

**Uncertainty and Risk in The Anthropocene: Lived Experiences of Repeated Disasters in
Southeast Texas**

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Author Note

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Abstract

Between 2017 and 2019, Southeast Texas experienced two of the five wettest tropical storms on record in the contiguous United States with Tropical Storms Harvey and Imelda. While citizens were still recovering from Imelda, the TPC refinery in Port Neches exploded, triggering evacuations and uncertainty. Research addressing populations that are victims of repeated disasters in a short period of time is limited. Though the coastal region sees frequent hurricanes, the impact on Southeast Texans' cognitive response and perception of their environment is nearly absent in the existing literature. The purpose of this study is to better understand the effects of the aforementioned disasters on this population. Utilizing semi-structured interviews within a framework of interpretative phenomenological analysis (IPA) and Karl Weick's approach to enacted sensemaking in crisis situations, it qualitatively examines the lived experiences of this population within the context of resilience, risk, and environmental uncertainty. Six citizens who were affected by at least two of the three disasters gave in-depth interviews. Findings reveal themes of anxiety, lost time, trauma, and place attachment. Challenging assumptions that these themes equated a negative outcome, data analysis revealed an overarching consensus among participants that resilience and improved disaster preparedness resulted from their experiences. This suggests that uncertainty and environmental threat stress can be mitigated through the enactment of survival and recovery. Adaptation measures such as disaster drills as a resilience-building strategy is a potential consideration for emergency response teams and populations living in areas with similar risks.

Keywords: resilience, Harvey, Imelda, Southeast Texas, sensemaking, disaster preparedness, risk

Uncertainty and Risk in The Anthropocene: Lived Experiences of Repeated Disasters in Southeast Texas

Tropical Storm Harvey made landfall in Southeast Texas in August of 2017 as the wettest and second-costliest cyclone in U.S. history, dumping 60.58 inches of rain and causing about \$125 billion in damages (Amadeo, 2019; Mathews, 2019). Two years later in September of 2019, Tropical Storm Imelda, the fifth wettest cyclone in the contiguous U.S., dropped 43.15 inches of rain on the same area, costing approximately \$5 billion in damages (Mathews, 2019; Smith 2020). Shortly after Imelda, in November 2019, on the eve of Thanksgiving, the TPC refinery in Port Neches exploded twice, damaging properties (some still in the midst of post-Imelda repairs) and prompting a mandatory evacuation covering a 4-mile radius around the plant (Dick & Scherer 2019).

The community of Southeast Texas, a three-county Gulf Coast refinery hub near the Texas/Louisiana border, is familiar with the threat of seasonal hurricanes. But since 2017, the disasters dealt to the same area have been as varied as they have been unprecedented. The purpose of this study is to understand how victims of these disasters respond to and create meaning out of their experience so that moving forward, disaster preparation and mitigation efforts can include better-informed practices for coastal or industry-dependent populations living with analogous threats.

Background and Theoretical Framework

Abundant research is available regarding the effects of natural disasters, flooding and other traumatic environmental stressors on the mental health on an affected population. However, as it is uncommon for a population to experience multiple disasters in such a short

period of time, the study of Southeast Texans' experiences provides a fortuitous opportunity to address that gap in the existing body of knowledge (Stough & North, 2018). Although Southeast Texas is often the scene of major weather events, a review of the literature revealed little has been done to examine the recovery process of its community. This paper addresses the need for further study in both areas by investigating the confluence of successive record-breaking disaster experiences of a population that is wholly undocumented in the literature. The theoretical framework of this study is based in trauma processing and environmental hazards, but expand into resilience, uncertainty, risk, and later in the paper, coping styles.

The Role of Resilience

Schiraldi (2017) defines resilience in part as “those inner strengths of mind and character – both inborn and developed – that enable one to respond well to adversity” (p. 2). In Djalante and Thomalla's (2010) review of definitions and frameworks of community resilience, they note the significance of the existing literature having defined resilience as either “an outcome versus a process” (p.167). They found that outcome associated resilience is based on an ability to recover and rebuild after a disaster, while resilience as a process is the idea that an adaptation has occurred – which will better inform and aid in disaster preparedness and mitigation (Djalante & Thomalla, 2010). Chandra et al. (2011) outline the definition of *community resilience* as “the ability of communities to withstand and mitigate the stress of a disaster” (para. 2). Chandra and colleagues continue, “there is less clarity on the precise resilience-building process” (Chandra et al., 2011, para. 2).

The population of Southeast Texas shows features of both resilience as a process and resilience as an outcome, which can serve to further inform researchers. Like the Vietnamese

population in New Orleans that have shown marked resilience despite numerous challenges and disasters, the persistence of Southeast Texans is perhaps due to its long history with adversity (hurricanes, flooding, racial tensions, and limited economic prospects outside of the oil industry) (Xu, 2017).

The Role of Uncertainty

Uncertainty theory from the sciences and humanities is often used within the context of communication in organizations, but is prescient and applicable, especially if we frame Southeast Texas as the “organization”. Driskill and Goldstein (1986) expand upon Gilbrath’s definition, “Uncertainty = total information needed for a task – information already possessed”, by pointing out that, “information alone will not enable people to manage uncertainty. Facts must be perceived according to someone’s perspective” (p. 45). The aim of this study and the qualitative process utilized is to not only understand the information people need to reduce uncertainty, but also the cultural and personal meaning they have attached to their experiences and how that affects their relationship with environmental uncertainty.

Uncertainty Reduction Theory is a communication model that deals with interpersonal encounters in which the uncertainty of meeting a new person is complicated by expectations and biases: “communicators seek to reduce their uncertainties about their environments so that they can respond to these environments in ways that will assure goal achievement, whether the goal is interpersonal or transactional in nature” (Smith, 1996, p. 301). These theoretical underpinnings support the view of Southeast Texas as an entity with a background of experience in thriving despite often adverse environmental conditions, who has used that experience as a means of uncertainty reduction.

Miller (2015) says of organizational uncertainty, “one of the most straightforward ways to deal with this uncertainty and the anxiety it provokes is communication and the provision of information” (p. 180). Miller (2015) cites a Miller and Monge 1985 study that found employees preferred negative information about change in the organization to no information at all (p. 180). Miller’s findings support the current research, described in detail in the results section, where respondents reported an increase in risk mitigation and weather awareness, using weather tracking apps on their phones to reduce uncertainty – whether that meant preparing for storms or clear skies. The shift to information-seeking behavior is also in line with Miller’s assessment that communication is crucial to successfully navigating uncertain situations.

Risk

It is important to understand how the citizens of Southeast Texans perceive and respond to risk, as accurate risk negotiation is a crucial component of disaster preparedness. MacFarlane refers to this in *Disasters and Mental Health* (2005) writing, “one of the major reasons for the deaths in disasters is the failure of technology and the denial or incorrect appraisal of risk” (MacFarlane in Lopez-Ibor Alino, p. 39). Comfort (2005) describes risk negotiation as an answer to uncertainty which usually calls for a reappraisal of the situation/system in place and an effort to cast a wider net of resources in order to respond effectively.

