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Do Individuals Have Stressful Experience of a Future Possible Disaster in the Rio Grande Valley?

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DO INDIVIDUALS HAVE STRESSFUL EXPERIENCE OF A FUTURE POSSIBLE DISASTER IN THE RIO GRANDE VALLEY?

A Thesis

by

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ABSTRACT

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The risk of exposure to natural and man-made disasters in the United States has been an increasing concern among key stakeholders. During a disaster event, individuals living in the impacted area experience destruction through personal experience. Whereas, individuals living in other parts of the country experience the disaster second-hand through media outlets such as print, news broadcast, social media, and the Internet.

This study focuses on individuals living in the Rio Grande Valley, a location that is geographically vulnerable to natural disasters including hurricanes, flooding, flash flooding, and storm surge. The study investigates whether individuals indirectly experience stress of two types of disasters, namely hurricanes and mass shootings. A 5-point Likert scale online survey was used to collect data from individuals residing in the Rio Grande Valley. Participants were selected through a snowball sampling method. In addition, the study investigates the association between social determinants and stress.

DEDICATION

Primeramente, quisiera agradecer a mis padres, Dyna y Eliseo, por su amor incondiconal, apoyo, y por sus sacrificios de crear a sus hijos en un pais extranjero para poder darles un mañana mejor. To my siblings, Ezer, Vanessa, and Genesis, the sky is the limit.

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CHAPTER I

INTRODUCTION

1.1 Disasters under Climate Change

While the occurrence of a disaster seems to be few and far between, the reality is that disasters happen frequently (Statista, 2019). According to the United Nations, a disaster is defined as "a serious disruption of the functioning of a community or society involving widespread human, material, economic, or environmental losses and impacts, which exceeds the ability of the affected community or society to cope with using its resources" (United Nations, 2019). Disasters often occur with limited notice and cause long-lasting and extensive damage to a community (Clay, Greer, & Kendra, 2018). "Since 1980, the United States has sustained 241 weather and climate disasters where the overall damage costs reached or exceeded $1 billion (including adjustments based on the Consumer Price Index, as of January 2019). The cumulative cost for these 241 events exceeds $1.6 trillion." (NOAA Climate, 2019). In the last century, floods have claimed more lives and caused the greatest damage to property than any other natural disaster (Kousky, 2010). Communities in coastal regions are more susceptible to disasters and the scope of vulnerability widens due to lower geographic elevations and higher population densities than that of inland communities (Bathi & Das, 2016).

1.2 Increased Social Vulnerability and Preparedness

Disasters coupling with social vulnerability negatively impact death, causalities, loss of properties, and damages of crops resulting in deteriorating the quality of life (Cui & Han, 2019). To minimize negative impacts, disaster preparedness at both individual and organizational levels plays a vital role in coping with disasters and should be better understood. Evidently, the Federal Emergency Management Agency (FEMA) acknowledged the limited preparedness at the individual and community level and recognized that a one-size-fits-all strategy suitable to address preparedness does not exist. Thus, the agency placed its priority in allocating resources to enhance disaster preparedness among citizens and community members and cultivating a culture of preparedness by creating programs such as FEMA's Higher Education Program (FEMA, 2019). A recent experience with a disaster is one of the several possible factors that could influence the preparedness of individuals. As existing studies have shown, recency of a disaster experience has been positively associated with disaster preparedness (Hoffmann & Muttarak, 2017), and evacuation decision making (Kyne & Donner, 2018).

1.3 Individual Disaster Experience and Preparedness

Similarly, "several preparedness theories and approaches suggest that prior experience of earthquakes and other disasters influences the preparedness process (e.g. Protection Motivation Theory (Rogers, 1983); Person Relative to Event theory (Mulilis et al., 2003) – also summarized in Ejeta et al. (2015); the Protective Action Decision Model (Lindell and Perry, 2011); and the mental models approach (Bostrom, 2008) and Kyne–Donner Model of Authority's Recommendation and Hurricane Evacuation Decisions (Kyne and Donner, 2018). However, these and other studies have also identified how complex the experience-preparedness

relationship is, with different types of experience having a range of influences on the preparedness process (Becker, Paton, Johnston, Ronan, and McCluree, 2016)."

Direct experience is defined as being physically present during the disaster and directly experiencing the damage as whereas indirect or vicarious experience entails exposure to the disaster through interactions with people with direct experience, media outlets such as news broadcasts or social media, or having exposure to damage caused by the disaster such as volunteers assisting in relief efforts (Becker, Paton, Johnston, Ronan, & McClure, 2017).

Whereas indirect or vicarious experience, then, is defined as exposure to a disaster via secondary methods such as media, traditional news broadcast and/or social media usage without being physically present at the time the disaster event occurred. After the terrorist attacks that occurred in the United States on September 11, 2001, individuals from all over the world, such as Italy experienced the disaster and the damage caused even though they only witnessed the destruction through televised media coverage (Dougal, 2005).

1.4 Indirect Disaster Experience and Stress

While the increasing use of modern technological advancements to obtain information has augmented the level of disaster awareness and engagement in real-time or social media discussions, it has also altered the perception of threat in individuals (Lachlan, Spence, & Seeger, 2009). For instance, on November 2019, the American Psychological Association released the annual nationwide Stress in America article in which it revealed mass shootings as the most prevalent source of stress (71%) in U.S. adults and a predominate stressor in Hispanic adults (84%) (Association, 2019). Research has found that people who were exposed to a disaster event via mass media and did not have any association with a direct victim experienced similar

negative symptoms to the disaster (Pfefferbaum et al., 2014). Similarly, a research study conducted after the terroristic attacks on 9/11, examined 300 people that lived distant from where the attacks took place experienced reactions similar to victims that had directly been there at the time of the attracts (Dougal, 2005). Through repeated indirect experiences some individuals can develop negative psychological outcomes such as fear, depression, stress-related behaviors and post-traumatic stress (Hopwood, 2017).

PTSD is a disorder caused by traumatic events that have already occurred through direct experience. Symptoms include reliving the traumatic event and developing negative feelings or beliefs. The concept of pre-traumatic stress focuses on experiencing similar symptoms like the ones of PTSD but for events that have not happened. The symptoms of pre-traumatic stress occur from imagining a future potential disaster and the consequences it could create. Understanding the indirect experience of a disaster can have great benefits for a location that has a high poverty rate, and which is prone to natural disasters and can just as easily experience a man-made disaster.

The DSM-5 lists criterions that guide mental health professionals in diagnosing a person with PTSD but there is no such guide for pre-traumatic stress as it is not listed as a mental health disorder in the diagnostic manual (Publishing, 2018). According to the American Psychiatric Association, PTSD affects approximately 3.5 percent of U.S. adults with an estimate of 1 in 11 people will be diagnosed with PTSD in their lifetime (Parekh, 2017). It is a disorder that develops after experiencing or witnessing a disaster and produces symptoms such as re-experiencing, avoidance, arousal, and negative changes in feelings and beliefs that last longer than a few months (U.S. Department of Veterans Affairs, 2019)

Even though there is a steady increase in research on indirect experiences and pre-

traumatic stress the term pre-traumatic stress is a novel concept among mental health experts and implores further study as pre-traumatic symptoms similar to those of PTSD can be experienced by people that have not directly experienced a traumatic event (Hopwood, 2017). For that reason, studying the stressful experience of a hurricane or mass-shooting through the lens of pre-traumatic stress augments its significance. To constructively address the problem previously discussed, the following research questions have been formulated to better understand if people have a stressful experience of a future possible disaster and if demographic characteristics can be utilized to better understand the possible stressful experience of a future disaster event.

1.5 Research Questions

This study has three questions, which are:

Question 1. Do individuals have stressful experience of a future hurricane event?

Question 2. Do individuals have stressful experience of a future mass shooting event?

Question 3. Is there a difference in stressful experience of a future hurricane event compared to a mass shooting event?

CHAPTER II

LITERATURE REVIEW

2.1 Disasters in Texas

Until now, a total of 355 Disaster Declarations have been issued for the state of Texas. Accordingly, Texas has been ranked first in variety and frequency of natural and man-made disasters occurring in the United States (FEMA, 2020; Technology, 2017). For example, on August 27, 2018; the state of Texas encountered an atmospheric disaster named Hurricane Harvey. It made landfall as a category 4 hurricane along the coastal city of Rock Port, Texas, resulting in devastating damage to surrounding cities. Hurricane Harvey reached sustained wind speeds of 134 mph, dropped over 60 inches of rain on the Texas coast and a total of 68 casualties were directly caused by the storm. What started as a weak tropical storm rapidly intensified into what would be the next major hurricane to hit the United States in twelve years and the second-most costly hurricane to make landfall in the United States (Blake, 2018). With major disasters such as hurricanes individuals often know days in advance about the potential of a disaster and are encouraged to develop an emergency preparedness plan to respond if needed (N. D. Baker, 2014) such as knowing the risks to the area, preparing an emergency kit containing essentials such as no perishable food and water to sustain them for 72 hours after a disaster (Levac, Toal-Sullivan, & O'Sullivan, 2012).

Nearly one year later, the state of Texas experienced a different type of disaster known as an anthropogenic intentional disaster. On the morning of August 3, a 21-year-old gunman from Allen, Texas, armed with an A.K.-47 style rifle entered a Wal-Mart at a shopping center in El Paso, Texas, killing 22 and injuring 24 ("'Heroics in the face of violence': Inside University Medical Center of El Paso after the mass shooting" 2019). Twenty minutes before the gunman opened fire the gunman uploaded an anti-immigrant manifesto to a website popular within white supremacy circles. The shooting in El Paso was the first mass shooting of two that happened within 24 hours of each other. The Department of Justice called the shooting an act of domestic terrorism and has been described as the deadliest anti-Latino attack in the United States (Romo, 2019). Unlike with natural disasters such as hurricanes where individuals have time to prepare, research has shown that individuals encounter difficulty preparing for disasters of rare or unpredicted occurrence (N. D. Baker, 2014).

