properly respond to them- becomes increasingly necessary. Identifying ways to make early warnings more understandable, accessible, and beneficial may help save someone’s life. Finally, given the widespread engagement with social media, it is likely that many people are learning, accurately or not, how to respond during earthquake shaking or after receiving an earthquake early warning through these platforms.

Social Media

Considering the broad usage of social media platforms, it is interesting to acknowledge social media’s power from an educational standpoint. It has been found that people do learn from social media, since it can act as an informal learning environment where individuals encounter new ideas and develop critical thinking skills (Ansari & Khan, 2020). Additionally, 95% of teenagers in the United States today are engaged on some form of social media (Vogels et al., 2022), suggesting that social media has the power to influence and teach an astonishingly large number of people. As we continue in our digital age, younger generations may gain access to social media and technology earlier, which expands the likelihood that these generations will be largely educated by social media.

Interestingly, earthquake videos are finding their way onto many people’s social media pages. Often, these videos are posted by people recording their own videos of shaking, or they are posted by news profiles, like ABC News, as eyewitness accounts. With the growing presence of earthquake footage online, these videos might play a role in shaping how social media users learn about and understand earthquake events. Given this potential influence, it is valuable to consider how official sources, like the USGS, are using videos to inform the public about earthquake preparedness and response.

USGS researchers were able to create and disseminate a video model of the ShakeAlert® USGS technology. They found viewers enjoyed the video, and it also positively impacted their intentions to "Drop, Cover, and Hold" - the safest protective action (Crayne et al., 2023). This study highlighted the success of using an animated video, shown in multiple languages, to better educate the public on earthquakes and protective action (Crayne et al., 2023). While it is unlikely ShakeAlert® videos will make their way onto social media sites, these results do indicate that videos, like those shared on social media platforms, may be an effective way to impact public understanding of earthquakes, cross-culturally and translingually. Ultimately, this evidence implies that not only can social media videos enhance public understanding, but they can also serve as a tool to reach audiences in which further education about natural disasters is needed.

Using social media videos may help identify gaps in the public's knowledge in how they are learning about natural disasters. Many individuals may view the same or similar videos online due to media platform's algorithms. This means that people are likely to be exposed to a narrow subset of possible earthquake footage, and it is possible they may only view the same or similar videos over and over again (Liu et al., 2024). The illusory truth effect is a psychological phenomenon that explains that repeated exposure to information (correct or incorrect) can force a viewer to perceive this information as more truthful (Hassan & Barber, 2021). Consequently, frequent exposure to false or misleading content on media platforms can lead individuals to accept such information as accurate, solely due to its repetition. In this sense, social media allows for the rapid dissemination of ideas, but it also may highlight areas where people's understanding falls short.

Misinformation is defined as a "piece of false or inaccurate information" (American Psychological Association, 2024). Given that anyone has the power to upload whatever they choose to social media public domains, misinformation is rampant on social media (Safieddine et al., 2020). This evidence suggests that possible misinformation surrounding earthquakes and protective action may be circulating on social media platforms, inadvertently leading viewers to adopt incorrect protective actions.

Social media can serve as a tool for sharing educational content that corrects misunderstandings and addresses gaps in awareness. Using the influence of social media platforms like Tiktok, Instagram, Facebook, and X, this research examines what people are naturally learning about earthquakes and earthquake behavior online. Specifically, this thesis aims to assess people's knowledge of earthquakes and correct response behaviors, with the goal of identifying and addressing common misconceptions.

Present Thesis

This research study uses social media videos participants have encountered on their own social media pages in order to explore beliefs and attitudes about earthquakes and earthquake safety. In this study, social media can be defined as web and mobile platforms which allow people to virtually connect with each other, exchanging and creating content, messages, and videos. To understand the extent to which social media earthquake footage can inform or misinform, it is crucial to learn more about the kinds of human-behavior-earthquake-footage people may encounter on social media, as well as how they interpret the footage they are viewing. This study will also consider participant demographics; if people with different earthquake experiences, people of different genders, or if people of different ages respond to earthquakes in different ways.

Using our survey, we are hoping to answer the question: In what ways do social media videos of earthquakes shape public perception and memory of earthquakes and earthquake response? Additionally, what kinds of earthquake-related content are users exposed to on social media platforms? What types of earthquake response behaviors are depicted in these online videos, and to what extent do these representations align with recommended safety practices or reflect misinformation? Do people with different past earthquake experiences have different earthquake protective action knowledge?

Participants were asked to search for earthquake videos on any social media platform of their choosing and were instructed to answer a set of questions about the videos they chose. Participants who did not have access to social media platforms were presented with a selected set of three videos from an earthquake in Anchorage in 2018. Participants in both groups were instructed to respond to a set of demographic questions, including items about their prior earthquake experience and education.

We hypothesize that people's knowledge of earthquakes and earthquake safety is limited, especially among those who have not previously experienced an earthquake, and therefore they will be at risk of misinformed judgements about safe earthquake responding. Specifically, we hypothesize that individuals with prior earthquake experience will be less likely to endorse behavior as exhibiting the safest action.

Individuals residing in regions where earthquakes are relatively common, those who have previously experienced an earthquake, or those who meet both conditions, are expected to display a higher accuracy in their judgments of proper earthquake response and safety.

Methods

Participants

This study was conducted using self-reported responses from University of Oregon college students, on a Qualtrics survey. Participants completed this online survey via SONA, through the UO General Survey for course credit. The General Survey is a large collection of surveys, and the order of the surveys is randomly assigned to each participant. An umbrella IRB approval is used for the surveys under the General Survey. Responses were collected during the Summer 2024 (June-early September) and the Fall 2024 academic terms (late September-December).