In a rapidly changing world where “the risk of natural, technological, and deliberate disasters is certain to increase”, Comfort writes, “managing risk can best be understood as a continuing process of inquiry, adaptation, and learning” (p. 353). One of Comfort’s (2005) proposed methods for promoting that process is using computer simulations to expose citizens to multiple scenarios in order to encourage considerations of a wide variety of conditions and thus,

preparations. Later in this paper, we will discuss a similar consideration for Southeast Texans to pro-actively develop resilience through enactment of risk and disaster mitigation via drills and/or simulations.

The Anthropocene

The concept of the Anthropocene is mentioned as a contextual consideration because it serves as a backdrop to this research (Butler, 2016). The term “Anthropocene” was created by biologist Eugene Stoermer in the 1980’s to describe the period on Earth that has been definitively altered and influenced by civilization (Butler, 2016). The Anthropocene describes the geological epoch following the Holocene (10-12,000 years after the last ice age, still the official designation) epoch (Butler, 2016). “Anthropocene” means “Age of Men”, and the “Anthro” aspect of the word is meant to highlight the amount of influence human existence has had on the Earth from a geological, ecological, and epidemiological perspective (Butler, 2016).

Climate change is perhaps the most powerful indication of man’s impact on the planet and is one of the considerations this study makes. The environmental variables caused by the location of Southeast Texas in regard to climate change and the petrochemical industry are permanent challenges to the residents. Butler’s Anthropocene is useful in this research for its description of the responsibility to and dependence on the planet we live on; Southeast Texas is a microcosm of this description.

Enacted Sensemaking

Karl Weick’s (1988) work on enacted sensemaking in crisis situations provides one perspective for understanding how/why people construct meaning during and after disasters. In making sense of the impact of repeated disasters, every subject interviewed in this study reported

a sense of strength and resilience as a result of experiences. Weick's (1988) interpretation of enactment, "that when people act, they bring events and structures into existence and set them in motion" and that the enacted environment is how "retrospective sensemaking" is constructed, explains how the actions that constituted survival (evacuation, adaptation, home re-builds) during and immediately after the disasters informed the way participants interpreted the work of disaster recovery as resilience-building (p. 306).

Reflexive Note and the Hermeneutic Circle

The utilization of Interpretative Phenomenological Analysis (IPA) as the methodology is a source of theoretical framework in and of itself. Smith and colleagues (2009) write of the hermeneutic circle (a foundation of IPA methodology), "To understand any given part, you look to the whole; to understand the whole, you look to the parts" (p. 27). In doing so, "the interpretative analyst is able to offer a perspective on the text which the author is not" (Smith, 2009, p. 23).

IPA is not a prescriptive methodology – rather, the emphasis is placed on a subjective, constitutive understanding of the subjects' experiences (Smith et al., 2009). It's a fitting methodology here, as it encourages the researcher to acknowledge their role in the meaning making process. Indeed, even as great effort went into maintaining a respectful and empathic approach to the participants' perspectives, my own experiences and biases inevitably influenced the interpretation of the data. Though themes are extracted from the respondent's data, the meaning assigned to the experience must pass through the lens of the interpretive analyst (Smith, 2009).

As a researcher, the meaning making process of this project moved in and out of the Hermeneutic circle from the global perspective of the Anthropocene, to reacting to the personal stories of the respondents, to re-assessing my interpretation of my own experience. Part of the interviewing process was a development of rapport that involved responses and anecdotes based on my own experience with TS Harvey (my home was flooded and rebuilt – the impetus for this project). The conversations with respondents not only constructed a network of themes and meaning for them, it informed and influenced the way I saw my current relationship with my experience.

Like Sheeran (2016) found in her IPA study of how pre-term births affected adolescent mothers, “the shift in my thinking early in the research process allowed me to challenge my own assumptions” (p.8). The preconceived notions I held that the disruption caused by the disasters would be regarded negatively faded into the background as the respondent’s true reactions began to form and take shape. The researcher’s responsibility as interpreter of the participants’ experience is inextricably linked to their own perceptions. Speaking to this, Smith et al. (2009) write, “it may help to think of one’s relationship to the data as shifting according to the hermeneutic circle, too” (p. 28).

Sociocultural Considerations

Diverse on paper, Southeast Texas reflected a total population of 388, 745, with 58.78% identifying as White and 41.22% identifying as Non-White in 2010 (Southeast Texas Regional Planning Commission [SETRPC], 2010). Still, according to the most recent census, there are towns in Southeast Texas, such as Vidor, where only 13 Black or African American citizens

reside in the town of 10,579 citizens (SETRPC, 2010). Additionally, 13.5 percent of families and 16.7 percent of individuals in Southeast Texas are living in poverty (SETRPC, 2006-2010).

The large area, composed of 21 towns across 3 counties, functions as an interconnected community; citizens often work together in the larger cities, and commute home to surrounding towns to raise their families (SETRPC, n.d.). Yet, post-Harvey, the area united – indiscriminately helping each other gut houses, feed families and find resources; the effort reflected in the hashtag and rally cry #SouthEastTexasStrong (Twitter, n.d). Understanding how such a nuanced community responds to repeated disasters can assist in developing an equally nuanced and customized disaster preparation and adaptation strategy.

Literature Review

The review of literature investigates the role and implications of climate change and industry in Southeast Texas. Next, literature on trauma, uncertainty and uncertainty mitigation will be cogitated. The social and psychological impact of trauma specific to flooding and repeated disasters is examined with a concentration on hurricane experiences on the Gulf Coast. Finally, IPA is considered and discussed as the most epistemologically appropriate methodology for this project.

Climate Change and Industry

Climate change, deforestation, and reductions in biodiversity are changes in the Earth system that will result in significant changes in human life and health. In *The Anthropocene – The biggest threat to health on the African continent*, Robert Mash (2009) writes of climate change-related traumas that echo those of Southeast Texas: Mozambique, on Africa's east coast, suffered a blow from cyclone Idai then cyclone Kenneth (Tanzania was also affected by

Kenneth), while Durbon experienced devastating flooding, and Namibia on the west coast declared a national emergency due to drought. Mash (2009) appeals to his audience:

The environmental crisis facing communities across the planet is, in fact, a series of crises that are coming together in a perfect storm. We can expect an escalation in environmental disasters . . . such disasters are accompanied by injuries, psychological trauma, outbreaks of infectious diseases . . . disruption of health services (such as for HIV and obstetrics) and displacement of people (para. 3).

Notably, as this review is being written, the planet is collectively suffering an outbreak of the novel coronavirus, Sars-Cov-2, a zoonotic pathogen thought to originate in a bat and whose earliest cases were lined to a market in Wuhan, China that sold live animals (Sheposh, 2020). By recognizing and understanding the role human influence plays in the changing patterns emerging on the Earth, populations might be further inspired and empowered to proactively mitigate the negative public health consequences.

Scientific data shows an increase in sea levels, ocean temperatures, surface temperature and atmospheric temperatures on Earth (Tucker 2020). Tucker's (2020) findings also reveal loss of mass in glacier ice and sea ice. While these changes have been occurring, data analyzing the sun's energy output since 1978 has been remarkably consistent over the years, deviating only for the 11-year sun-spot cycles, indicating a different cause. Westgate builds on this, noting rising temperatures could mean busier hurricane seasons and a gradually encroaching ocean as sea levels rise (as cited in Segura, 2020).