In fact, within the last five years, the state of Texas witnessed several major disasters that were widely publicized by modern technological channels such as The World Wide Web, traditional news broadcast as well as new social media applications (King, 2018). With the surge of modern technological advancements, large scale disaster reports have become increasingly accessible for public viewing consumption than in previous years (T. L. Hopwood, Schute, Nicola S., Lio, Natasha M, 2017). These advancements have demolished the constraints of geography to obtain accessible, up-to-date information on a disaster event (Jain, 2010) (T. L. Hopwood, Schute, Nicola S., Lio, Natasha M, 2017). Large scale disasters such as the 1995 Oklahoma City bombing, the terroristic attacks of September 11, and natural disasters such as the Indian Ocean Tsunami and Hurricane Katrina, have become more widely available to the public through traditional television (Pfefferbaum et al., 2014).

2.2 Individual Disaster Experience

To better comprehend the significance of this study it is important to fully comprehend the pathbreaking work by Robert J. Lifton in his book titled Death in Life Survivors of Hiroshima. His pioneer study in Japan provided insight into the effects a disaster can cause on an individual through indirect experience. Lifton was able to gain insight into emotional effects as well as extreme preparedness measures, such as opting for voluntary sterilization, to avoid future radioactive consequences caused by the bomb by documenting testimony of Hiroshima survivors seventeen years later (Lifton, 1967). Accordingly, improved understanding of indirect disaster experience will enable stakeholders not only in emergency management but in mental health to better disseminate resources aimed at creating resilience programs that support at-risk individuals.

How disaster experience relates or has an effect on disaster preparedness is complex however it is important to understand the different characteristics that contribute to disaster preparedness. Previous literature has found risk perception and self-efficacy as contributing indicators of disaster preparedness in cases of potential flooding and the preparedness measure of buying flood insurance (Anilan & Yuksek, 2017) Other factors are education, a person's knowledge and motivation to prepare (Levac et al., 2012) as well as ethnicity and income (Donner & Lavariega-Montforti, 2018). Classifying different characteristics that contribute to preparedness are covaried with how a person experiences a disaster.

Disaster preparedness becomes significantly important for vulnerable populations. Frequently, they lack financial and social resources to properly prepare and obtain adequate shelter for themselves or their families during a disaster event (David P. Eisenman, Cordasco, Asch, Golden, & Glick, 2007). Groups such as homeless individuals face disproportionate risks

during disasters due to their distinctive situations of poverty and social isolation. Older adults (over the age of 50) are also disproportionally affected they may lack social support from family or friends and findings show that they don't often have disaster plans in place (Ashida, Robinson, Gay, Slagel, & Ramirez, 2017). Race and ethnicity have also been highly associated with levels of preparedness, with Mexican-Americans and blacks being less prepared than Anglos (Fothergill, DeRouen Darlington, & Maestas, 1999). How vulnerable populations experience disasters is essential.

2.3 Indirect Experience and Stress

As humans, we are hardwired to detect signals of danger and are sensitive to direct or first-hand experience dangers as well as indirect exposure via secondary media (Heir, Blix, & Knatten, 2016; Neuberg, Kenrick, & Schaller, 2011; Wayment, 2004) and since being aware of disasters and preparedness is important to reduce the negative effects caused by a disaster (Tam, Huang, & Chan, 2018), viewing disaster preparedness as a health-promoting behavior may hold promise to key stakeholders involved in emergency management (David. P. Eisenman et al., 2009). Prior literature states that consumption of media related to disasters and large-scale threats has a significant effect on negative psychological outcomes and a form of secondary exposure to traumatic events may play a transiently causal role in the negative outcomes (Pfefferbaum et al., 2014) (T. L. Hopwood, Schute, Nicola S., Lio, Natasha M, 2017). In 2006 a satirical media and newspaper organization published an article titled "Report: More U.S. Soldiers Suffering From Pre-Traumatic Stress Disorder", which discussed the higher prevalence of young drafted soldiers experiencing sleepless nights and stress over future-related scenarios (ONION, 2006). This article prompted researchers to engage in studies related to trauma that had not yet occurred.

In conclusion, preparedness actions are complex and a straightforward way of understanding them is challenging. Understanding disaster preparedness entails a comprehensive scope that embraces direct experience, indirect experience, psychological responses as well as social determinants. Fundamentally, understanding the different constructs that contribute to disaster preparedness can reduce risk and promote strategies that increase resilience in communities and societies (Paton, 2018).

CHAPTER III

RESEARCH METHODS

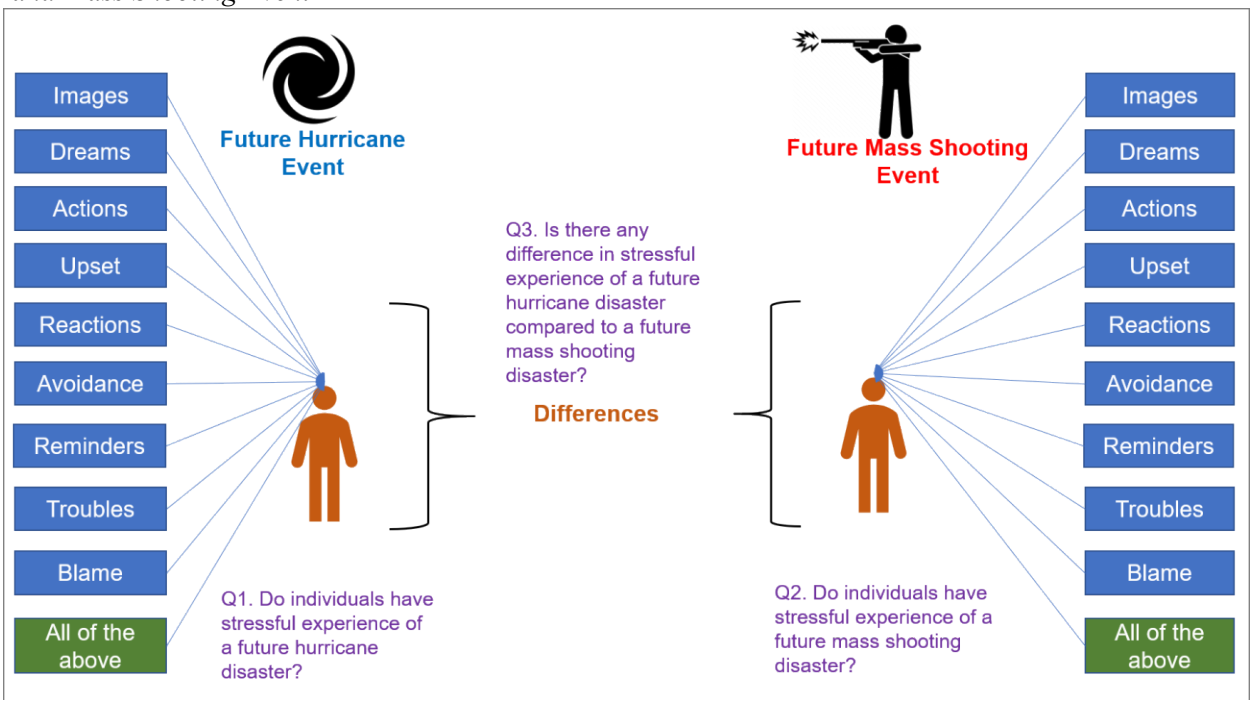
3.1 Conceptual Framework

The following chapter details the conceptual framework used for this study to further develop an understanding of indirect disaster experience and future potential disasters in the Rio Grande Valley.

Concepts important in furthering the understanding of the research questions and process are visually presented in Figure 1. Aiming to answer the following three research questions are: 1) do individuals have a stressful experience of a possible future hurricane disaster, 2) do individuals have a stressful experience of a possible future mass- shooting disaster, and 3) is there any difference in stressful experience between of a possible future hurricane disaster compared to a future mass shooting disaster. The three questions are measured using a Pre-traumatic Stress Reactions Checklist (PreCL), Temporally Reversed Items by Bernsten and Rubin, that was modified from the original civilian version of the Posttraumatic Stress Disorder Checklist (Berntsen & Rubin, 2015). Questions 1, 2, and 3 are analyzed through a PreCL self-report measure formulated towards a future event of: 1) images, 2) dreams, 3) actions, 4) upset, 5) reactions, 6) avoidance, 7) reminders, 8) troubles,

and 9) blame. As the stressful experience of a future possible hurricane event or mass shooting event has not occurred it is predicted that the 9 items being measured in the PreCL checklist form an independent aspect of phenomenology of PTSD as similar to the PreCL checklist used in the study by Bersnten and Rubin.

Figure 1 A Conceptual Framework Measuring Indirect Disaster Experience of Two Future Hurricane and Mass Shooting Event



3.2 Study Population

This study is comprised of individuals aged 18 and older living in counties Hidalgo, Cameron, and Star that form part of the Rio Grande Valley. It is a four-county region bordering Mexico and bounded on the south and southwest by the Rio Grande River, a boundary mark between The United States and Mexico (R. C. Baker & O.C., 1964). A unique geographical region, the Rio Grande Valley has a population of approximately 1.3 million individuals of which 92% are of Hispanic ethnicity and the population in the area is projected to increase

exponentially by 2030. Additionally, more than and 35% of the area's population live below the poverty line and educational attainment is comparatively lower in this region with only 63% obtaining a high school degree compared to 82% in Texas and 87% in the United States (Census, 2020). Similarly, this region is also characteristically defined by a large number of makeshift communities called "colonias" that lack potable water, sewage, and trash pick-up and are often housed by individuals with limited financial resources (Rivera, 2014).