Participants' data were excluded from analysis if they failed to respond in interpretable ways to key questions about three different videos. If a participant failed to provide a link to the videos they watched but described the video in enough clear detail to be identified, the participants response was used. 437 participants took part in our survey, with 407 gathering and viewing videos from social media. These 407 participant responses will be used as the data source for this project. Participants were University of Oregon psychology undergraduate students ranging in age 18 to 53 years old (M = 19.34, SD = 2.8). For full participant demographic information, see Appendix A. 6 participants (1.47%) elected to use Facebook as their platform of choice, 239 (58.72%) chose Instagram, 150 (36.86%) chose TikTok, and 12 (2.95%) used X (formerly Twitter) as their social media of choice.

Design

The Qualtrics survey asked participants if they had experienced any earthquakes. If they had, they were directed to respond regarding the actions they took during the earthquake, where it occurred, and when it occurred.

Participants were then asked if they were comfortable viewing earthquake video footage. If they were comfortable watching footage, and had access to either Facebook, X, Instagram, or TikTok, participants were asked to search “Earthquake Videos” and select the top three videos to watch, in order to mimic a real social media feed. If participants were comfortable watching earthquake video footage, but did not have access to social media, they were directed to watch three videos of from a pool of CCTV footage from the 2018 Anchorage earthquake. These videos are not used in data analysis and will not be discussed further. Participants who were not comfortable watching earthquake video footage were given the option to opt out. This group was directed to view three videos depicting food preparation and analyze whether they thought the preparation was safe or not. These videos are also not used in data analysis and will not be discussed further.

Upon completion of the survey, participants were asked a series of questions about their previous exposure to earthquake footage online, their previous knowledge about earthquakes, as well as demographic questions (See Appendix B). Demographic questions were included to help establish any differences in earthquake training or education, age, or socioeconomic status.

Procedure

Stimuli and Materials

Following participant informed consent to participate in the General Survey, participants were directed to complete our survey via SONA. For our survey, an anonymous Qualtrics survey was used, allowing participants to respond truthfully without disclosing identifying information. This self-report survey was used because it posed minimal threat to participants and facilitated efficient collection of a large dataset. Appendix B includes all the questions that participants in our analyzed dataset were asked.

Coding

To analyze the collected data, a systematic coding process was designed. First, participant survey responses were organized into an Excel spreadsheet and grouped according to whether the participant collected their own earthquake videos, watched our Anchorage videos, or watched the food safety videos. The responses were organized based on the set of questions answered prior to coding. The Anchorage and food safety video responses were not coded at all and were not used in analysis for this project.

A nominal coding system was utilized to code for the questions about inappropriate response in videos, what participants would remember about correct response, and what participants think the people in their videos should have done had they received a notification warning about the earthquake. 79 unique safety response codes were generated from video responses, and these 79 unique responses were grouped intuitively together into nine general categories (see Appendix C). An additional, separate nominal coding system was used for responses about what participants would remember about earthquakes and earthquake damage in general (see Appendix D).

In response to the question "If you believe they [the people in the video watched] responded inappropriately, to what extent do you think their actions increased their own personal risk?", the same nominal coding system was used to code for content in the response. Then, a numerical coding system was used to identify whether the survey participants mentioned any risk assessment in their response to this question (0 = no risk discussion, 1 = risk discussion present). A –2 to +2 Likert scale was used to discern whether the participant believed the human action in the video increased or decreased their personal risk during the earthquake. A score of –2 indicated that the participant believed the human response in the video decreased their personal risk the most, while a score of +2 indicated that the participant believed the human response increased their personal risk the most. A score of 0 meant the participant believed the response taken did not significantly increase or decrease the personal risk of the person in the video. Then, this same scoring scale was applied to code for the same videos participants provided, this time an expert-coder independently rated the behavior in the same videos, from the standpoint of protective action recommendations made by experts, such as those at the U.S. Geological Survey (USGS).

To calculate the accuracy of participants' safety judgments relative to how the USGS would rate the risk, the following equation was used to calculate a 1 (perfect accuracy), 0.75, 0.5, 0.25, and 0 (complete inaccuracy scale):

$$Accuracy = 1 - |(\mathrm{PR} - \mathrm{USGSR})/4|$$

PR = Participant Risk Rating, USGSR = USGS Risk Rating

No other coding methods were utilized in this project's analysis. Next, we report analyses conducted on the subset of participants of 407 participants who gathered social media videos. All analyses were performed using R.

Results

How did people rank the safety of various actions for individuals on the upper floors of an office building to take during an earthquake?

Participants were asked to rank 5 options in order of perceived safety in response to this question (1 = safest action, 5 = least safe action). The options were "go to a doorway", "flee the area", "don't move", "get under a table and hold on", and "get away from windows".

Getting under a table and holding on was ranked the safest action to take (M = 1.81, SD = 0.98), with getting away from windows following into a close second ranking (M = 2.19, SD = 0.95). Participants ranked getting under a doorway next (M = 2.81, SD = 1.01), with not moving as their next choice ranking (M = 4.05, SD = 0.97). Fleeing the area was the highest (most unsafe) ranked choice (M = 4.13, SD = 1.31).

Table 1. Descriptive statistics for each choice of a 5-option safety ranking

	Mean	SD	Median
Flee	4.13	1.31	5
Don't Move	4.05	0.97	4
Doorway	2.81	1.01	3
Get away from windows	2.19	0.95	2
Get under table & hold on	1.81	0.98	2

Means, standard deviations, and medians for a 5-option safety rating participants provided for individuals on the upper floors of an office building

What did participants remember about earthquakes in general from viewing the social media earthquake videos?