Westgate explained, "Since 2010, we've had five of the busiest hurricane seasons out of the top 20 that are recorded. That goes back to 1851" (Westgate in Segura, 2020, para. 8). In

March of 2020, water temperatures off the coast of Texas in Sabine Pass were 10 degrees warmer than they should be, indicating an early and active 2020 hurricane season (Westgate in Segura, 2020). Westgate stressed the need for local governments to adapt to the changed weather patterns by adding infrastructure to promote adequate drainage and pointed out, “projection for 2100...we may have a two meter, or about six-foot, rise in sea level in the next 80 years” (Westgate in Segura, 2020, para. 21). This scenario would mean hard-hit, flood-weary Southeast Texas communities like Orange and Bridge City (which sits about 5 feet above sea level) will be under a foot of water.

The risks associated with living in the shadow of the petrochemical industry have been tolerated since Spindletop struck oil in 1901 by the community that largely lives off of the jobs it provides (Motavalli, 2006; Texas Economic Development Corporation, 2019). Former EPA official Eric Shaeffer wrote two studies on pollution in Port Arthur and said, “It’s one of the worst I’ve seen” (Rohr, 2007, Industrial skyline section, para. 2). Environmental activist Hilton Kelley describes the tense dichotomy of financial support from area refineries and the physical health risk their presence incurs, saying, “When you appeal to the conscience of man, how these things are impacting our children, you can get them to see our point. But a lot of the times, the bottom line still wins” (Rohr, 2007, Governor declines to intervene, para.7).

Uncertainty Negotiation and Denial as Risk Mitigation

Evaluating the unique range and amount of risk Southeast Texans must negotiate to make a life in the area provides additional context to the findings of this research. Authors of a previous study quantitatively analyzed the influence of uncertainty on mental health and found that uncertainty about the safety of the home, personal safety, and safety of friends and/or family

were associated with a negative impact on mental health (Afifi et al., 2012). Further, the study showed that the duration of participants' uncertainty about the safety of the home correlated with negatively impacted mental health.

In the field of communication studies, researchers Charles Berger and Richard Calabrese developed a theory that identifies and explains how individuals negotiate through new interpersonal interactions to reduce uncertainty and discomfort or stress (Punyanunt-Carter, 2019). They propose the idea that the lack of familiarity or predictability with a person (or, for the purposes of this research, situations) is what causes stress and anxiety. The researchers identify ways people seek to reduce the uncertainty and identify the types of uncertainty individuals experience as cognitive and behavioral. Uncertainty Reduction Theory (URT) assumes that interpersonal settings produce uncertainty, uncertainty is uncomfortable and creates anxiety and individuals will immediately try to reduce uncertainty and increase predictability when faced with new interpersonal situations (Punyanunt-Carter, 2019).

If uncertainty reduction theory is correct, and people deal with unknown variables by attempting to reduce them, what are the implications for populations like those in Southeast Texas living under the constant pressure of many threatening unknowns? An article from the *Journal of Risk Research* describes embodied uncertainty: an approach that considers the subjective experience of how an individual evaluates risk, taking into consideration social identities, past experiences, social norms, beliefs and values (Sword-Daniels et. al., 2015). Embodied uncertainty explains how individuals internalize risk and highlight how our social identity – how we see ourselves in our community – influences how we interpret risk and uncertainty in the world. Sword-Daniels and colleagues (2015) propose that by accepting

uncertainty and the complex means by which we interpret it, we are able to navigate risk from a position of empowerment, an observation aligned with the findings of this study.

The Bulletin of the Atomic Scientists, Sea Level Rise, Storm Risk, Denial and the Future of Coastal Cities, uses New York City as an example of the desperately needed measures that need to be taken to mitigate the risks of climate change and storms like Hurricane Sandy, which will see the likelihood of recurrence “increase at least tenfold before the end of the 21st century” (Jacob, 2015). Jacob (2015) describes how populations are aware of the increasing risk of living in a coastal area, but have done little to prepare for potentialities: “Sandy provided an opportunity to change this, but while some incremental changes to reduce risk are under way, we are still in denial of the long-term consequences of sea level rise” (p. 42).

Living on the Gulf Coast comes with an innate awareness of hurricane season. In 2008, Hurricane Ike devastated Galveston Island, Bolivar Peninsula, and inundated Orange and Bridge City (towns in Orange County, within Southeast Texas) with floodwaters from its 22-foot-storm surge. It was the most devastating storm in recent memory. The town of Bridge City was left with only 24 of its 3400 homes habitable (The Storm Resource, 2020). In Orange and Bridge City in particular, the community benefitted from communal coping, a phenomenon in which groups of people confronting a shared stressor tend to feel like “we are in this together”, offsetting the emotional toll of the trauma (Afifi et al., 2012). The towns recovered, but the trauma of the rebuilding process still lingers in the collective memory. By 2017 the uncertainty that each hurricane season brings was blunted by a sense that Ike was the 500-year-storm that would buy future seasons of peace, and many citizens (myself included) were taken by surprise when TS Harvey wreaked its havoc.

It is tempting to let time erode the memory of devastating traumatic events; In Southeast Texas, every summer that doesn't bring a major hurricane or rainfall event potentially lulls the population – even those sworn to vigilance after experiencing flooding themselves – to lower their guard, and maybe even consider skipping that year's flood insurance premium. However, the urgency to take substantive risk-mitigating steps increases with time. Jacob (2015) writes: “the sooner we awake from our risk denial, both on climate mitigation and adaptation, the better off we are...for every dollar spent on disaster risk mitigation and resiliency, we earn an average of four dollars by avoiding losses” (p. 42).

Ulrich Beck's *Risk Society: Towards a New Modernity* raises the idea of a society that is living in a world of self-produced risk (and is collectively aware of and choosing to look past it), under a governing authority whose ability to manage those risks is in doubt (Burgess et al., 2017). From climate change and refinery explosions to covid-19, the often-uncoordinated responses we have seen from disaster management entities support this idea that unnecessary risk is a partially self-inflicted byproduct of our cultural norms.

The Social and Psychological Impact of Trauma Associated with Flooding, Repeated Disasters

Repeated disaster events have been shown to correlate positively with mental health disorders, yet few studies have focused on the adverse effects of repeated disasters on the mental health of a population, as it is uncommon for a variety of risk factors to affect one area (Heo et al., 2008; Stough & North, 2018). Southeast Texas is one of those unique areas that faces unpredictable environmental variables from multiple sources: hurricanes, rainfall/flooding events and disturbances from area refineries.

In a study to gauge health-related quality of life, 83 residents of the Garisan-ni, Inje-gun, and Gangwon-do, a predominantly agricultural farming community, were assessed with the Korean version of the 36 Item Short-Form Health Survey (SF-36-K) between April and June 2006 (Heo et al., 2008). On July 15, 2006, a massive flood struck the area; 58 of the original 83 respondents were available for re-assessment 18 months later and results showed 22.4% of respondents qualified for a diagnosis of PTSD (Heo et al., 2008).