Furthermore, environmental disasters are no stranger to the area. The Rio Grande Valley is prone to experiencing natural disasters such as hurricanes that originate in the Gulf of Mexico and often cause widespread flooding (Rivera, 2014). These factors exacerbate the negative consequences faced by Hispanic communities where receiving mental health services is poor due to a lack of mental health professionals and financial resources to afford treatment (Mykyta, Ghaddar, & Vela, 2018).

3.3 Data Collection and Sampling

Constructing the survey used for this study was centered on a measure created by Bernsten and Rubin that tested internal consistency, means, and correlations in comparison with the original PTSD Checklist (Berntsen & Rubin, 2015). Bersten and Rubin were interested in researching pre-traumatic stress reactions in soldiers being deployed to Afghanistan and whether they experienced stress reactions before being deployed. For the present study, in an attempt to better understand if a stressful experience of a future disaster is potentially possible without having direct experience with a disaster event, an instrument providing a future-oriented comparison to negative stress reactions as described in the diagnostic criteria for PTSD (Berntsen & Rubin, 2015). The online survey questionnaire was compartmentalized in three data

collection parts: (1) a stressful experience of a future mass hurricane disaster; (2) a stressful experience of a future mass shooting disaster, and (3) socio- demographic characteristics: gender, language, ethnicity, race, educational attainment, employment, income and county of residence. The instrument is formulated to ask the participant questions about problems and complaints that people can have before a possible stressful life event, such as a hurricane or mass shooting. It was important to formulate and reword 9 questions specifically for a hurricane disaster, and then use the same 9 questions formulated and reworded specifically for a mass shooting disaster. Therefore, a total of 18 questions were compartmentalized in two sections of the following manner (1) Repeated, disturbing and unwanted images of a possible future hurricane disaster-related stressful experience? and (2) Repeated, disturbing and unwanted images of a possible future mass shooting related stressful experience?

Subsequently, nine questions sectioned for a hurricane disaster and information of the most recent hurricane impacting Texas was provided. Additional to the information, three visuals of a hurricane were included: (1) Hurricane track of Hurricane Harvey, (2) Damage caused by Hurricane Harvey and (3) Infographic data of Hurricane Harvey. Similarly, two visuals of a mass shooting were included: (1) Damage caused by mass shooting and (2) Infographic data of mass shooting events, were presented of the most recent mass shooting that occurred in Texas.

Based on previous literature discussed, quantitative research methodologies were best suited to address the three research questions. After attaining IRB approval, data collection process was initiated utilizing an online Likert scale survey questionnaire of 29 questions. The online survey questionnaire was sent out to undergraduate students in a Disasters and Society course and graduate students that had previously taken Disasters and Society and Geographical Information Systems course at the University of Texas Rio Grande Valley. The study was also

sent out to non-student individuals living in the Rio Grande Valley by email, text messages, and social media (Facebook, Instagram, and Snapchat) that were friends, family or colleagues of the initial UTRGV students. Utilizing snowball sampling, the initial individuals recruited for the survey were then asked to send the online survey questionnaire to an additional three persons who met two criteria: (1) close contacts who did not form part of the same household and (2) lived in the Rio Grande Valley. Emails, text messages and social media interactions consisted of the initial contact with two follow-up reminders.

A total of 160 participants. initiated the online survey questionnaire. However, 47 observations were removed due to a lack of completion, leaving a total of 113 useful observations. The sample was comprised of 40 UTRGV students and 73 non-students. At the beginning of the study, much higher participant response was anticipated however data collection was stopped prematurely due to uncertainty faced upon a fluid state of Coronavirus Pandemic affecting the community of the Rio Grande Valley.

3.4 Data Analysis

For this study, three separate analyses were performed and responses from the same participant were analyzed and used to compare (1) a stressful experience of future hurricane disaster and (2) a stressful experience of a future mass shooting disaster.

First, descriptive analysis was used to understand the sociodemographic characteristics of the respondents who participated in this study. To obtain the descriptive analysis, tabulation was generated using STATA statistical program. Second, for questions 1 and 2, a different descriptive analysis was used to tabulate the answers of yes and no for each of the eight different variables related to stressful experience. Third, a paired t-test (for matched samples) was conducted to test for a difference between the paired means. This approach is appropriate for this

study as samples consisted of paired data with normally distributed mean differences. Let n=sample size. Let X_{ij}, i = 0; 1; j = 1, , n_i be the observations from two independent samples.

n-1= degrees of freedom (df). Let X_d=sample mean difference (Xu et al., 2017).

$$T_2 = \frac{X_d}{\sqrt{\frac{1}{n(n-1)}\sum_{j=1}^{n}\left(X_{ji} - \bar{X}_d\right)}}$$

3.5 Validity and Reliability

Though the results of a study are important and considerable attention is given to the results, the quality of how the study was conducted, such as study's validity and reliability is equally important and should be given proper attention. Being able to develop a measure that adequately represents what is being studied allows for future researchers to replicate the study.

The validity of the study is defined by how well the concept being measured is accurately measured in the survey design used to conduct the study and assessed by content validity, face validity and criterion validity (Xu et al., 2017). Equally important is the reliability of the study which relates to the consistency of the survey and can be calculated by three attributes: internal consistency, stability, and equivalence (Xu et al., 2017). Reliability was calculated using Cronbach's Alpha reliability test for the survey instrument for stressful experience to a future hurricane event (α-.93) (Table 1). Similarly, Cronbach's Alpha reliability test for stressful experience to a future mass shooting event was also calculated (.94), yielding high internal consistency for both survey instruments (Table 2) similar to the results obtained by Bernsten and Rubin.

Table 1 Cronbach's Alpha Reliability Test for Survey Instrument for Stressful Experience Related to a Future Hurricane Event

Item	Obs	Sign	verage item-test correlation	correlation	a item-rest correlation	interitem alpha
images_h	113	+	0.7157	0.6355	0.6158	0.9277
dream_h	113	+	0.8624	0.8193	0.5786	0.9165
act_h	113	+	0.8474	0.8002	0.5824	0.9177
upset_h	113	+	0.8219	0.7678	0.5890	0.9198
physical_h	113	+	0.8054	0.7472	0.5933	0.9211
avoid_h	111	+	0.7964	0.7362	0.5952	0.9217
remind_h	113	+	0.7993	0.7395	0.5949	0.9215
trouble_h	113	+	0.8533	0.8076	0.5809	0.9173
blame_h	113	+	0.6958	0.6127	0.6215	0.9293
Test scale					0.5946	0.9296

Table 2 Cronbach's Alpha Reliability Test for Survey Instrument for Stressful Experience Related to a Future Mass Shooting Event

Item	Obs	Sign	verage item-test correlation	correlation	a item-rest correlation	interitem alpha
images_m	113	+	0.8216	0.7692	0.6390	0.9340
dream_m	113	+	0.8173	0.7640	0.6398	0.9342
act_m	112	+	0.8709	0.8316	0.6251	0.9303
upset_m	112	+	0.8365	0.7878	0.6342	0.9327
physical_m	112	+	0.8506	0.8058	0.6305	0.9318
avoid_m	112	+	0.8453	0.7988	0.6318	0.9321
remind_m	111	+	0.8850	0.8497	0.6208	0.9291
trouble_m	112	+	0.8129	0.7579	0.6401	0.9343
blame_m	112	+	0.6731	0.5879	0.6773	0.9438
Test scale					0.6376	0.9406

CHAPTER IV

RESULTS

4.1 Descriptive Statistics

The following demographic characteristics included in the online survey questionnaire are shown in Table 3..

The study showed the sample was made up of predominantly female participants. The majority of participants were English speaking and classified themselves as White and of Hispanic ethnicity. The majority of the participants had an educational attainment of some college but no degree or higher. The study was also predominantly comprised of students and reported income of less than $25,000 or between $25,000-$50,000. The sample of the study was predominantly from Hidalgo County.

Table 3 Demographic Characteristics of Participants

		N	Percent	Cumulative Percent
Gender	Female	68	61.26	61.26
	Male	39	35.14	96.4
	Others	4	3.6	100
Language	English	64	57.66	57.66
	Spanish	42	37.84	95.5
	Other	5	4.5	100
Hispanic	Yes	106	95.5	95.5
	No	5	4.5	100
Race	White	91	82.73	82.73
	Black or African American	2	1.82	84.55
	Others	17	15.45	100

Education Attainment	Some High School (No Diploma)	3	2.73	2.73
	High School Graduate or GED	14	12.73	15.45
	Some College but No Degree	34	30.91	46.36
	Associate degree	31	28.18	74.55
	Bachelor's Degree	23	20.91	95.45
	Master's Degree	5	4.55	100
Employment	Work full-time	38	34.23	34.23
	Work part-time	22	19.82	54.05
	Student	40	36.04	90.09
	Unemployed	8	7.21	97.3
	Retired	2	1.8	99.1
	Other	1	0.9	100
Income	Less than $25,000	32	28.83	28.83
	$25,000 to less than $50,000	31	27.93	56.76
	$50,000 to less than $75,000	14	12.61	69.37
	$75,000 or more	18	16.22	85.59
	Don't know/Would rather not say	16	14.41	100
County of residence	Hidalgo	96	88.07	88.07
	Cameron	10	9.17	97.25
	Starr	3	2.75	100

4.2 Stressful Experience of a Future Hurricane Event

The study emphasized nine variables, namely images, dreams, actions, upset, reactions, avoidance, reminders, troubles, and blame which are related to a future hurricane disaster event and stressful experience. The purpose of this analysis is to see whether respondents experience a stressful experience of a future hurricane disaster event. Five answer choices, which include (1) Not at all, (2) A little bit, (3) Moderately, (4) Quite a bit, and (5) Extremely were provided in each of the nine questions for a future hurricane disaster event. To analyze the data, the 5 Likert Scale was converted to a dichotomic scale of yes/no by recoding (1) Not at all as “Yes” and the other choices which include (2) A little bit, (3) Moderately, (4) Quite a bit, and (5) Extremely as “No.”