For video responses in which participants provided a link or description (N = 1,132), we nominally coded their answer to the question "What would you remember about earthquakes from this video?" Of these 1,132 videos, 624 (51.4%) did not include a response to the question, leaving us with a final sample of 508 videos with responses.

For these 508 videos, we received 68 unique response types that could be intuitively grouped into five general coding categories. The codes organized into their respective categories are presented in Appendix D. Of the 508 responses to videos, 80 (15.7%) had provided responses that fell into more than one coding category. For example, "I would remember how a tsunami could follow after a big earthquake" would have both "Earthquake Characteristics" and "Aftermath Related" codes. Therefore, percentages for coding categories do not sum to 100.

What participants indicated they remembered about earthquakes from the videos is presented in Table 2. 54.72% (N = 278) of participants' responses mentioned characteristics of the earthquake, 28.35% (N = 144) of participants' responses mentioned something about the aftermath of the earthquake, and 20.08% (N = 102) of participants indicated they would remember something about the effects of the earthquake. Less than 10% of responses mentioned a code in the last two coding categories, and these results can be viewed in Table 2. 11 videos (2.17%) elicited responses that were not codable.

Table 2. What participants would remember about earthquakes

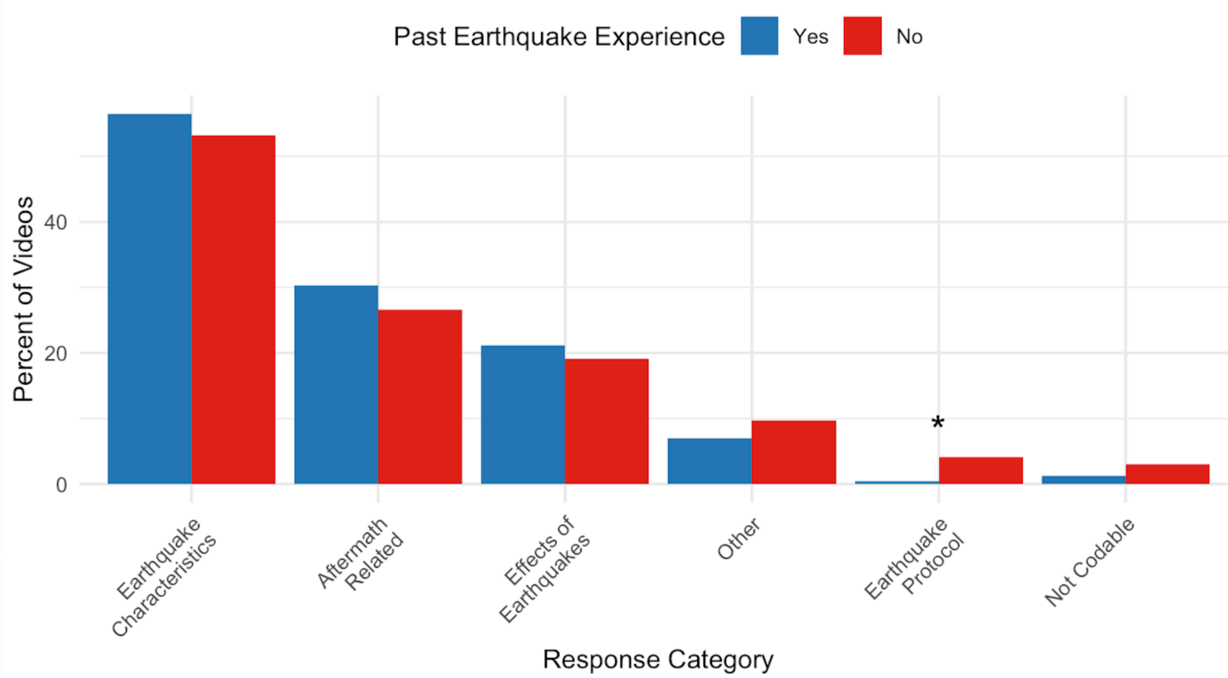
Coding Category	% of responses (# of response)
Earthquake Characteristics	54.72%, N = 278
Aftermath Related	28.35%, N = 144
Effects of Earthquakes	20.08%, N = 102
Other (Responses that had a frequency less than 5)	8.46%, N = 43
Earthquake Protocol (What to do during an earthquake)	2.36%, N = 12

Percentages and counts for each of the five response-type categories in response to the question "What would you remember about earthquakes from this video?" Some participants' responses could be classified into multiple coding categories; thus, percentages do not total 100%.

Did prior earthquake experience impact what participants remembered about earthquakes in general?

Participants who provided a video link or description (N = 1,132) were asked to answer, "What would you remember about earthquakes from this video?" Of these 1,132 video responses, 624 (51.4%) did not provide a response to the question, leaving us with a final sample size of 508 videos. Of the 508 videos coded for memorable safety actions, 241 were watched by participants who had experienced an earthquake, while 267 videos were watched by those who had no previous earthquake experience. We ran 4 chi-square of independence tests to assess the differences in what people remembered from social media posts about earthquakes, based on their previous earthquake experience; no significant differences were found, all ps>0.09 (see Table 3). Significantly more participants without past earthquake experience recalled the need for earthquake protocols (Fisher's exact test, p=.007, odds ratio = 0.10, 95% CI [0.002, 0.679]).

Figure 1. What participants remembered about earthquakes based on past earthquake experience



Red bars represent participants with no prior earthquake experience; blue bars represent participants with prior earthquake experience. Both bars are representative of what the groups indicated that they would remember about earthquakes, depending on coding category.

Nominal codes were assigned to five different coding categories, seen in Appendix D. We omitted "No Response" and "Not Codable" responses from the analysis. Figure 1 shows the breakdown of coding category prevalence, depending on past earthquake experience.