Van der Kolk (2015) describes the way trauma can change how our brains negotiate threats in our environments, creating new pathways that can lead to maladaptive responses and psychopathology/disorders. People who experience trauma in situations where they are physically held down, stuck in battle, *trapped* and/or are not fully supported, experience a constant flood of stress chemicals and the brain can get suspended in a state of fight or flight long after the event has passed (Van der Kolk, 2015). This information provides an additional dimension of understanding that can be applied to the experiences encountered in research of Southeast Texans who have been victims of repeated flooding or disasters. In the context of Harvey and Imelda, victims are often trapped in an inactive role, helpless to the floodwaters that violate their homes, and they experience an overwhelming dose of stress chemicals as they wait for rescue or for waters to recede, potentially creating a risk factor for future psychopathologies such as PTSD.

In terms of social trauma specific to Southeast Texas, a survey by the Kaiser Family Foundation a year after hurricane Harvey found that fifteen percent of victims across Texas reported their homes were still unlivable after 10 months, a statistic that rose to 25 percent for residents of the Golden Triangle/ Southeast Texas (Hamel et al., 2018). Additionally, Hamel and

colleagues (2018) write that residents who were low income, African American, or residents of the Golden Triangle/Southeast Texas were more likely to report that they were not getting the help they needed for recovery and were still living a disrupted version of their pre-Harvey lives.

Research Questions

Taking previous research into consideration, this study endeavors to answer the following questions:

1. What does the experience of a Southeast Texas citizen whose life has been profoundly disrupted by 2 or more of the disasters (Harvey, Imelda, TPC explosion) in the past two years look like?
2. How has the past experience of repeated disasters influenced present-day life within a changing climate, surrounded by the environmental influence of the petrochemical industry?
3. How did participants process the uncertainty of the aftermath?
 - a. Did risk negotiation change as a result of the lived experiences?
 - b. To what extent, if any, did denial of risk play in negotiation of risk?

Methodology: Interpretative Phenomenological Analysis

Interpretative Phenomenological Analysis is the methodology used in the analysis of the data collected through semi-structured interviews. Smith (2007) describes the purpose of the IPA study as an empathic, in-depth understanding of the participant's experience. Emphasis is placed on mutual sense/meaning making for the interviewer and the subject. Willig and Rogers (2017) articulate the value of this methodology, writing: "rather than transcend the particular, IPA aims to grasp the texture and qualities as it is lived by an experiencing subject" (p. 194).

IPA research does not aim to test a hypothesis or obtain quantitative information limited to a Likert scale or a yes/no response. Rather, IPA is a “bottom up” approach in which the respondents control their own narratives, offering data that is rich, complex, broad and deep (Reid et al., 2005). The researcher’s job is to distill the information through diligent and systematic analysis, identify themes, organize them into super-ordinate themes and then repeat the process for each individual interview before beginning to apply the same process across the study. IPA emerged in the mid 1990’s as a new qualitative research channel in health psychology (Smith, 2009)

One interpretative phenomenological study of children’s lived experiences of Hurricane Katrina ten years after the trauma, provides valuable insight into the way coping mechanisms shifted from adaptive coping strategies in childhood to active coping strategies in early adulthood (Mason, 2015). Themes emerged revealing the impact trauma, hurricane preparedness, emotional reactions, displacement, relocation and social support networks had on the survivors. In order to produce authentic, comprehensive analysis, this method of data collection is appropriate, as it allows the participants to control the narrative of their own experience.

Design

The qualitative, IPA design investigates lived experience. Semi-structured interviews were conducted via Zoom (an online meeting platform) meetings to procure the data. Six respondents were interviewed ranging in age from 19 to 46 years of age. Three males and three females participated, and all self-identified as Caucasian except for one who self-identified as Asian (Pakistani). Interviews lasted from 21 minutes to 1 hour and 14 minutes, averaging 46 minutes.

The interview schedule, though flexible, was adhered to consistently across interviews. A sample of the schedule is listed in Appendix B. Video interviews were recorded via Zoom and audio was additionally recorded and transcribed through Otter.ai. Verbatim transcriptions were analyzed, corrected, and recorded by the researcher. Video, transcriptions and audio recordings are all being saved and will be deleted within three years per the informed consent agreement. In alignment with the IPA methodology, the transcripts were processed individually through multiple readings, initial annotation of impressions, theme identification, super-ordinate theme identification, charting of the sub-ordinate and super-ordinate themes, then processed collectively for shared themes across cases. If more than 50% of participants reveal the same theme, it is regarded as a shared, superordinate theme.

Sampling

Due to the specific nature of the research, the population under consideration is purposive. The sample needed to be residents of Southeast Texas who have been substantially affected by at least two of the following disasters: Tropical Storm Harvey, Tropical Storm Imelda or the TPC explosion in Port Neches. Substantially affected in this case means damage to the home, a disruption in living arrangements or displacement. Snowball sampling was also utilized and yielded two participants. The sample is reasonably homogenous in age range and level of trauma experienced. Due to the immersive nature of the analysis in an IPA research study, Smith et al. (2009) recommends that undergraduate to graduate students aim for a sample size of 3-6. With this in mind, the sample size this study was capped at 6 participants.

Figure 1*Participants' Demographics*

Name (pseudonym to protect identity)	Age	Race	Gender	Disasters
Alex	35	White	Female	Imelda, TPC
John	45	White	Male	Harvey, Imelda
David	19	Asian/ Pakistani	Male	Harvey, Imelda
Jamie	32	White	Female	Harvey, Imelda
Cameron	46	White	Female	Harvey, Imelda
Kevin	36	White	Male	Harvey, TPC, Imelda

Participants were recruited using a flier on social media outlets such as Facebook and Instagram as well as through networking among faculty and their students in the communication department of Lamar University.

Instrumentation

The current research used in-depth semi-structured interview as the main source of collecting and analyzing raw data. This study is qualitative in nature and the results emerged as the result of deep, repeated analysis and the descriptive, linguistic and conceptual notations made in the initial reviews (Smith et al., 2009). Charting and notations were used to organize emergent themes from the data which was supported by evidence in the form of verbatim excerpts from the interviews. Multiple recording devices were used to capture the interviews and as primary researcher, I edited the automated transcriptions from Otter.ai for further accuracy.

Figure 2*Instrumentation Utilized*

Instrumentation	Function
Instrument 1: Semi-structured interview	Open-ended questions allow for freedom of participant to articulate experience as clearly as possible. See Appendix A for schedule.
Instrument 2: Zoom, Otter.ai	Zoom, an online video conferencing app, was used to execute and record video of the interviews. Otter.ai, a recording and transcription app, was used as a secondary measure to ensure validity and reliability.
Instrument 3: The researcher	I, the researcher, personally edited and further transcribed the app's copy against the voice recordings.
Instrument 4: Notations, Charting	Notes and charting taken during interview analyzation guide organization.

Data Collection and Analysis

The data was collected via six semi-structured interviews with the goal of providing an empathic, safe environment for the respondent to share their lived experiences. Informed consent documents were delivered, signed and collected prior to the start of each interview. The work of identifying emerging themes from the observations was done while working to ensure the connections stay grounded in the respondent's words and non-verbal communication (Noon, 2018). The themes were then charted or mapped according to how the researcher considers them best organized. Patterns across themes were identified with abstraction, helping the researcher to begin assigning clusters of similar themes into sub-ordinate themes (Smith et al., 2009).