Findings are visually presented in Table 4. and Figure 2. For question one, 71% of individuals experience reported, disturbing and unwanted images of a future hurricane- related stressful experience and 29% do not. Relative to dreams, findings show 50% experience repeated, disturbing dreams of a possible future hurricane related stressful experience and equally, 50% do not therefore, no statistical significance is represented in question 2. Relative to

actions, 53% experience acting or feeling as if a possible future hurricane-related stressful experience were already happening and 47% do not. Relative to feeling upset, 53% feel very upset when something reminded them of a possible future hurricane-related event and 47% do not. Relative to having strong physical reactions, 42% experience strong physical reactions and 58% do not. Question six, 53% of respondents avoided images, thoughts or feelings of a possible future hurricane event whereas 47% do not. For question seven, 48% reported avoiding external reminders of a possible future hurricane event whereas 52% do not. For question eight, 53% of participants reported experiencing trouble imagining important parts of a future hurricane-related stressful experience whereas 47% do not. Finally, for question nine, 27% of participants reported blaming themselves or someone else for a possible future hurricane-related stressful experience and 73% do not.

A proportion test was performed to check if the probability of answering "yes" is greater than "no" in each of the nine causes. Findings revealed that the probability of answering "yes" was greater than "no" and is statistically significant in only images (Table 4, Appendix: One Sample T-Test).

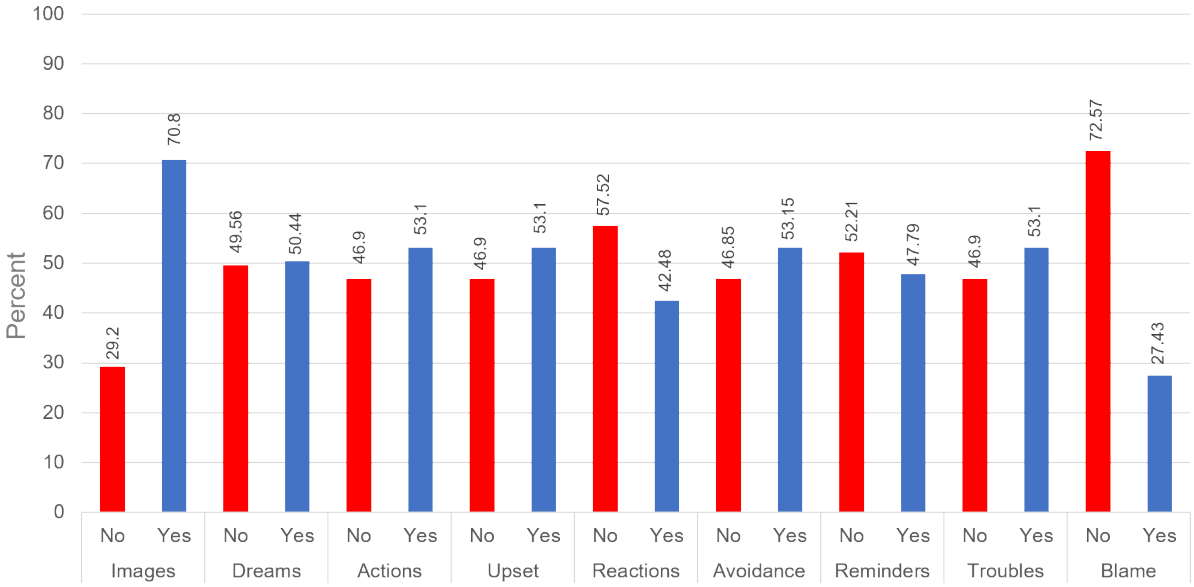
Table 4 Stressful experience by causes related a future hurricane event

No.	Stressful experience causes	No=1, Yes=2	N	Percent	Cumulative Percent
1	Images***	1	33	29.2	29.2
		2	80	70.8	100
2	Dreams	1	56	49.56	49.56
		2	57	50.44	100
3	Actions	1	53	46.9	46.9
		2	60	53.1	100
4	Upset	1	53	46.9	46.9
		2	60	53.1	100
5	Reactions	1	65	57.52	57.52
		2	48	42.48	100
6	Avoidance	1	52	46.85	46.85
		2	59	53.15	100
7	Reminders	1	59	52.21	52.21
		2	54	47.79	100

8	Troubles	1	53	46.9	46.9
		2	60	53.1	100
9	Blame	1	82	72.57	72.57
		2	31	27.43	100

Note: *** p>0.001, ** p>0.01, * p>0.05

Figure 2 Stressful experience by causes related to a future hurricane event



4.3 Stressful Experience of a Future Mass Shooting Event

Similarly, this study emphasized nine variables, images, dreams, actions, upset, physical, avoidance, reminders, trouble, blame which are related to a future mass shooting disaster event and stressful experience The purpose of this analysis is to see if each respondent expressed their indirect disaster experiences in a mass shooting event. Five answer choices, which include (1) Not at all, (2) A little bit, (3) Moderately, (4) Quite a bit, and (5) Extremely were provided in each of the nine questions for the two future disaster events, namely hurricane and mass shooting events.

To analyze the data, the 5 Likert Scale was converted to a dichotomic scale of yes/no by recoding (1) Not at all as “Yes” and the other choices which include (2) A little bit, (3)

Moderately, (4) Quite a bit, and (5) Extremely as "No." Findings are visually presented in Table 5. And Figure 3.

In question one, 71% experience repeated, disturbing and unwanted images of a future mass shooting-related stressful experience and 19% do not. Question two 68% experience repeated disturbing dreams of a possible future hurricane-related stressful experience and 32% do not. Question three, 68% experience acting or feeling as if a possible future hurricane-related stressful experience were already happening and 32% do not. Question four, 80% feel very upset when something reminded them of a possible future hurricane related event and 20% do not. Question five, 64% experience strong physical reactions and 36% do not. Question six, 71% of respondents avoided images, thoughts or feelings of a possible future hurricane event and 29% do not. For question seven, 67% avoided external reminders of a possible future hurricane event and 33% do not. For question eight, 67% of participants reported experiencing trouble imagining important parts of a future hurricane-related stressful experience and 33% do not. Finally, for question nine, 46% of participants reported blaming themselves or someone else for a possible future hurricane-related stressful experience and 54% do not. A proportion test was performed to check if the probability of answering "yes" is greater than "no" in each of the nine causes. Findings revealed that the probability of answering "yes" was greater than "no" is statistically insignificant in reactions and blame (Table 5).

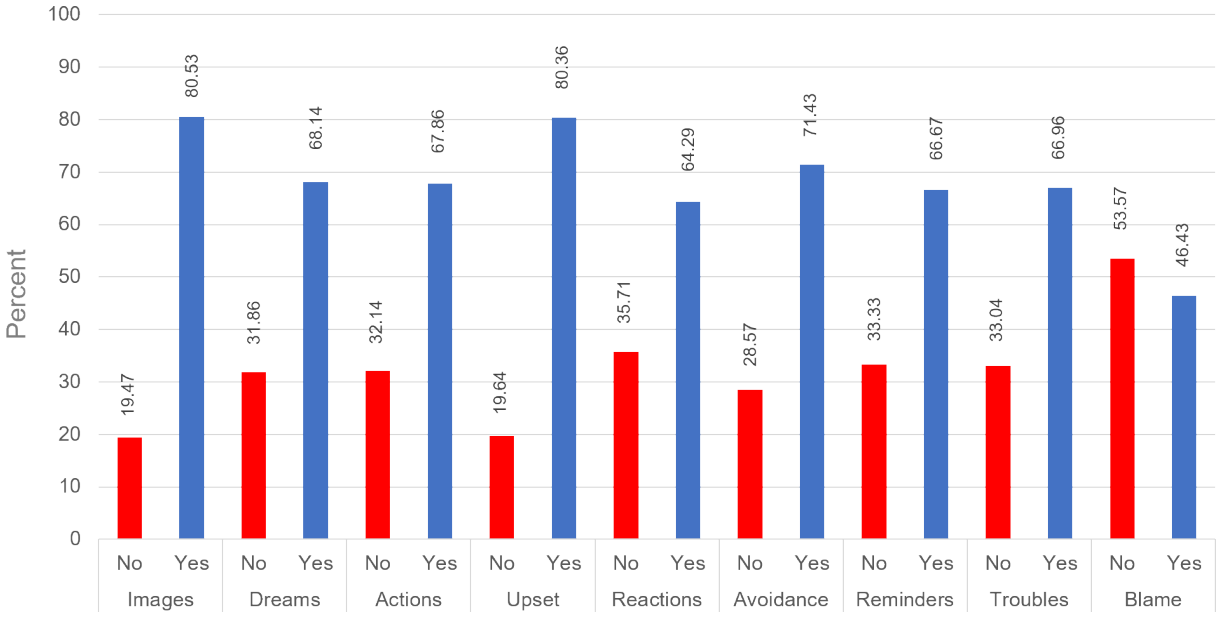
Table 5 Stressful experience by causes related to a future mass shooting event

No.	Stressful experience causes	No=1, Yes=2	N	Percent	Cumulative Percent
1	Images***	1	22	19.47	19.47
		2	91	80.53	100
2	Dreams***	1	36	31.86	31.86
		2	77	68.14	100
3	Actions***	1	36	32.14	32.14
		2	76	67.86	100
4	Upset***	1	22	19.64	19.64
		2	90	80.36	100
5	Reactions	1	40	35.71	35.71
		2	72	64.29	100

6	Avoidance***	1	32	28.57	28.57
		2	80	71.43	100
7	Reminders***	1	37	33.33	33.33
		2	74	66.67	100
8	Troubles***	1	37	33.04	33.04
		2	75	66.96	100
9	Blame	1	60	53.57	53.57
		2	52	46.43	100

Note: *** p>0.001, ** p>0.01, * p>0.05

Figure 3 Stressful experience by causes related to a future mass shooting event



4.4 Differences in Stressful Experience of a Future Hurricane Event Compared to a Future Mass Shooting Event

The purpose of this analysis is to see if each respondent expressed their indirect disaster experiences in a hurricane event and a mass shooting event differently. Five answer choices, which include (1) Not at all, (2) A little bit, (3) Moderately, (4) Quite a bit, and (5) Extremely were provided in each of the nine questions for the two future disaster events, namely hurricane and mass shooting events.