Table 3. χ^2 and p-values for earthquake memory responses by earthquake experience level

Variable	χ^2	**p-value**
Earthquake Characteristics	0.42	0.52
Aftermath Related	0.68	0.41
Effects of Earthquakes	0.22	0.64
Other	0.86	0.35

Chi-square tests of independence and their p-values for each coding category, depicting what participants would remember about earthquakes based on prior earthquake experience

What did participants remember about earthquake safety after watching social media earthquake videos?

For videos in which participants provided a link or description (N = 1,132), we nominally coded their answer to the question "What would you remember about safe earthquake response from this video?". For these 1,132 videos, 224 participants (15.3%) did not provide a response to the question, leaving us with a final sample of 908 responses. 44.7% (N = 406 out of 908) of participants' video responses mentioned some form of safe earthquake response, 24.1% (N = 219) mentioned some form of safety response, and 21.5% (N = 195) claimed they would remember to stay away from possible hazards. All other coding categories made up less than 10% of video responses, and these results can be viewed in Table 4 below.

Of the 908 videos with a response, 281 (30.9%) had more than one code category attached based on the response. For example, "I would remember to stay low to the ground, cover your head with a chair, or go between the beams of a house" would receive both safe earthquake response (staying low and covering head), and actions that are not recommended for safety (going between beams). Because of this, these percentages do not equal 100, because they are not exclusive codes. 79 of the unique safety response codes generated from these 908 responses were grouped intuitively together into nine general categories (see Appendix C). 41 (4.5%) of videos elicited responses that were not deemed to be codable.

Table 4. What participants would remember about safe earthquake response

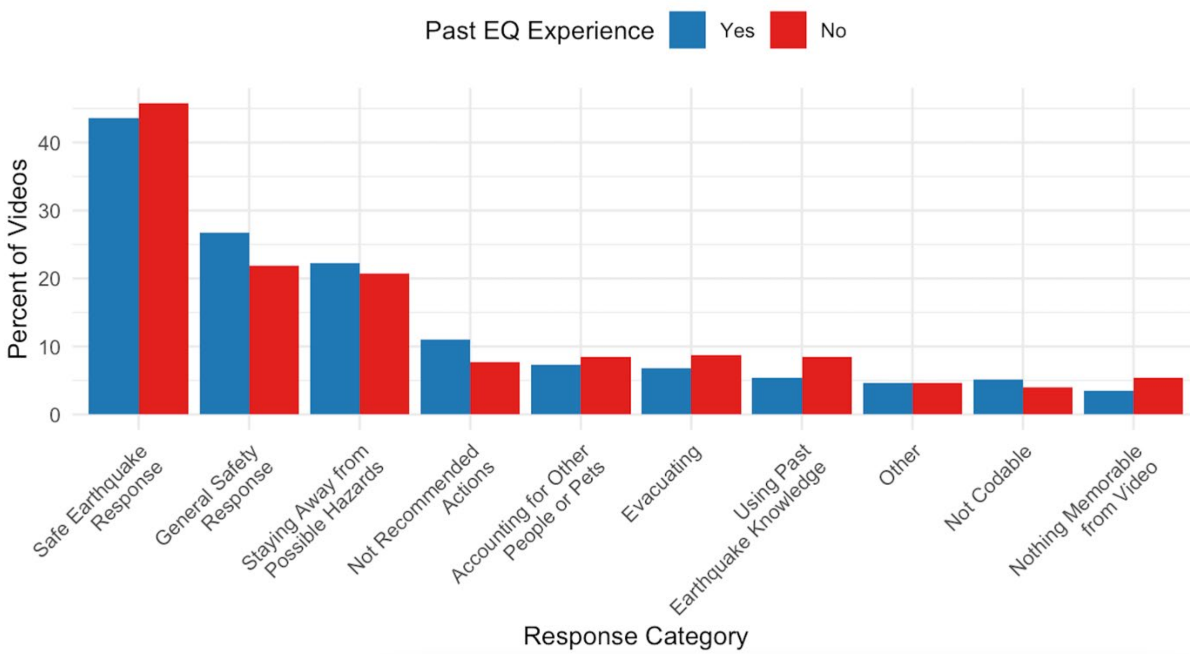
Code Category	**% of videos**
Safe Earthquake Responses	44.7%, N = 406
General Safety Responses	24.1%, N = 219
Avoiding Possible Hazards	21.5%, N = 195
Unsafe Earthquake Responses	9.25%, N = 84
Accounting for Other People or Pets	7.9%, N = 72
Evacuate	7.89%, N = 71
Using Past Earthquake Knowledge	7.0%, N = 64
Other (Responses that had a frequency less than 10	4.6%, N = 42
Would Remember Nothing from Video	4.5%, N = 41

Percentages and counts for each of the nine response-type categories in response to the question "What would you remember about safe earthquake response from this video?" Some participants' responses could be classified into multiple coding categories; thus, percentages do not total 100%.

Did prior experience with earthquakes influence the type of safety information individuals remembered?

Of the 908 videos coded for memorable safety actions, 427 (47.0%) were watched by participants who had experienced an earthquake, while 481(53.0%) were watched by those who had no previous earthquake experience. 10 chi-square tests of independence were run to assess the differences in what people remembered about earthquake safety from social media posts, based on their previous earthquake experience; no significant differences were found (all $ps>0.09$). Figure 2 shows the breakdown of coding category prevalence, depending on past earthquake experience. See Table 5 for a detailed report. To summarize, there were no significant difference in what participants remembered about earthquake safety based on past earthquake experience.