This process is repeated for each case, with the ultimate goal of identifying emerging themes across the sample. Data used to support the findings comes from verbatim quotations. With each reading of the transcriptions and review of the recordings, the researcher is “trying to make sense of the participant trying to make sense of what is happening to them” and understanding unfolds (Smith and Osborn, 2015, para. 2).

Protection of Human Rights

Participants in the research study were assured of confidentiality verbally and in a written consent form. The form specified that while excerpts of their interviews will be published, identification of the subjects will be protected, and no personal information will be shared. Participants were documented in the agreement as voluntary and retained the right to withdraw up to the point of completion. Approval with the Institutional Review Board (IRB) through Lamar University was obtained before starting the data collection process.

Results

Expectations were challenged by the findings of the data, as it was assumed that respondents’ recollections would be focused on trauma and environmental anxiety. Almost immediately, however, the first super-ordinate theme, resilience, emerged from the data unanimously across the sample.

Resilience as result of enacted sensemaking

The narrative built by the participants told a story in which the act of survival and rebuilding in the first disaster served as a guide/map to better navigate the disruption caused by the second disaster:

Harvey, I just remember going, “oh, man, it’s actually gonna – it’s gonna flood”...You know, it’s coming. Yeah, and then I was just, I think it was just the, the uncertainty of: “When is it going to quit raining? When is the water gonna quit rising, and when is, you know, how’s this insurance thing work? I have no idea. I was still in the final stages of finishing up my house from Harvey when Imelda came through and I was just, I think I was more resolved to not let it overwhelm me a little bit and I kind of knew what to expect from my adjusters...I mean, there was still some uncertainty there but it was, I had a lot more resolve to myself knowing that, ok, we made it through one, I did a whole lot of work...this...this will be fine. (John)

John mentioned uncertainty twice, but when facing the aftermath of the second disaster (Imelda), his experience with the first one (Harvey) served as a source of self-confidence rather than self-pity; uncertainty was mitigated through this self-confidence. Resilience surfaces in John’s reflections as he refers to himself as ‘resolved’ and that despite the work he knows is in store for him, “this will be fine”.

The other respondents similarly acknowledged the pain and hardship involved with repeated disasters but “...just like with [the] hurricane...you learn from them. You get better prepared after with the risk you have taken and the consequences” (David). Jamie, a mother who suffers from anxiety, reflects that while her weather-related anxiety has “gotten worse”, “losing everything” taught her that it can be overcome and how to do it. Again, the concept of *knowing what to expect* emerges, reinforcing the idea that uncertainty is less of an issue during subsequent disasters.

I definitely know what steps to take in regards to losing everything...I was more prepared to, you know, to leave. And I expected to lose things. During Harvey was hard because, like, I didn't expect any of that and everything we have been building for the last 15 years was just gone...during Imelda I was like, "okay, well, here we go again" and you know, I know the process, but it was still super scary like it was scarier because, you know, I knew what to expect. (pause) But I was more prepared. (Jamie)

One respondent expanded on this, making sense of her time spent gutting her elderly parents' home of its 40 years of memories after Harvey, negotiating with their insurance, and overseeing the rebuilding only to find herself flooded out of her own home due to Imelda, saying, "it kind of definitely makes you see that nothing is safe" (Cameron). Her reaction to the loss and recovery translated into a deeper appreciation for life and family, while at the same time releasing her of her attachment to the material. Such a perspective is helpful in an environment where the possibility of recurring disasters is high.

I think that's really what both of these [events] have shown us, and like I said, is that you gotta be able to roll with whatever happens. Nothing is certain. It's just a, just a building...it's just a home. This is just where your stuff is, as long as you have your people then you're good...I kind of feel like, as a whole, we are more resilient to things. I think we are doing well for the pandemic, I mean, had we not had Harvey and Imelda for sure. But I think it's made us all like, "meh, we can do anything now". We can live through it. (Cameron).

Weick (1988) says of enacted sensemaking in crisis situations, "understanding is facilitated by action...action during crisis is not just an issue of control, it is an epistemological

issue” (p. 306). Meaning, the knowledge of how to navigate these disasters is obtained through the experience of living through them. If enactment/action in a crisis is creating an enacted environment which informs the meaning made retrospectively, then the *action* of survival, which each participant reported taking part in (escaping floodwaters, cleaning flooded homes out, rebuilding), was creating meaning – an example of one’s ability to survive – in real time (Weick, 1988). This suggests that in traumatic situations, one’s actions – even if they are reflexes – will influence if the experience is remembered as a lesson or a trauma.

Resilience as a process: trauma driven

While the super-ordinate theme of resilience emerged as a generally positive takeaway from the participants, there was plenty of reflection on the rough road leading to that resilience: damage that repeated disasters– especially the first one – caused emotionally, professionally and psychologically. Alex, who experienced Imelda and then the TPC refinery explosion, recalls her reaction to the first brush with disaster as “disbelief” and “panic” (Alex).

You know, it was like panic. But I had to keep it together for my kid, you know...he’s sitting in his high chair surrounded by water and I’m like “you can’t get out baby, you can’t get in this water” and Adam, he’s just running around the house trying to do stuff – he’s going out into the front yard seeing if there’s anyone to flag. Eventually, the boats came kind of through the neighborhood. But it was just, it was very surreal...I know I kind of like, lost it and cried (Alex).

In experiencing the inundation of the place most people consider to be their sanctuary– their home– and the oftentimes subsequent displacement while the home is repaired, victims are

forced to re-assess their idea of what they consider permanent. What eventually became resilience was first a complete upheaval of one's understanding of their world.

Kevin: I just thought about this recently. I can't leave the apartment unless I know the cat bowl is like, even if I just fed him his wet cat food, I can't leave until the water is filled up. And then the dry cat food is filled up...So I can't leave the apartment without making sure, if I die, my cat has something to eat (Kevin).

Researcher: Did you start doing that after TPC or Harvey?

Kevin: After Harvey.

Kevin, who experienced Harvey, Imelda and the TPC explosion but was mostly affected professionally, still experienced significant changes to the way he negotiates his environment, saying, "after Harvey, basically from June to October – any time it's gonna rain heavy it's...I just get that little pit in my stomach" (Kevin). Similarly, Jamie found her self-perception challenged: "It made me feel like I was not an adult because I didn't know where to go or what to do...like I don't even know who to call" (Jamie). The residual effects of the trauma rippled through her family.

In Harvey, we were displaced for over a year, but it caused a lot of anxieties for us. Like my daughter, for instance, she still to this day has a hard time sleeping in her room herself because we all lived in the same room for so long...we all have separation anxiety, you know, because you never know what's going to happen especially if it's raining outside or there's bad weather (Jamie).

The majority of participants reported a varying sense of anxiety during intense weather events. This suggests that the resilience built through the adversity faced is not gained without

the risk of traumatization. Future disaster preparedness research could benefit from investigating how strong the correlation is between traumatic experience and resilience vs traumatic experience and maladaptive responses.

Growth beyond disaster response

This research uncovered themes of resilience as a response to performing the actions of survival and how that serves as uncertainty mitigation related to disasters, but participants also reported a more grounded perspective on life in general as a result of their experiences.