During this study, it was found that individuals experienced higher stressful experiences of a future mass shooting disaster event when compared to a future hurricane disaster event.

1. Stressful experience caused by repeated, disturbing and unwanted images

Table 6 A paired t-test for difference of stressful experience caused by repeated, disturbing and unwanted images of a possible future mass shooting event compared to a possible future hurricane event

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
images_m	113	2.867257	.120906	1.285249	2.627697	3.106816
images_h	113	2.469027	.1199655	1.275251	2.23133	2.706723
diff	113	.3982301	.1285309	1.366303	.1435625	.6528976

```
     mean(diff) = mean(images_m - images_h)                        t
 =                                                          3.0983 Ho:
 mean(diff) = 0                                             degrees of freedom
 =                                                          112

 Ha: mean(diff) < 0           Ha: mean(diff) != 0           Ha:
 mean(diff) > 0 Pr(T < t) = 0.9988                          Pr(|T|
 > |t|) = 0.0025            Pr(T > t) = 0.0012
```

A paired t-test was run on a sample of 113 participants to examine if there was a difference in stressful experience caused by repeated, disturbing and unwanted images of a possible future mass shooting event compared to a possible future hurricane event. Participants had more stressful experience in mass shooting experience (2.867 ± 1.128) as opposed to the hurricane event (2.469 ± 1.275); a statistically significant increase of 0.398 (95% CI, 0.1435 to 0.6528), t(112)=3.098, p<0.005.

2. Stressful experience caused by repeated, disturbing dreams

Table 7 A paired t-test for difference of stressful experience caused by repeated, disturbing and unwanted dreams of a possible future mass shooting event compared to a possible future hurricane event

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]

dream_m	113	2.504425	.125787	1.337134	2.255194	2.753656
dream_h	113	2.061947	.1187823	1.262673	1.826595	2.297299
diff	113	.4424779	.1130949	1.202216	.2183948	.666561

```
    mean(diff) = mean(dream_m - dream_h)                           t
=                                                          3.9124 Ho:
mean(diff) = 0                                             degrees of freedom
=
                                                           112

Ha: mean(diff) < 0           Ha: mean(diff) != 0           Ha:
mean(diff) > 0 Pr(T < t) = 0.9999                          Pr(|T|
> |t|) = 0.0002            Pr(T > t) = 0.0001
```

A paired t-test was run on a sample of 113 participants to examine if there was a difference in stressful experience caused by repeated, disturbing and unwanted dreams of a possible future hurricane event compared to a possible future mass shooting event. Participants reported a higher stressful experience in a mass shooting event (2.504 ± 1.337) as opposed to a hurricane event (2.061 ± 1.262); a statistically significant increase of 0.442 (95% CI, 0.2183 to 0.6665), t(112)=3.912, p<0.005.

3. Stressful experience caused by suddenly acting or feeling as if a possible future disaster event

Table 8 A paired t-test for difference of stressful experience caused by suddenly acting or feeling as if a possible future event of mass shooting compared to a possible future hurricane event

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
act_m	112	2.428571	.1214683	1.2855	2.187874	2.669269
act_h	112	1.964286	.1029867	1.089909	1.760211	2.168361

diff	112	.4642857	.0948552	1.003854	.2763237	.6522477

mean(diff) = mean(act_m - act_h) t = 4.8947 Ho: mean(diff) = 0 degrees of freedom = 111

Ha: mean(diff) < 0 Ha: mean(diff) != 0 Ha: mean(diff) > 0 Pr(T < t) = 1.0000 Pr(|T| > |t|) = 0.0000 Pr(T > t) = 0.0000

A paired t-test was run on a sample of 112 participants to examine if there was a difference in stressful experience caused by suddenly acting or feeling as if a possible future mass shooting event were already happening compared to a possible future hurricane event. Participants reported a higher stressful experience in mass shooting event (2.428 ± 1.285) as opposed to a hurricane event (1.964 ± 0.102); a statistically significant increase of 0.464 (95% CI, 0.2763 to 0.6522), t(111)=4.894, p<0.005.

4. Stressful experience caused by feeling very upset when something reminded you of a possible future disaster event

Table 9 A paired t-test for difference of stressful experience caused by feeling very upset when something reminded you of a possible future mass shooting compared to a possible future hurricane event

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
upset_m	112	2.883929	.1247556	1.320289	2.636717	3.13114
upset_h	112	1.928571	.1043722	1.104571	1.721751	2.135392
diff	112	.9553571	.1165161	1.23309	.7244728	1.186242

mean(diff) = mean(upset_m - upset_h) t = 8.1994 Ho: mean(diff) = 0 degrees of freedom = 111

Ha: mean(diff) < 0 Ha: mean(diff) != 0 Ha:

```
mean(diff) > 0 Pr(T < t) = 1.0000                         Pr(|T|
> |t|) = 0.0000          Pr(T > t) = 0.0000
```

A paired t-test was run on a sample of 112 participants to examine if there was a difference in stressful experience caused by repeated, disturbing and unwanted images of a possible future mass shooting event compared to a possible future hurricane event. Participants reported higher stressful experience in mass shooting event (2.883 ± 1.320) as opposed to a hurricane event (1.928 ± 1.104); a statistically significant increase of 0.955 (95% CI, 0.7244 to 1.1862), t(111)=8.199, p<0.005.

5. Stressful experience caused by feeling very upset when something reminded you of a possible future disaster event

Table 10 A paired t-test for difference of stressful experience caused by having strong physical reactions (e.g., heart pounding, trouble breathing, sweating) when something reminded you of a possible future mass shooting compared to a possible future hurricane event

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
physi~_m	112	2.419643	.1253299	1.326367	2.171293	2.667992
physi~_h	112	1.767857	.1038064	1.098583	1.562158	1.973556
diff	112	.6517857	.1194622	1.264269	.4150635	.888508

```
     mean(diff) = mean(physical_m - physical_h)                    t
=                                                          5.4560 Ho:
mean(diff) = 0                                             degrees of freedom
=                                                          111

Ha: mean(diff) < 0           Ha: mean(diff) != 0           Ha:
mean(diff) > 0 Pr(T < t) = 1.0000                         Pr(|T|
> |t|) = 0.0000          Pr(T > t) = 0.0000
```

A paired t-test was run on a sample of 112 participants to examine if there was a difference in stressful experience caused by having strong physical reactions (e.g. heart

pounding, breathing, sweating) when something reminded them of a possible future mass shooting event compared to a possible future hurricane event. Participants reported higher stressful experience in mass shooting event (2.419 ± 1.326) as opposed to a hurricane event (1.767 ± 1.098); a statistically significant increase of 0.651 (95% CI, 0.4150 to 0.8885), t(111)=5.456, p<0.005.

6. Stressful experience caused by avoiding imaginings, thoughts or feelings related to a possible future disaster event

Table 11 A paired t-test for difference of stressful experience caused by avoiding imaginings, thoughts or feelings related to a possible future mass shooting compared to a possible future hurricane event

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
avoid_m	110	2.645455	.1314488	1.378647	2.384927	2.905982
avoid_h	110	2.018182	.1118365	1.172951	1.796526	2.239838
diff	110	.6272727	.1297069	1.360377	.370198	.8843475

```
    mean(diff) = mean(avoid_m - avoid_h)                          t
=                                                  4.8361 Ho:
mean(diff) = 0                                     degrees of freedom
=                                                  109

Ha: mean(diff) < 0           Ha: mean(diff) != 0           Ha:
mean(diff) > 0 Pr(T < t) = 1.0000                          Pr(|T|
> |t|) = 0.0000            Pr(T > t) = 0.0000
```

A paired t-test was run on a sample of 110 participants to examine if there is a difference of stressful experience caused by avoidance of images or feelings related to a possible future mass shooting event compared to a possible future hurricane event. Participants reported higher stressful experience in mass shooting event (2.645 ± 1.378) as opposed to a hurricane event

(2.018 ± 1.172; a statistically significant increase of 0.627 (95% CI, 0.3701 to 0.8843), t(109)=4.836, p<0.005.

7. Stressful experience caused by avoiding external reminding's of a possible future disaster

Table 12 A paired t-test for difference of stressful experience caused by avoiding external reminding's of a possible future mass shooting compared to a possible future hurricane event

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
remind_m	111	2.387387	.1228725	1.294542	2.143883	2.630892
remind_h	111	1.90991	.1051885	1.10823	1.701451	2.118369
diff	111	.4774775	.1199555	1.26381	.2397538	.7152012

mean(diff) = mean(remind_m - remind_h) t = 3.9805
Ho: mean(diff) = 0 degrees of freedom = 110

Ha: mean(diff) < 0 Pr(T < t) = 0.9999
Ha: mean(diff) != 0 Pr(|T| > |t|) = 0.0001
Ha: mean(diff) > 0 Pr(T > t) = 0.0001

A paired t-test was run on a sample of 111 participants to examine if there was a difference in stressful experience caused by avoidance of external reminding's of a possible future mass shooting event compared to a possible future hurricane event. Participants reported higher stressful experience in mass shooting event (2.387 ± 1.294) as opposed to a hurricane event (1.909 ± 1.108); a statistically significant increase of 0.477 (95% CI, 0.2397 to 0.7152), t(110)=3.980, p<0.005.