Figure 2: What participants remembered about earthquake safety based on past earthquake experience



Red bars represent participants with no prior earthquake experience; blue bars represent participants with prior earthquake experience. Both bars are representative of what the groups indicated that they would remember about earthquake safety, depending on coding category.

Table 5. χ^2 and p-values for differences in coding category prevalence by prior earthquake experience

Variable	χ^2	p-value
Safe Earthquake Response	0.35	0.55
General Safety Response	2.67	0.10
Staying Away from Possible Hazards	0.21	0.65
Not Recommended Actions	2.58	0.11
Accounting for Other People or Pets	0.34	0.56
Evacuating	0.93	0.34
Using Past Earthquake Knowledge	2.94	0.09
Other	< 0.0001	1
Nothing Memorable from Video	1.47	0.23
Not Codable	0.50	0.48

Chi-square tests of independence and their p-values for each coding category, depicting what participants would remember about earthquake response, based on prior earthquake experience

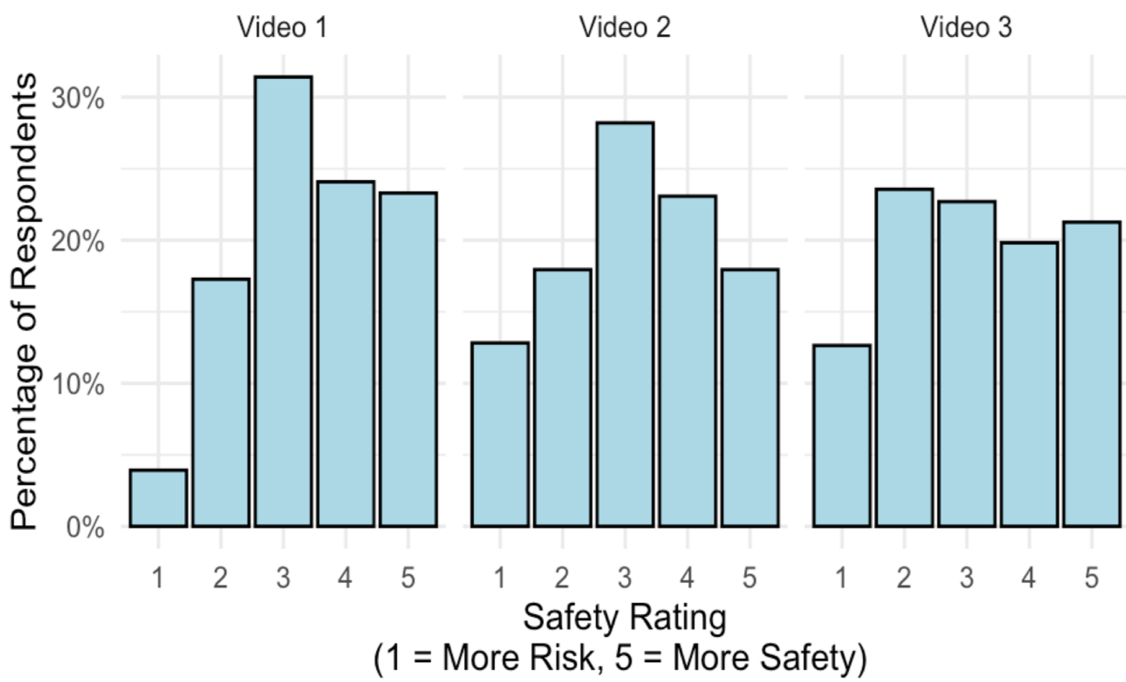
Did participants' evaluation of earthquake safety display significant change over the course of their viewing of all three videos?

Participants were asked to "Indicate the extent to which the majority of people responded appropriately in terms of their own personal safety". Participants were instructed to select 1-5 on a Likert scale: 1 indicated individuals in the video they watched put themselves in more danger, 3 indicated the individuals' actions did not impact personal safety, or a 5 indicated the individuals in the video put themselves in the safest situation possible.

Across all videos (1,081 responses total, from 390 participants), participants mostly believed the actions of the people in their videos did not impact their safety (M = 3.25, SD= 1.26). Responses for the first video participants watched (N = 383) had an average safety score of 3.45 (SD = 1.14). Responses for the second video participants watched (N = 363) reported an average safety score of 3.15 (SD = 1.27). Lastly, participants who watched a third video (N =

358) reported an average safety score of 3.14 (*SD* = 1.34). The videos participants watched were selected entirely individually on their social media platform of choice, which meant that almost all the videos were different. We found that there was a tendency for participants to provide increasingly reduced safety ratings as they moved through their second and third videos. See Figure 3 for a detailed report of participant's safety ratings by video.

Figure 3: Distribution of perceived safety ratings by video



Participant safety ratings significantly differed across videos

Does past earthquake experience influence participants' ratings of safety?

Participants were asked to indicate the extent to which the majority of people in the videos they watched responded appropriately in terms of their personal safety on a 1-5 Likert scale, with low ratings indicative of people putting themselves in more danger, and higher ratings indicative of people increasing their safety. Responses were collapsed across all videos that participants rated. We predicted that participants with prior earthquake experience would be less likely to endorse behavior as exhibiting the safest action. This prediction was to some degree confirmed. Participants with prior earthquake experience tended to produce lower ratings on the rating scale (M = 3.18, SD = 1.29) than participants without prior earthquake experience (M = 3.32, SD = 1.22), which was a marginally significant difference, independent samples $t(1079) = -1.82$, $p=0.06$. Thus, there was some tendency for those with prior earthquake experience to rate people's behavior as indicative of increasing their risk relative to those with no prior earthquake experience.