Cameron's evolved perception of attachment to material things was one example of this subordinate theme ("it's just a house. It's just a structure"). John, who was in the middle of a divorce when Harvey filled his home with 4.5 feet of water, said that initial experience was "kind of like when you're in a fight...when your back's against the wall...it's time to find out what you're made of". In learning how capable he was, he unlocked an increased sense of optimism.

Why would you let yourself get so upset over the threat of something...The worst thing that could happen is what happened to me. We'll take life as it hands it to us and we'll deal with it accordingly. If you can go through some of these things, why not do it joyfully? (John)

John didn't know that he would respond with "determination and fierceness" but once he was faced with Imelda's destruction while still finishing repairs from Harvey, he *chose* to use that resolve as a tool and show it "through a smile and a gentle peace". Alex drew pride and satisfaction from her experiences, reflecting, "I'm very pleased with the work. It was satisfying...I learned a lot along the way and, you know, I feel like I can kind of tackle any kind of home remodel now". While Alex's home was uninhabitable from Imelda's floodwaters, she

stayed at her in-law's home which was affected by the TPC explosion. She managed to find meaning and purpose in the work of improving on her home instead of yielding to the stress of the situation and she ended up with an upgraded, more sellable home, constructed by her and her partner's own two hands. And despite the ongoing Covid-19 pandemic, Alex and her partner have decided to get married on Halloween (the couple's favorite holiday) because, "we're like f-- it, we're getting on with our lives...we're gonna take this and make the best of it".

Improved Disaster Preparedness

The second super-ordinate theme that was represented among respondent's testimony was that of a more conscious, active approach to disaster preparation. Attitudes shifted from "I never had to think about it...as a youngster we didn't really care about it" (David) to "you have to get prepared for it and get with our relatives and get supplies, get in touch with them, if they need anything" (David).

John said disaster preparedness was "something I've never given a lot of thought to". After Harvey, John added 600 square feet to his house during the remodel – all upstairs. He also "built a nice shop and some of the shelving I have built way, way up" and talked about how his remodel designs were done with the knowledge that "how fast the water is coming in makes a huge difference because you don't just have a lot of time...your plan should involve difference in water rising levels speed" (John).

Reduced Risk Tolerance

Participants who reported being only casually aware of the environmental threats in Southeast Texas before, have since reported obtaining flood insurance coverage or increasing their existing coverage, and becoming more literate and active consumers of weather-related

media. This supports Stancu (2020) and researcher's assertion that, "it is essential to understand how people make decisions as they attempt to cope with risk...risk perception plays an important role in adaptive or preventive risk coping" (p. 2).

John had to stretch his insurance money for his rebuild after Harvey since he didn't have home contents coverage and said, "Yes, first of all, obviously I have contents coverage on my flood insurance. So, I had it on there the during Imelda". His adaptive behavior in proactively engaging in disaster preparedness by reducing his levels of risk paid off in the form of enough insurance money to comfortably see him through his second rebuild/remodel.

Alex, who lives in an area that doesn't historically flood said of risk reduction behaviors, "We got that first big rain, and I'm like, calling my insurance agent like okay, we're ready to activate that flood insurance policy now – here's my credit card number". Jamie had "the bare minimum that was required" had her insurance policy upgraded to "the max amount" after two "500 year" floods hit her property within 3 years.

An increased reliance on weather-related media and tracking apps developed among the female recipients, "I'm watching every single different weather channel, even if it's just a thunderstorm" (Alex), while an increase in the awareness of real-time weather events was reported among the males "whenever it starts raining hard it's just like 'let's wait for this to be over'...it's not just the weather; it's, like, what happens after the weather event" (Kevin).

Cameron, who said of her experiences, "my only change in all this was knowing that it's just a house...and not to feel, like, devastated over something happening to it", also talked later in the interview of her connection to weather tracking apps.

Cameron: I mean I've always liked the weather and I've always watched it but not like I do now. Like, if there's something in the Gulf, or if there's a disturbance of some sort, I mean I'm, you know, I'm watching it. I've got the app on my phone. You know I'm going to that NHOAA whatever the National Hurricane website, watching it to track what it's supposed to do.

Researcher: And during intense weather events, how do you feel?

Cameron: Anxious.

Cameron's creation of meaning emphasizes her freedom from attachment, but the actions she describes indicate that she has – perhaps unconsciously – adopted behaviors that serve to reduce the risk she will get caught unaware by another flooding event. It's possible that the focus on detachment is a self-defense mechanism used to protect her from the fear that attachment to material things would cause in such an environmentally unpredictable climate.

Place Attachment

This study has revealed a population that exhibits an unusually adaptive and resilient response to exposure to repeated disasters. We have explored the role enacted sensemaking plays in a crisis, but there is another consideration to be made: most respondents made no mention of wanting to leave the area as an adaptive response, "I still enjoy living here and I don't think I would ever move unless I lost my house, maybe two more times" (Jamie). On the contrary, participants refer to Southeast Texas as "home...I feel like it is a safe place to live" (Kevin). John's commitment to the community went deeper: "I'd like to maybe...my community involvement in talking to our legislators and officials and asking these questions, what is our

thought process in the future about allowing water to drain because obviously, this is not the only time we're going to experience some high water in southeast Texas".

Place attachment, the final super-ordinate theme, defined by Stancu and colleagues (2020) as "the bond people develop over time with their place" has been identified as a factor in "how people perceive the risk or how they cope with it" (p. 2). John's place attachment intensity is high and leaving was never a consideration, but the trauma and disruption of his experiences still pushed him to engage in proactive risk reduction – in his case for the entire drainage district he resides in as well. David, the 19-year-old respondent whose family's apartment flooded in Harvey and Imelda said of his feelings toward Southeast Texas:

What I really liked was that you know that all the churches getting together despite their religious factor and they were getting – going outside you know to community members to help them, giving separate supplies and everything. That's, that's what a good community feels like (David).

This is in line with a recent study published in the *International Journal of Disaster Risk Reduction* that found, "place attachment intensity might facilitate the feeling of distress and hinder avoidant coping strategies for people experiencing high objective and subjective risk" (Stancu et. al, 2020, p. 7). Indeed, the participants in this study report a normal amount of trauma and stress from their experiences, but "enact distress – an adaptive emotional coping strategy" by dealing with the aftermath, rebuilding, and reducing risk for future events (Stancu et al., 2020, p. 7). Further research is needed to explore if this trend is the result of place attachment, cultural influence, or both.

Re-defining home: the meaning of lost time

A final sub-ordinate theme that emerged was the sense that the time lost to disaster recovery and re-building homes intensified the desire to nest; to have a safe space to retreat to at the end of the day and decompress freely with family, “you want your little space back whole, you want your bubble complete” (Cameron).

My son...it was really hard on him because he didn't get to see me and his dad as much...and he was so happy to be back home when we did move back in (Alex). Alex reported the 7 months she was displaced at her in-law's as the part that affected her psychologically, “it felt like nothing I ever did was enough and so I spend as much time away as I could”. For Kevin, lost time was a big concern surrounding the disasters he experienced, but he felt a lot of guilt for that concern, “I realized how selfish I was, because the first thing I thought was like, ‘Okay, now what am I gonna have to do’”.