8. Stressful experience caused by trouble imagining important parts of a possible future disaster event

Table 13 A paired t-test for difference of stressful experience caused by trouble imagining important parts of a possible future mass shooting event compared to a possible future hurricane event

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
troub~_m	112	2.410714	.1239847	1.31213	2.16503	2.656398
troub~_h	112	1.964286	.107571	1.138424	1.751127	2.177445
diff	112	.4464286	.1168269	1.23638	.2149282	.677929

```
     mean(diff) = mean(trouble_m - trouble_h)                      t
 =                                                          3.8213 Ho:
 mean(diff) = 0                                             degrees of freedom
 =                                                          111

 Ha: mean(diff) < 0           Ha: mean(diff) != 0           Ha:
 mean(diff) > 0 Pr(T < t) = 0.9999                          Pr(|T|
 > |t|) = 0.0002            Pr(T > t) = 0.0001
```

A paired t-test was run on a sample of 112 participants to examine if there was a difference in stressful experience caused by trouble imagining important parts of a possible future mass shooting event compared to a possible future hurricane event. Participants reported higher stressful experience in mass shooting event (2.410 ± 1.312) as opposed to a hurricane event (1.964 ± 1.138); a statistically significant increase of 0.446 (95% CI, 0.2149 to 0.6779), $t(111)=3.821$, $p<0.005$.

9. Stressful experience caused by blaming yourself or someone else for a possible future disaster event

Table 14 A paired t-test for difference of stressful experience caused by blaming yourself or someone else for a possible future mass shooting compared to a possible future hurricane event

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
blame_m	112	1.928571	.1160498	1.228155	1.698611	2.158532
blame_h	112	1.5625	.1004985	1.063576	1.363356	1.761644
diff	112	.3660714	.106871	1.131017	.1542993	.5778435

```
    mean(diff) = mean(blame_m - blame_h)                          t
=                                                          3.4254 Ho:
mean(diff) = 0                                             degrees of freedom
=

                                                           111

Ha: mean(diff) < 0           Ha: mean(diff) != 0           Ha:
mean(diff) > 0 Pr(T < t) = 0.9996                          Pr(|T|
> |t|) = 0.0009            Pr(T > t) = 0.0004
```

A paired t-test was run on a sample of 112 participants to examine if there was a difference in stressful experience caused by blaming themselves or someone else for a possible future mass shooting event compared to a possible future hurricane event. Participants reported higher stressful experience in mass shooting event (1.928 ± 1.228) as opposed to a hurricane event (1.562 ± 1.063); a statistically significant increase of 0.366 (95% CI, 0.1542 to 0.5778), $t(111)=3.425$, $p<0.005$.

10. Stressful experience caused by all of the above causes related to a possible future disaster event

An overall score was computed by summing the score of each of the nine questions to test for a difference of stressful experience caused by all of the above causes related to a possible future mass shooting compared to a possible future hurricane event and is important to calculate.

Table 15 A paired t-test for difference of stressful experience caused by all of the above causes related to a possible future mass shooting compared to a possible future hurricane event

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
all_m	109	22.66055	.9236225	9.642902	20.82977	24.49133
all_h	109	17.79817	.7943245	8.292991	16.22368	19.37265
diff	109	4.862385	.7482529	7.81199	3.379218	6.345552

```
    mean(diff) = mean(all_m - all_h)                              t
=                                                          6.4983 Ho:
mean(diff) = 0                                             degrees of freedom
=                                                          108

Ha: mean(diff) < 0           Ha: mean(diff) != 0           Ha:
mean(diff) > 0 Pr(T < t) = 1.0000                          Pr(|T|
> |t|) = 0.0000            Pr(T > t) = 0.0000
```

A paired t-test was run on a sample of 109 participants to examine if there was a difference in stressful experience caused by all of the above causes related to a possible future mass shooting event compared to a possible future hurricane event. Participants reported higher stressful experience in mass shooting event (22.660 ± 9.642) as opposed to a hurricane event (17.798 ± 8.292); a statistically significant increase of 4.862 (95% CI, 3.3792 to 6.3455), $t(108)=6.498$, $p<0.005$.

CHAPTER V

DISCUSSION

5.1 What contribute to stressful experience of a future hurricane event

The study's findings revealed that the following factors that more respondents answered "yes" in the following items for a stressful experience during a future hurricane event. Only "images" is statistically significant in probability of answering "yes" than "no". :

- Cause 1: Images
- Cause 2: Dreams
- Cause 3: Actions
- Cause 4: Upset
- Cause 6: Avoidance
- Cause 8: Troubles

One possible reason as to why individuals in the Rio Grande Valley reported higher "yes" answer with images is that the repeated televised material during a disaster event as well as ease of obtaining information depicting the damage caused by natural disasters through social media channels such as Twitter and Facebook (T. L. Hopwood & Schutte, 2017). In contrast, items that did not cause significant levels of stressful experience with a disaster such as reactions, reminders, and blame could be contributed to higher levels of self-efficacy in

preparedness measures when confronted by a possible future hurricane disaster. (Ryan, Rohrbeck, & Wirtz, 2018).

5.2 What contribute to stressful experience of a future mass shooting event

The study's findings revealed that more respondents answered "yes" in the following causes for a stressful experience during a future hurricane event. Both reaction and blame are statistically insignificant in probability of answering "yes" than "no".

- Cause 1: Images
- Cause 2: Dreams
- Cause 3: Actions
- Cause 4: Upset
- Cause 5: Reactions
- Cause 6: Avoidance
- Cause 7: Reminders
- Cause 8: Troubles

Individuals experience higher stressful experiences to a mass shooting disaster, this could possibly be due to lack of feeling adequality prepared to respond due to unpredictability of occurrence as well as lacking previous direct experience to a man-made disaster (Paton, 2018). Furthermore, accessibility to repeated media content of negative outcomes caused by a mass shooting can contribute to higher stressful experience (T. L. Hopwood, Schute, Nicola S., Lio, Natasha M, 2017).

While factors were significantly higher for a man-made disaster, it is important to note that reactions and blame did not cause a high statistical stressful experience. Perhaps, people do

not experience self-blame or blame someone else, such as emergency responders for a mass shooting future disaster event because the may attribute mental illness or helplessness to prevent a to prevent the disaster from happening (Metzl & MacLeish, 2015) .

5.3 The different level of stressful experience associated with type of disasters

The study examined the different level of stressful experience associated with the type of disasters. The findings are summarized as follows:

1. Stressful experience caused by repeated, disturbing and unwanted images
    - Participants had more stressful experience in mass shooting experience as opposed to the hurricane event
2. Stressful experience caused by repeated, disturbing dreams
    - Participants had more stressful experience in mass shooting experience as opposed to the hurricane event
3. Stressful experience caused by suddenly acting or feeling as if a possible future disaster event
    - Participants had more stressful experience in mass shooting experience as opposed to the hurricane event
4. Stressful experience caused by feeling very upset when something reminded you of a possible future disaster event
    - Participants had more stressful experience in mass shooting experience as opposed to the hurricane event

5. Stressful experience caused by feeling very upset when something reminded you of a possible future disaster event

- Participants had more stressful experience in mass shooting experience as opposed to the hurricane event

6. Stressful experience caused by avoiding imaginings, thoughts or feelings related to a possible future disaster event

- Participants had more stressful experience in mass shooting experience as opposed to the hurricane event

7. Stressful experience caused by avoiding external reminding's of a possible future disaster

- Participants had more stressful experience in mass shooting experience as opposed to the hurricane event

8. Stressful experience caused by trouble imagining important parts of a possible future disaster event

- Participants had more stressful experience in mass shooting experience as opposed to the hurricane event

9. Stressful experience caused by blaming yourself or someone else for a possible future disaster event

- Participants had more stressful experience in mass shooting experience as opposed to the hurricane event

10. Stressful experience caused by all of the above causes related to a possible future disaster event

- Participants had more stressful experience in mass shooting experience as opposed to the hurricane event

In a nutshell, the level of stressfulness in mass shooting is greater than the level in hurricane event. The findings are in line with the findings reported in the Stress in America 2019 by the American Psychological Association (APA). The findings showed that "more than six in 10 adults (62%) stated that mass shootings were a significant source of stress in 2018, this figure increased to more than seven in 10 adults (71%) in 2019 (A(Association, 2019)PA, 2019)" This study includes more than 95% of Hispanics and the report further indicated that "Hispanic adults are the most likely in both years to cite mass shootings as a significant source of stress (84% in 2019 and 76% in 2018) (APA, 2019)."

CHAPTER VI

CONCLUSION AND RECOMMENDATION

6.1 Conclusion

This study's goal is to empirically investigate if individuals have a stressful experience of a future disasters and if the stress level differ with types of disaster (natural or man-made). The stress level was measured with nine questions focusing on causes, namely images, dreams, upset, actions, avoidance, reactions, reminders, troubles, blame. An online survey instrument was utilized to collect the data. A total of 113 observations were used for data analysis. Findings indicated that in a hurricane event, more respondents answered "yes" in images, dreams, actions, upset, avoidance, and troubles which caused them stressful experience whereas in a mass shooting event, the respondents also provided more "yes" in images, dreams, actions, upset, reactions, avoidance, reminders, and troubles than "no." In addition, overall respondents indicated that they had greater level of stress in mass shooting event. The difference was observed statistically significant.

This study aimed to further the understanding of whether individuals can experience disasters indirectly through stressful future experiences of a disaster as well as expanding the understanding of demographic characteristics unique to the population in the Rio Grande Valley. By conducting a study in a unique geographical location prone to natural disasters such as hurricanes and flooding along with a high Hispanic population that is often marginalized in

disaster preparedness efforts (David. P. Eisenman et al., 2009) this study is able to shed light for

the first time of how individuals living in a predominantly Hispanic community indirectly experience a hurricane and mass shooting disaster by stress.