That said, participants' responses to a related question "*Do you think the majority of people responded in the most safe way? Yes or No"* failed to confirm the same prediction. 61.41% of the responses from 539 videos provided from individuals with previous earthquake experience indicated that individuals in the videos they watched *did* respond in the safest way, while 63.41% of the responses from 595 videos from people with no previous earthquake experience likewise indicated that people in the videos responded in the safest way, which was a non-significant difference by a chi-square test of independence, χ^2 (1, N = 539) = 0.40, $p=0.528$).

To what degree did participants' responses concerning the safety of peoples' earthquake-related action depicted in videos align with the judgments of an expert coder inspired by USGS recommendations about earthquake-related protective action?

Participants were asked "Do you think the majority of people in the video responded in the most safe way?" A response of "1" indicated the participant thought the majority of people *did* respond in the safest way, and a response of “0” meant the participant did not believe that people responded in the safest way.

A discrepancy score was calculated for a subset of the videos (N = 83) between participants’ responses and responses provided by an expert coder judging from the perspective of the U.S. Geological Survey’s recommendations regarding earthquake-related protective action. Interestingly, 54.2% (N = 45) of participants’ responses aligned with the expert coder’s judgments regarding the safety of peoples’ earthquake-related behavior in this subset of videos, which did not differ from chance levels based on a binomial test (p>0.255). Thus, although judgment discrepancies from the USGS-inspired earthquake safety recommendations were not uncommon, participants’ judgments accorded with the expert perspective in a small (but non-significant) majority of videos sampled.

Turning to focus specifically on the 38 cases in which participants’ judgments diverged from the expert’s judgment, we found that 24 of those 38 cases (63.16%) involved participants responding “yes” to the question about people in the video responding in the most safe way, while the expert coder responded “no.” According to a binomial test, this was marginally more common than would be predicted by chance alone (p<.072). Thus, there was some indication in participants’ responses that they were inclined to overestimate the safety of peoples’ earthquake-related behavior relative to what the judgment of an expert inspired by USGS recommendations.

To what extent does prior earthquake experience influence participants’ recollections of earthquakes and earthquake safety?

Participants responded *no* for 424 of the 1,132 videos (34.46%) in response to the question, “Do you think the majority of people responded in the most safe way?” 305

participants (74.94% of 407 participants) responded that in at least one of their 3 videos people did not respond in the safest way.

Of these 424 videos, 189 responses (44.58% of 424 or 16.70% of 1132) mentioned some form of an evaluation of the safety of people's earthquake related behavior, so these responses were able to be rated on a -2 to +2 scale which assessed degree of safety. Assigning a -2 meant the participant judged the people in their video increased their safety the most, 0 meant the participant judged the people in the video had neutral safety behavior, and +2 meant the participant judged the people in their video decreased their safety the most. A coder independently rated the behavior of the people in 189 videos on this scale from the standpoint of protective action recommendations made by experts, such as those at the U.S. Geological Survey (USGS). 41.03% of 407 participants had one of their 3 videos receive both a rating on their risk response and a USGS-inspired expert recommendation rating.

For the 189 videos contributing to this analysis, participants' ratings displayed a relatively high level of alignment with the expert perspective on risk inspired by USGS protective-action recommendations, (*M alignment* = 0.73, *SD* = 0.25). We evaluated responses on a graded accuracy scale from 1 (perfect accuracy) to 0 (complete inaccuracy), with intermediate scores of 0.75, 0.5, and 0.25 representing high, moderate, and low accuracy, respectively.

However, only 27.51% of participants' risk ratings (N = 52) aligned precisely with the expert coder's risk ratings, which was a significantly lower percentage than chance alone would predict, according to a binomial test ($p<.001$). When risk ratings did not match (137 videos) 25.55% (35 videos) underestimated the safety of people's earthquake-related behavior relative to the expert coder's perspective on safety, and 74.45% (102 videos) of participants' ratings overestimated the safety of people's earthquake-related behavior in relation to the expert coder's safety rating. This latter percentage indicative of safety overestimation was statistically greater than chance would predict by a binomial test, $p<.001$. Thus, the inaccuracies that participants displayed in their judgment of peoples' earthquake-related behavior in the videos indicated a bias toward judging people to be acting more safely than would be endorsed from a USGS-inspired expert perspective.

Which among the following elements —gender, age, earthquake experience, socioeconomic status (SES)—were robust, independent predictors of accuracy in relation to a USGS-inspired expert coder?

Participants were prompted to provide their age, gender identity, previous earthquake experience, and the level of education for one of their caregivers (which was used to assess socioeconomic status). A multiple regression analysis was conducted to determine the extent to which age, gender, earthquake experience, and socioeconomic status independently predicted expert-related accuracy in judging earthquake safety behaviors. The model was not statistically significant, $F(12,170) = 1.51$, $p=0.123$, $R^2 = 0.033$. None of the individual predictors were statistically significant, and the model did not explain any variance in accuracy ratings.

The subset of participants who were prompted to provide a risk rating (because they responded to the "acted in the most safe way" question with a "no" response) were split into two groups: one group who rated the actions of people in the video to be less safe than the USGS-inspired expert coder's rating, and the group who rated the actions of people in their video to be more safe than the expert coder's rating. In the group whose ratings indicated a judgment of safer than the expert coder, there were 98 unique videos (with complete data in the predictor variables), from 90 unique participants. Since participants provided answers to the 3 videos they watched, it is possible that multiple different responses (from more than one video watched) came from the same participant. A multiple regression analysis revealed that men in this group were less likely than women to accurately predict the risk rating, $F(11, 86) = 1.44$, $p=0.013$, $R^2 = 0.170$. In other words, among participants who tended to underestimate risk, women were significantly more accurate than men. The overall model was not statistically significant; however, gender was a significant predictor in this model.