The aftermath of a disaster is disruptive, time-consuming, expensive and exhausting. The culture of resilience in Southeast Texas and the expectation for the community to put its ‘nose to the grindstone’ might be also putting atmospheric stress on citizens to work before they have had the chance to process the trauma they are experiencing. For one disaster, this kind of crisis-mode behavior can be a very effective strategy. But in a community where disasters are an increasingly regular occurrence, the sense of constant upheaval and lost time risks manifesting into maladaptive coping strategies and compassion fatigue.

Discussion and Concluding Thoughts

Consistent with Weick's (1988) perspective of enacted sensemaking, the citizens of Southeast Texas who participated in this study have learned through their experiences and actions that they are capable of navigating disasters. The act of survival has served as a sort of inoculation against the full impact the stress of future disasters might have otherwise caused. In living through it, they "understand the problem they face only after they have faced it and only after their actions have become inextricably wound into it" (Weick, 1988, p. 306).

The resultant resilience additionally serves as a means of uncertainty reduction and encourages risk-mitigating behavior such as disaster preparedness and weather awareness. Interestingly, the place-attachment factor in southeast Texas is very high, and despite the inherent risk of living in a volatile, unpredictable environment, the option of moving was only considered by 1 of the 6 respondents. Additionally, there was not as much concern for climate change as was anticipated considering the proximity to the Gulf of Mexico and the frequency of 'unprecedented' rainfall events in the area; the culture of resilience and place-attachment is a possible factor for this.

Harrington and Gelfand (2014), in their work on a culture's inclination to tightness or looseness, or "the strength of punishment and degree of latitude/permissiveness". Collective, rule-centered societies like Japan would be classified as a tight culture, while more individualistic, freedom-focused societies like the United States would be considered loose (Gelfand in TedxTalks, 2018). Harrington and Gelfand (2014) write:

In localities with a high degree of either environmentally induced or human-inflicted threat (i.e., natural disasters, resource scarcity, disease, conflict that threatens one's

livelihood), it is adaptive to develop a cultural milieu with stronger norms, greater behavioral constraint, and lower deviance tolerance” (p. 1; p. 6).

Harrington and Gelfand (2014) list Texas as the 6th tightest state in America. Consistent with the perspective that tightness can be a cultural response to a need for rules and norms due to environmental threats, Southeast Texas has cultivated a resilient, hardy population that almost instinctively looks for who needs help after a natural disaster. However, we must consider the possibility that the thick skin/culture of resilience of the community might one day be a hindrance to safety as the risks of climate change become more extreme and the need for relocation might begin to compete with place attachment.

Implications

In a region where the risk of future disaster occurrence is high, emergency management organizations can benefit from understanding the role enacted sensemaking plays on resilience. If the action of survival is a factor in resilience-building, it might be useful to consider teaching the community to ‘enact’ survival and rebuilding in advance as preparation for future storms via drills, testimonials from survivors, or even through virtual reality simulations. Knowing what to expect regarding everything from floodwater to insurance companies was a positive adaptation for respondents in this research when faced with their second disaster. Counseling the community via public service announcements and/or social media campaigns on the need for flood insurance, as well as what to expect during the communication process with adjusters after a disaster would be an impactful addition to current disaster preparedness protocols.

Further research in investigating the link between enacted sensemaking and resilience in people who have experienced repeated disasters in communities outside of Southeast Texas is

needed. It would be useful to better understand if the findings of resilience in this small sample are more closely correlated with their role in enacted sensemaking, place attachment, or are a result of the unique combination of these phenomena overlapping in Southeast Texas.

Limitations of this study include the lack of diversity among age, race, and socioeconomic backgrounds. The participants in this study all seemed to have access to resources that are not available to all segments of the population in Southeast Texas. The differences in perspectives among those identifying as male and those identifying as female were subtly present in this project but needs further study.

A final consideration for future research would be the overlapping albeit slower-moving disaster that is occurring concurrently; the Covid-19 pandemic. The parallels of the uncertainty from the disasters and the uncertainty from the virus were brought up by respondent's multiple times. Further interviews inquiring about how risk habits and resilience have influenced citizens' Covid-19 response would provide useful illumination on the tightness-looseness perspective in Texas (Harrington & Gelfand 2014).

While there is a need for more research on Southeast Texans' experiences of weather and environmental trauma, this project extracted useful themes to further inform emergency management response entities and the community of Southeast Texas how these disasters have been interpreted by some of its citizens, and how to better prepare for them in the future.

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Appendix A

Definition of Terms

The following terms are used frequently and are critical to the framework that support this study:

1. *Interpretative Phenomenological Analysis*- A qualitative research methodology in which “participants are the experts on their own experiences” (Reid et al., 2005). Hypothesis are suspended in favor of a “bottom up” approach in which the researcher aims to “capture and explore the meanings that participants assign to their experiences”. The results are interpreted by the researcher but supported by the data provided by the respondents.
2. *Phenomenology* – the study of experience. Attributed to Edmund Husserl, the philosopher was interested in bringing people to know their own experiences and identify the “*essential*” qualities of those experiences. Smith et al. (2009) writes, “If this could be done, then Husserl reasoned that these essential features of the experience would *transcend* the particular circumstances of their appearance, and might then illuminate a given experience for others too.”

3. *Hermeneutics* – Originally applied to biblical texts, this philosophy of interpretation has since expanded to a wide variety of texts. The theory is the foundation of the hermeneutic circle; the idea that the part and the whole are dynamically interlinked – to understand the part, you must see the whole and to understand the whole, you must look towards the parts (Smith et al., 2009).
4. *Idiography* – An approach that emphasizes concern for the particular; the individual – and a dedication to the analysis of phenomena as subjective and influenced by specific thoughts, feelings and behaviors (Noon, 2018).
5. *Super-Ordinate Theme* – in IPA, a cluster of themes that have emerged from the text of the data produced by in-depth interviews (Smith, 2009).
6. *Lived Experience* – An understanding of an experience that is obtained by living through it. In health psychology, IPA is useful in providing insight to healthcare providers about the lived experiences of patients with illnesses and chronic pain (Reid et al., 2005).
7. *Anthropocene* – The proposed name for the current geological epoch in Earth’s life span. Meaning “The age of man”, the moniker aims to highlight the impact humans have had on the functioning of the planet from climate change to deforestation (Butler, 2016).
8. *Uncertainty* – a state of being in which the future situation is unclear. In this study the context of uncertainty pertains to the anxiety caused by disruptions of housing and security in the aftermath of a disaster.
9. *Risk Negotiation* – In the context of this research, risk negotiation refers to the way the population in Southeast Texas addresses living in a high-risk environment: mitigation, preparation, inaction, etc.

Appendix B

Semi-Structured Interview Schedule

The purpose of this study is to understand how victims of repeated disasters in Southeast Texas respond to and create meaning out of their experience within an environment that poses continual risks (weather, industrial). It is hoped that as a result of this research, future disaster preparation efforts might include proactive measures that will address potential mental health, financial, emotional and social consequences.

This interview will be semi-structured, meaning that the questions are meant to be used as a framework. The interviewee is encouraged to respond thoughtfully and freely and can stop responding at any time.

- 1. Please tell me about the disasters you experienced.**
(possible probing questions)
 - a.) How did that feel?
 - b.) How were you thinking about it before and after?