As with any study, limitations worth mentioning for this study was English language used solely for the online survey questionnaire, limiting our responses to individuals who can understand the language and excluding a large Spanish speaking population. A second limitation was the small sample size obtained for the study which was prematurely stopped due to unprecedented times faced by the Rio Grande Valley caused the novel Coronavirus (COVID-19).

While the study was not able to achieve a higher sample size it nevertheless sheds light at factors that contributed to higher levels of a stressful experience. Factors significant to a mass shooting future disaster event were (1) images (2) disturbing repeated dreams, (3) actions (4) upset (5) physical behaviors, (6) avoidance behaviors of thoughts or feelings (7) reminders, (8) trouble imagining important parts of future disaster, and (9) blame. Similarly, factors that contributed to higher levels of stressful experience to a hurricane future disaster event were (1) images, (2) actions (3) upset (4) physical (5) avoidance behaviors of thoughts or feelings and (8) trouble imagining important parts of future disaster.

In conclusion, findings in the study showed that overall, individuals living in the Rio Grande Valley report higher stressful “yes” responses to a mass shooting future disaster event when compared to a hurricane future disaster event.

6.2 Recommendation

Therefore, future recommendations for disaster professionals include proposing inclusion of Spanish speaking individuals by constructing a survey that includes both English and Spanish

language.

Additionally, disaster professionals should look at potential stress children could experience when imagining a future hurricane or mass shooting disaster in the Rio Grande Valley and incorporate the findings in their disaster and emergency planning for school disaster management. Furthermore, disaster and mental health professionals should work together to develop outreach programs that address disaster preparedness and mental health in a region that often lacks access to affordable mental health care since feeling connected to the community influences motivation to prepare for disasters (Levac et al., 2012). The stress generated from a possible mass shooting has increased from 2018 to 2019 (APA, 2019). Therefore, it is a public health issue and it must be properly addressed.

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APPENDIX

APPENDIX A

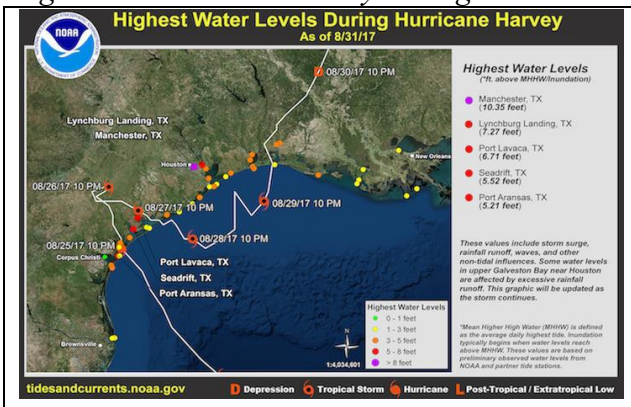
1. Hurricane Event

Q1 A hurricane disaster can cause various levels of destruction. Please take a look at the level of destruction caused by Hurricane Harvey which made landfall in August 2017. Harvey developed from a tropical storm to a category 4 hurricane in 56 hours. Many areas received over 40 inches of rain. Estimated cost of damage at 125 billion dollars. At least 68 fatalities are directly attributed to Hurricane Harvey. First major hurricane since 2005.

A hurricane disaster can cause various levels of destruction. Please take a look at the level of destruction caused by Hurricane Harvey which made landfall in August 2017.

- Harvey developed from a tropical storm to a category 4 hurricane in 56 hours.
- Many areas received over 40 inches of rain.
- Estimated cost of damage at 125 billion dollars.
- At least 68 fatalities are directly attributed to Hurricane Harvey.
- First major hurricane since 2005.

Figure 4 Hurricane Harvey in August 2017



Below is a list of problems and complaints that people sometimes have before a possible, very stressful hurricane related experience in the future. Please read each one carefully, then select the answer that best indicates how much you have been bothered by a possible future hurricane in the near future

Not at all (1)

A little bit (2)

Moderately (3)

Quite a bit (4)

Extremely (5)

1. Repeated, disturbing and unwanted images of a possible future hurricane disaster-related stressful experience?

2. Repeated, disturbing dreams of a possible future hurricane disaster-related stressful experience?

3. Suddenly acting or feeling as if a possible future hurricane disaster-related stressful experience already were happening (as if you were pre-living it)?

4. Feeling very upset when something reminded you of a possible future hurricane related stressful experience?

5. Having strong physical reactions (e.g., heart pounding, trouble breathing, sweating) when something reminded you of a possible future hurricane related stressful experience?

6. Avoiding imaginings, thoughts or feelings related to a possible future hurricane related stressful experience?

7. Avoiding external reminding's of a possible future hurricane related stressful experience (for example people, places, conversations, activities, objects or situations)?

8. Trouble imagining important parts of a possible future hurricane related stressful experience?

9. Blaming yourself or someone else for a possible future hurricane related stressful experience or what has led up to it?

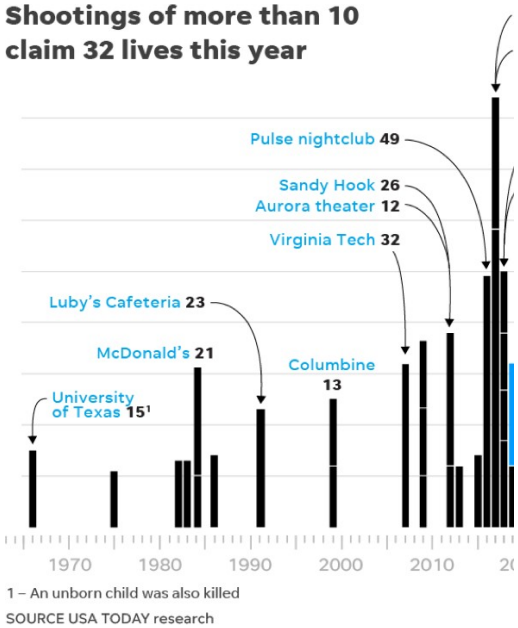
2. Mass-shooting Event

Q4 A mass shooting is a man-made disaster that could impact a community at any moment. Please take a look at the destruction that occurred in El Paso, Texas on August 2019. Active shooter walks into a Walmart Supercenter around 11 AM and opens fire. Incident leaves 22 people are dead and 24 injured. A manifesto believed by authorities to be posted online by the shooter targeted Hispanic population.

A mass shooting is a man-made disaster that could impact a community at any moment. Please take a look at the destruction that occurred in El Paso, Texas on August 2019.

- Active shooter walked into a Walmart Supercenter around 11 AM and opened fire.
- Incident leaves 22 people are dead and 24 injured.
- A manifesto believed by authorities to be posted online by the shooter targeted Hispanic population.

Figure 5 A Mass Shooting Event in Texas



Below is a list of problems and complaints that people sometimes have before a possible, very stressful experience in the future. Please read each one carefully, then select the answer that best indicates how much you have been bothered by a possible future mass shooting in the near future

Not at all (1)

A little bit

(2) Moderately

(3) Quite a bit (4)

Extremely (5)

1. Repeated, disturbing and unwanted images of a possible future mass shooting related stressful experience?
2. Repeated, disturbing dreams of a possible future mass shooting related stressful experience?
3. Suddenly acting or feeling as if a possible future mass shooting related stressful experience already were happening (as if you were pre-living it)?
4. Feeling very upset when something reminded you of a possible future mass shooting related stressful experience?
5. Having strong physical reactions (e.g., heart pounding, trouble breathing, sweating) when something reminded you of a possible future mass shooting related stressful experience?
6. Avoiding imaginings, thoughts or feelings related to a possible future mass shooting related stressful experience?

7. Avoiding external reminding's of a possible future mass shooting related stressful experience (for example people, places, conversations, activities, objects or situations)?

8. Trouble imagining important parts of a possible future mass shooting related stressful experience?

9. Blaming yourself or someone else for a possible future mass shooting related stressful experience or what has led up to it?

3. Demographic

Q7. Record gender

Female

Male

Other _____

Q8. What is your first language?

English

Spanish

Other _____

Q9. Are you of Hispanic, Latino, or Spanish origin?

Yes

No

Q10. Which of the following best describes your race? Would you consider yourself to be…?

White

Black or African American

American Indian or Alaska Native

Native Hawaiian or Pacific Islander

Something Else or other(Specify) _____

Q11. In what year were you born?

yyyy _____

Q12. What is the highest level of education that you have attained?

Some High School (No Diploma)

High School Graduate or GED

Some College but No Degree

Associate degree

Bachelor's Degree

Master's Degree

Doctorate's Degree

7. Which best describes your job status?

Work full-time

Work part-time

Student

Unemployed

Retired

Other

8. What is your home ownership status?

Own

Rent

Other _____

9. Which of the following income ranges represents your annual household income in 2019? Feel free to stop me at the correct range. Was your household income…?

Less than $25,000

$25,000 to less than $50,000

$50,000 to less than $75,000

$75,000 or more

Don't know/Would rather not say

10. What county do you live in?

Hidalgo

Cameron

Willacy

Starr

11. What is your zip code (five digit zip code)

Postal code _____

APPENDIX B

Table 1. One Sample T-Test for Yes/No Answers in Hurricane Event

One-sample test of proportion — imagesh_t: Number of obs = 113

Variable	Mean	Std. Err.	[95% Conf.	Interval]
imagesh_t	.7079646	.0427744	.6241282	.791801

p = proportion(imagesh_t) z = 4.4214
Ho: p = 0.5

Ha: p < 0.5 Ha: p != 0.5 Ha: p > 0.5
Pr(Z < z) = 1.0000 Pr(|Z| > |z|) = 0.0000 Pr(Z > z) = 0.0000

One-sample test of proportion — dreamh_t: Number of obs = 113

Variable	Mean	Std. Err.	[95% Conf.	Interval]
dreamh_t	.5044248	.0470342	.4122394	.5966101

p = proportion(dreamh_t) z = 0.0941
Ho: p = 0.5

Ha: p < 0.5 Ha: p != 0.5 Ha: p > 0.5
Pr(Z < z) = 0.5375 Pr(|Z| > |z|) = 0.9251 Pr(Z > z) = 0.4625

.