Discussion

The primary purpose of this thesis was to investigate in what ways social media videos of earthquakes shape public perception and memory of earthquakes and earthquake response. We hypothesized that people possess limited knowledge of earthquakes and earthquake safety, particularly those who have not experienced an earthquake. As a result, these individuals may be more likely to make inaccurate, misinformed judgements about correct earthquake response behaviors. We also hypothesized that individuals without previous earthquake experience would be less likely to identify certain behaviors as the safest actions to take during an earthquake. People who have prior experience with earthquakes were expected to demonstrate greater accuracy in their judgments regarding proper earthquake response and safety.

Interestingly, we found that previous earthquake experience did not impact what participants remembered about earthquakes. In fact, more participants *without* earthquake experience specifically recalled the need for earthquake protocols, like drills. Additionally, we found no significant difference in what participants remembered about earthquake safety based on previous earthquake experience. We found some evidence that participants were likely to have a bias to overestimate the safety of an earthquake response relative to what a USGS-inspired expert coder would have judged. Lastly, analysis revealed that past earthquake experience, gender identity, age, and socioeconomic status were not significant predictors of accuracy in relation to a USGS-inspired expert coder. However, in participants who rated behavior safer than the USGS would, women were significantly more accurate than men, indicating that men may underestimate unsafe earthquake behavior. To summarize, overestimating safety could mean that people simply don't know what the correct response is, or that they don't understand the real danger of earthquakes.

Surprisingly, people's prior earthquake experience did not significantly influence their responses regarding the degree to which people depicted in videos exhibited safe earthquake behavior. This might indicate that prior earthquake experience is not particularly influential in people's understanding of appropriate earthquake protective action.

Promisingly, we learned that many participants remembered some form of safe earthquake response after watching their videos; actions like drop, cover, and hold on (as recommended by the USGS) were frequently recalled, regardless of prior earthquake experience. That said, prior earthquake experience might nevertheless play a role in how people behave when actually experiencing an earthquake. For example, previous research indicates that prior earthquake experience increases the likelihood that people take protective action (rather than freeze) when an earthquake occurs (Becker et al, 2022). Our findings also suggest a need for greater public education, particularly explaining *which* safe behaviors should be performed during an earthquake, since many people recalled unsafe actions, like standing in a doorway, or moving during the shaking.

Returning to the earlier result that inaccuracies in judgments of earthquake safety predominantly reflect an overestimation of safety, it is interesting to consider how different genders are influenced by this overestimation, Specifically, how men are more likely to inaccurately overestimate safety, and what this may mean for the safety of men during an earthquake. Our findings imply that social media videos of earthquakes may be leading to misinformation regarding viewers' earthquake safety knowledge. People may be taking away misinterpretations about what would constitute safe earthquake action from the videos they watch. While this may be extremely difficult to execute across the millions of videos of social media, if social media platforms could make out a way to parse out inappropriate videos depicting incorrect earthquake response behaviors, and attach a banner to these videos, people may be less likely to be influenced by incorrect safety behaviors. The banner could read "This video depicts unsafe actions: for correct earthquake response protocol, please visit usgs.gov (*What should I do DURING?,* 2024)". Providing banners like these on the masses of earthquake footage online could help educate everyone to learn more about correct earthquake response behaviors.

Limitations

The research process behind this thesis was not without its share of challenges and limitations. While many participants provided videos of earthquake footage, many did not complete a full analysis of their video, leaving us with significantly less participant data for questions about personal beliefs of earthquake risk and proper earthquake behavior. Additionally, many earthquake videos online do not depict human behavior; a sizable number of videos participants found were news anchors reporting on an earthquake or were comedic videos of individuals acting out entertaining responses to earthquakes.

When comparing a theoretical USGS rating of proper earthquake response to the rating provided by participants, it is important to consider that this USGS rating is an estimate of what someone at the USGS may rate a response. Therefore, while it is unlikely, it is possible that there is some minor disparity in this USGS estimation, compared to what someone at the USGS would actually say. This effect may be amplified due to our fairly small sample sizes for some of our analyses.

Lastly, since our data was collected from students at the University of Oregon, our research is derived from a convenience sample that is predominantly Western, educated, industrialized, rich, and democratic (WEIRD). WEIRD samples are widely regarded as psychological outliers (Schulz et al., 2019), because they are not representative of the rest of the world in psychological and social dimensions (Pitesa & Gelfand, 2023). The lack of representation in our sample limits the generalizability of our findings, as our results may not accurately reflect the behaviors or attitudes of a broader population beyond the specific college-student demographic we studied.

Future Research

The findings of our research provide a basis for further exploration of earthquake beliefs and attitudes. Future research should aim to include more diverse and larger samples, emphasizing diversity in participants' geographical upbringing and ages. Many of our participants were from the West coast, and the participants' average age fell within the college-age demographic. However, older participants may be more active on different social media platforms or may have previously been taught incorrect earthquake response behaviors. This may provide researchers with a more diverse understanding of the types of earthquake footage readily available on social media platforms, and how participants of all ages may interpret this footage.

Future research should also aim to specifically highlight human behavior in the videos participants watch, in order to collect a sample more focused on human response and human actions during earthquakes. To focus more on earthquake beliefs and understanding, researchers could create their own pool of earthquake footage, with some videos portraying correct earthquake action, and could compare how participants rank the safety in these videos against unsafe actions in other videos. Lastly, while it is unrealistic for another undergraduate researcher to conduct a longitudinal study, it may be beneficial to examine how public understanding of earthquakes and correct behavior varies over time, especially in response to earthquakes as they arise.