- 2. How did the experience of the first disaster affect the way you handled the second (or third) disaster?**

- a.) How did prior experience positively affect the way you handled the subsequent disaster(s)?
 - b.) How did prior experience negatively affect the way you handled the subsequent disaster(s)?
- 3. Please tell me what displacement/damage to your home/disruption in living arrangements means to you.**
- a.) How did it affect you?
- 4. How did the uncertainty of the aftermath affect you?**
- a.) How did you feel about uncertainty during the events?
 - b.) How did you feel about the uncertainty of the recovery process?
- 5. Prior to your experiences, how often did you think about disaster preparedness?**
- a.) Has your attitude toward disaster preparedness changed?
- 6. Since experiencing the repeated disasters, how would you describe the way you negotiate risk?**
- a.) How do you feel about your awareness of risk?
- 7. If you were affected by the TPC explosion, how has your awareness of the influence the petrochemical industry has on the community changed?**
- 8. How does your experience with Harvey or Imelda affect the way you feel about the frequent severe weather events in Southeast Texas?**
- a.) What changes in your weather-awareness have you noticed, if any?
 - b.) How do you feel during intense weather events?
- 9. What are your thoughts on the effects of climate change in Southeast Texas?**
- a.) How has your perspective about climate change changed, if at all, since Harvey and Imelda?
- 10. How do you think of yourself now that you have gone through these disasters?**
- a.) Has your self-image changed? How?

11. How do you feel about Southeast Texas now that you have gone through these disasters?

a.) Have your feelings changed? How?

Thank you so much for sharing your story with me today. Is there anything else you would like to add regarding your experience?

Appendix C



LAMAR UNIVERSITY®

INFORMED CONSENT

**Uncertainty and Risk in The Anthropocene:
Lived Experiences of Repeated Disasters in Southeast Texas**

Purpose of the Study

You are being asked to participate in a research study about the lived experiences of repeated disasters in Southeast Texas. The purpose of this study is to understand the experience of a Southeast Texas citizen whose life has been profoundly disrupted by at least 2 of the following disasters: Tropical Storm Harvey, Tropical Storm Imelda and/or the TPC refinery explosion. In this study, “profoundly disrupted” means damage to the home, displacement, or disruption in living arrangements.

Additionally, this study is investigating how citizens who experienced repeated disasters are adjusting to present-day life in Southeast Texas within a changing climate and in an environment influenced by the petrochemical industry. Finally, the research will address how the uncertainty of the disaster’s aftermath has affected the way the citizen currently negotiates risk.

If you agree to participate in this study, you will be asked to:

- Participate in a semi-structured interview (questions are prepared, but the tone of the interview is that of an in-depth conversation)
- Agree to participate in the interview using an online meeting platform such as Zoom

- Agree to video recording of the interview and transcription of the audio.
- Agree to let the researcher use excerpts from the interview transcripts in the resulting paper (all excerpts will be anonymous)
- Verify you are 18 years of age or over
- Verify you are a current resident of Southeast Texas and were a resident at the time of the disasters

The interview will last approximately one hour. The interviews will be conducted remotely on a one-time basis.

Risks

This is a minimal risk research study. That means that the risks of participating are no more likely or serious than those you encounter in everyday activities. The foreseeable risks or discomforts include mental/psychological stress associated with recounting traumatic events. In order to minimize those risks and discomforts, the researchers will be sure to create an empathic and secure communication climate. The interviews are meant to allow for the participant to control the narrative. Questions that directly address trauma or intense emotional distress will be avoided and a list of resources are provided at the end of this form should the study bring up stressful reactions. You can withdraw from the study at any time, without any penalty.

Benefits

Participation in this study may directly benefit you by allowing you to fully explain your experience. This is an opportunity to describe in your own words how living through repeated disasters in Southeast Texas has impacted your life. More broadly, this study may help researchers learn more about lived experiences of repeated disasters in Southeast Texas and may help local mental health resources and disaster preparedness entities in anticipating their response to future crises. Additionally, other communities around the country and world currently living in high-risk, disaster-prone areas could benefit from the information revealed through the study.

Confidentiality

The researcher will make every effort to ensure that the information you provide as part of this study remains confidential. Your information will be collected through video/audio interviews. Numbers will be assigned to participants to ensure confidentiality will be protected. This information/data will be securely stored, and the interview recordings will be destroyed within 3 years of the study's publication. No identifying information such as name, age, occupation will be used in the interview recordings. Only location of residence will be referenced.

This informed consent form will be kept for three (3) years after the study as required by federal law and then it will be destroyed. Your identity will not be revealed in any publications, presentations, or reports resulting from this research study.

Participation

Your participation in this research is completely voluntary. If you agree to participate now and change your mind later, you may withdraw at any time. If you choose to withdraw after we have already collected information about you and the research project has been completed, the researcher will continue to use the information shared in the interview, but all identifying information will be removed and the recording of the interview will be deleted immediately instead of within the originally agreed upon 3-year window.

Any photograph or audio/video recordings will be stored securely and only the research team will have access to the photographs or recordings. The photographs and recordings will be kept for three (3) years after the study as required by federal law and then it will be destroyed.

Participant must initial one:

_____ I agree to be photographed or be audio/video recorded.

_____ I do not agree to be photographed or be audio/video recorded.

You will not receive any type of payment for participating in this study.

There is no cost to you for participating in the study.

Contact

Prior, during, and after your participation you may contact the researcher by email or phone [Andre Favors at afavors@lamar.edu; Christina Segura at csegura@lamar.edu by phone at 409.221.2021]. When asking questions about the research study please be sure to reference the researcher’s name and study title.

For concerns with any part of this study, please contact the Lamar University Institutional Review Board at rspa@lamar.edu.

Signature

You have been informed about the title of the study, the purpose of the study, the study procedures, the benefits of the study, and possible risks. You have been given a copy of this consent form. You have been given the opportunity to ask questions before signing this form.

By signing this form, you voluntarily agree to participate in this study, but you are not waiving any of your legal rights.

Participant’s Printed Name

Participant’s Signature

____/____/____
Date

As part of the research team, I have explained the study title, study purpose, study procedures, benefits of the study, and possible risks involved with the research study.

Research Team Member Printed Name

Research Team Member Signature

____/____/____

Date

Mental Health Resources

Mental health care is just as important as physical health care. There are many resources available to the community in Southeast Texas who are recovering from recent disasters and associated trauma.

Spindletop Center

http://www.spindletopcenter.org/MHMR_MH.html#OutpatientServices

Spindletop 24-hour Crisis Hotline: 1-800-937-8097

Baptist Hospital Behavioral Health Center

<https://www.bhset.net/our-services/behavioral-health/>

Baptist Behavioral Health Center 24-Hour Crisis Hotline: 409-212-7000

Samaritan Counseling Center of Southeast Texas (free screenings)

<https://screening.mentalhealthscreening.org/samaritan-counseling-center-of-southeast-texas>

Crisis Textline: Text “CONNECT” to 741741

Pearls of Wisdom Counseling Service

https://beapearl.com/?fbclid=IwAR0ihVsnupUI13RpOgoxL_eSENSOR_bVOZ8R4U6SWj9oYNtNd-fDS2HeK6g