One-sample test of proportion — upseth_t: Number of obs = 113

Variable	Mean	Std. Err.	[95% Conf.	Interval]
upseth_t	.5309735	.0469457	.4389616	.6229853

p = proportion(upseth_t) z = 0.6585
Ho: p = 0.5

Ha: p < 0.5 Ha: p != 0.5 Ha: p > 0.5
Pr(Z < z) = 0.7449 Pr(|Z| > |z|) = 0.5102 Pr(Z > z) = 0.2551

One-sample test of proportion — physicalh_t: Number of obs = 113

Variable	Mean	Std. Err.	[95% Conf.	Interval]
physicalh_t	.4247788	.0465007	.333639	.5159185

p = proportion(physicalh_t) z = -1.5992
Ho: p = 0.5

Ha: p < 0.5 Ha: p != 0.5 Ha: p > 0.5
Pr(Z < z) = 0.0549 Pr(|Z| > |z|) = 0.1098 Pr(Z > z) = 0.9451

.

Table 1. One Sample T-Test for Yes/No Answers in Hurricane Event (continued)

```
One-sample test of proportion                avoidh_t: Number of obs =      113

------------------------------------------------------------------------------
    Variable |       Mean   Std. Err.                      [95% Conf. Interval]
-------------+----------------------------------------------------------------
    avoidh_t |    .5221239     .04699                      .4300252    .6142226
------------------------------------------------------------------------------
    p = proportion(avoidh_t)                                      z =    0.4704
Ho: p = 0.5

     Ha: p < 0.5                 Ha: p != 0.5                 Ha: p > 0.5
 Pr(Z < z) = 0.6810         Pr(|Z| > |z|) = 0.6381          Pr(Z > z) = 0.3190

.
One-sample test of proportion              remindh_t: Number of obs =      113

------------------------------------------------------------------------------
    Variable |       Mean   Std. Err.                      [95% Conf. Interval]
-------------+----------------------------------------------------------------
   remindh_t |    .4778761     .04699                      .3857774    .5699748
------------------------------------------------------------------------------
    p = proportion(remindh_t)                                     z =   -0.4704
Ho: p = 0.5

     Ha: p < 0.5                 Ha: p != 0.5                 Ha: p > 0.5
 Pr(Z < z) = 0.3190         Pr(|Z| > |z|) = 0.6381          Pr(Z > z) = 0.6810

.
One-sample test of proportion             troubleh_t: Number of obs =      113

------------------------------------------------------------------------------
    Variable |       Mean   Std. Err.                      [95% Conf. Interval]
-------------+----------------------------------------------------------------
  troubleh_t |    .5309735   .0469457                      .4389616    .6229853
------------------------------------------------------------------------------
    p = proportion(troubleh_t)                                    z =    0.6585
Ho: p = 0.5

     Ha: p < 0.5                 Ha: p != 0.5                 Ha: p > 0.5
 Pr(Z < z) = 0.7449         Pr(|Z| > |z|) = 0.5102          Pr(Z > z) = 0.2551

One-sample test of proportion                  acth_t: Number of obs =      113

------------------------------------------------------------------------------
    Variable |       Mean   Std. Err.                      [95% Conf. Interval]
-------------+----------------------------------------------------------------
      acth_t |    .5309735   .0469457                      .4389616    .6229853
------------------------------------------------------------------------------
    p = proportion(acth_t)                                        z =    0.6585
Ho: p = 0.5

     Ha: p < 0.5                 Ha: p != 0.5                 Ha: p > 0.5
 Pr(Z < z) = 0.7449         Pr(|Z| > |z|) = 0.5102          Pr(Z > z) = 0.2551
```

Table 1. One Sample T-Test for Yes/No Answers in Hurricane Event (continued)

One-sample test of proportion — acth_t: Number of obs = 113

Variable	Mean	Std. Err.	[95% Conf.	Interval]
acth_t	.5309735	.0469457	.4389616	.6229853

p = proportion(acth_t) z = 0.6585

Ho: p = 0.5

Ha: p < 0.5	Ha: p != 0.5	Ha: p > 0.5
Pr(Z < z) = 0.7449	Pr(|Z| > |z|) = 0.5102	Pr(Z > z) = 0.2551

Table 2. One Sample T-Test for Yes/No Answers in Mass Shooting Event

One-sample test of proportion upsetm_t: Number of obs = 113

Variable	Mean	Std. Err.	[95% Conf. Interval]	
upsetm_t	.7964602	.0378763	.722224	.8706964

p = proportion(upsetm_t) z = 6.3028
Ho: p = 0.5

Ha: p < 0.5 Ha: p != 0.5 Ha: p > 0.5
Pr(Z < z) = 1.0000 Pr(|Z| > |z|) = 0.0000 Pr(Z > z) = 0.0000

One-sample test of proportion pmysicalm_t: Number of obs = 113

Variable	Mean	Std. Err.	[95% Conf. Interval]	
pmysicalm_t	0	0	0	0

p = proportion(pmysicalm_t) z = -10.6301
Ho: p = 0.5

Ha: p < 0.5 Ha: p != 0.5 Ha: p > 0.5
Pr(Z < z) = 0.0000 Pr(|Z| > |z|) = 0.0000 Pr(Z > z) = 1.0000

One-sample test of proportion imagesm_t: Number of obs = 113

Variable	Mean	Std. Err.	[95% Conf. Interval]	
imagesm_t	.8053097	.037249	.7323031	.8783164

p = proportion(imagesm_t) z = 6.4910
Ho: p = 0.5

Ha: p < 0.5 Ha: p != 0.5 Ha: p > 0.5
Pr(Z < z) = 1.0000 Pr(|Z| > |z|) = 0.0000 Pr(Z > z) = 0.0000

One-sample test of proportion dreamm_t: Number of obs = 113

Variable	Mean	Std. Err.	[95% Conf. Interval]	
dreamm_t	.6814159	.0438308	.5955092	.7673226

p = proportion(dreamm_t) z = 3.8570
Ho: p = 0.5

Ha: p < 0.5 Ha: p != 0.5 Ha: p > 0.5
Pr(Z < z) = 0.9999 Pr(|Z| > |z|) = 0.0001 Pr(Z > z) = 0.0001

.

Table 2. One Sample T-Test for Yes/No Answers in Mass Shooting Event (continued)

One-sample test of proportion — avoidm_t: Number of obs = 113

Variable	Mean	Std. Err.	[95% Conf.	Interval]
avoidm_t	.7079646	.0427744	.6241282	.791801

p = proportion(avoidm_t) z = 4.4214
Ho: p = 0.5

Ha: p < 0.5 Pr(Z < z) = 1.0000
Ha: p != 0.5 Pr(|Z| > |z|) = 0.0000
Ha: p > 0.5 Pr(Z > z) = 0.0000

One-sample test of proportion — remindm_t: Number of obs = 113

Variable	Mean	Std. Err.	[95% Conf.	Interval]
remindm_t	.6548673	.044723	.5672119	.7425226

p = proportion(remindm_t) z = 3.2925
Ho: p = 0.5

Ha: p < 0.5 Pr(Z < z) = 0.9995
Ha: p != 0.5 Pr(|Z| > |z|) = 0.0010
Ha: p > 0.5 Pr(Z > z) = 0.0005

One-sample test of proportion — actm_t: Number of obs = 113

Variable	Mean	Std. Err.	[95% Conf.	Interval]
actm_t	.6725664	.0441459	.5860421	.7590907

p = proportion(actm_t) z = 3.6688
Ho: p = 0.5

Ha: p < 0.5 Pr(Z < z) = 0.9999
Ha: p != 0.5 Pr(|Z| > |z|) = 0.0002
Ha: p > 0.5 Pr(Z > z) = 0.0001

One-sample test of proportion — troublem_t: Number of obs = 113

Variable	Mean	Std. Err.	[95% Conf.	Interval]
troublem_t	.6637168	.0444431	.5766099	.7508238

p = proportion(troublem_t) z = 3.4807
Ho: p = 0.5

Ha: p < 0.5 Pr(Z < z) = 0.9997
Ha: p != 0.5 Pr(|Z| > |z|) = 0.0005
Ha: p > 0.5 Pr(Z > z) = 0.0003

Table 2. One Sample T-Test for Yes/No Answers in Mass Shooting Event (continued)

One-sample test of proportion actm_t: Number of obs = 113

Variable	Mean	Std. Err.	[95% Conf. Interval]	
actm_t	.6725664	.0441459	.5860421	.7590907

p = proportion(actm_t) z = 3.6688
Ho: p = 0.5

Ha: p < 0.5	Ha: p != 0.5	Ha: p > 0.5
Pr(Z < z) = 0.9999	Pr(|Z| > |z|) = 0.0002	Pr(Z > z) = 0.0001

BIOGRAPHICAL SKETCH

Nancy Carlson earned a Bachelor of Science in Psychology from the University of Texas Rio Grande Valley in 2018. Subsequently, Mrs. Carlson earned a Master of Arts in Disaster Studies in 2020 from her alma mater. During her graduate studies, she worked as a research assistant working on various emergency preparedness projects.

Mrs. Carlson's research interest focus is on the understanding of human behavior, mental health, and organizational communication during disaster events in predominantly Hispanic populations. For any further academic inquiries, Nancy Carlson may be reached by email at nancycar26@gmail.com.