Conclusions

In the present study, past earthquake experience, socioeconomic status, gender identity, and age did not affect an individual's likelihood of accurately predicting safe earthquake response in social media videos of earthquakes. In the group who rated behavior safer than the USGS would, men were more likely overestimate the safety of earthquake responses than women. Previous earthquake experience did not impact participants' knowledge of earthquakes or safe earthquake behavior. Participants did remember some safe earthquake response behaviors, potentially indicating that many participants had been properly educated. These findings provide a foundation for future research to further explore the video-based information people consume on social media and its influence on public knowledge, beliefs, and attitudes regarding earthquakes and correct earthquake response.

Appendices

Appendix A: Full participant demographic information

Age		
Mean	19.34	
Median	19	
Standard Deviation	2.8	
Minimum	18	
Maximum	53	
	Number of participants (N=437)	**% of participants**
Gender Breakdown		
Female	306	70.02%
Male	115	26.32%
Non-Binary	12	2.75%
Self-Described	4	0.91%
Ethnicity Breakdown		
American Indian or Alaska Native	8	1.97%
Asian	29	7.13
Black or African American	9	2.21%
Hispanic, Latinx, or Spanish Origin	51	12.53%
Middle Eastern or North African	6	1.47%
Native Hawaiian or Other Pacific Islander	2	0.49%

White	255	62.65%
Some other ethnicity or origin	4	0.98%
I prefer not to answer	3	0.74%
Multi-racial	40	9.83%
Caregiver Highest Education Level		
Breakdown Less than 7th grade	7	1.80%
Junior High (9th Grade)	5	1.29%
Partial High School	8	2.06
High School Graduate	35	9.00%
Partial College/Special Training	59	12.17%
Undergraduate Degree	124	31.88%
Graduate Degree (Masters or Ph.D.)	146	37.53%
Prefer not to answer	3	0.77%
No education	2	0.51%

Appendix B: Qualtrics survey structural layout for someone who retrieved videos on social media

https://uoregon-my.sharepoint.com/:w:/g/personal/mcumming_uoregon_edu/EfZ3gesMLBlNn-n1vcTsns4B8Hs5b90sl7xVCQjZjaAbgQ?e=Ubqxtk

Appendix C: Coding categories for individual nominal codes about earthquake response

Only responses that were mentioned more than 10 times were grouped.

Code Category	Codes Included
Unsafe Earthquake Responses	▪ Get under a doorway (D) ▪ Don't move (DM) ▪ Panic, scared, anxiety (P) ▪ Don't record a video, be on phone, watch TV(DV) ▪ Record a video (RV) ▪ Go inside or stay inside (GI)
Safe Earthquake Responses *General- Duck, Cover, Hold On*	▪ General- Go under something, take cover (Gen Un) ▪ Cover your head, neck, or body (Head) ▪ Go under a desk or table (Un Tab) ▪ Stay calm (SC) ▪ Stay Low (Low) ▪ Hold onto table or something else (Hold) ▪ Pull over or evacuate car (Pull) ▪ Stay under cover after earthquake stops (Stay)
General Safety Responses	▪ Safe spot (SS) ▪ Protect yourself (PY) ▪ Be Safe (Safe) ▪ General- Do something (Gen Some)
Would Remember Nothing from Video	▪ Don't know what to do (IDK) ▪ Remember nothing from video (R Nothing)
Not Codable	▪ Participant response was uncodable (What??)
No Response	▪ Not applicable (NAs)
Accounting for Other People or Pets	▪ Safe pets (Pet) ▪ Account for others (Acc) ▪ Protect children/family (PCF)
Evacuate	▪ Go outside/evacuate (Out) ▪ Run (Run)
Using Past Earthquake Knowledge	▪ Be aware of surroundings (BAS) ▪ Building structural integrity (BSI) ▪ Earthquake preparation (Prep)
Avoiding Possible Hazards	▪ Stay away from large objects or debris (No LoD) ▪ Avoid glass/windows (No GW) ▪ Avoid water (W)

	▪ Get away from buildings (AwB)
Other (Responses that had a frequency less than 10)	▪ Any Codes Not in Categories Above

Appendix D: Coding categories for individual nominal codes about earthquakes and earthquake damage. Nominal codes were assigned to five different coding categories.

Code Category	**Codes Included**
Aftermath Related	▪ General Aftermath Danger (AD-G) ▪ Tsunami or Water-related Aftermath Danger (AD-W) ▪ Building or Structure-related Aftermath Danger (AD-B) ▪ Electrical-related Aftermath Danger (AD-E) ▪ Aftershock Aftermath Danger (AD-A) ▪ Landslide or Landscape Aftermath Danger (AD-L)
Effects of Earthquakes	▪ Earthquake debris (EQ Debris) ▪ Ground rupture (GR) ▪ Earthquakes cause damage (SD) ▪ Lasting effects from earthquake (LE) ▪ Earthquakes cause people to react (React) ▪ People are killed or hurt (PK)
EQ Characteristics	▪ Speed of earthquake starting (Speed) ▪ Earthquake power or intensity (EQ Pow) ▪ Earthquakes are unpredictable (UnP) ▪ Earthquakes are scary or cause anxiety (Scary) ▪ Earthquake shaking (Shake) ▪ Earthquakes are dangerous (Danger) ▪ Earthquake length = short (Short) ▪ Earthquake length = long (Long) ▪ Earthquakes affect different areas of the world (Wrld) ▪ Earthquake frequency = happen often (FRQ) ▪ Not all earthquakes are unsafe (US)
No Response	▪ Not applicable (NAs)
Not Codable	▪ Participant response was uncodable (What??)
Other	▪ Any other codes with less than 5 responses
Earthquake Protocol	▪ Follow protocol to stay safe (FP)

	▪ Remember earthquake drills (RD)

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