THE CONNECTION BETWEEN SEVERE WEATHER EXPERIENCES AND EMOTIONAL WELLBEING IN NATIVE AMERICANS IN OKLAHOMA

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ABSTRACT

Native Americans are underserved and at a greater risk for severe weather in Oklahoma. Previous studies have shown that there is a negative connection between severe weather experiences and emotional wellbeing. Because of this knowledge, we explore the connection between severe weather experiences and emotional wellbeing in Native Americans in Oklahoma. To do so, we use data from Wave 5 of the Oklahoma Meso-Scale Integrated Socio-Geographic Network (M-SISNet) Survey, fielded February 2024 to April 2024. The purpose of this study is to investigate how Native Americans emotional wellbeing, measured through one dimension of post-traumatic stress (reliving), relates to severe weather experiences using pre-severe weather event wellbeing data as a baseline measure. Results from this study indicate that Native Americans experience a higher stress response of reliving stressful events than their non-Native counterparts. We also found that Native Americans who have experienced a tornado may experience higher stress response (reliving) than their non-Native counterparts. Overall, we found that there is a connection between severe weather experiences and emotional wellbeing in Native Americans in Oklahoma. However, more research is needed to explore this relationship using post-event data

1. INTRODUCTION

Oklahoma is home to 39 different tribal nations, with American Indians making up 14.2 percent of the state's population (US Census Bureau 2020). Historically, American Indians/Alaska Natives have struggled to become sovereign and receive help from the government. The government has and continues to oversee tribes, creating an unhealthy paternalistic relationship. In June 1934, the Indian Reorganization Act (IRA) was published. This act was a turning point for Native populations in gaining some sovereignty, but many tribes were against it (National Library of Medicine n.d.). The act allowed self-government and land rights, but it only assisted tribes that adopted constitutions similar to the U.S. constitution. Even though the act was created for tribes to gain sovereignty, the government continued to oversee certain aspects of tribal economies and land. For example, tribal land was given to tribes as a "trust" but were exempt from state and local taxes (FEMA n.d.). Alaska and Oklahoma were exempt from the IRA, which led to the Oklahoma Indian Welfare Act (OIWA) of 1936. It authorized Oklahoma tribes to incorporate themselves for business purposes, adopt constitutions, and elect officers. The OIWA allowed some sovereignty, but it hindered the ability for tribes to become fully separate and independent from the U.S. government. Fortunately, the National Congress of American Indians (NCAI) was founded 1944. The purpose of the NCAI is to be the unified voice of tribal nations, protect and enhance treaty and sovereign rights. The NCAI seeks to secure traditional laws, cultures, and ways of life for descendants, promote a common understanding of the rightful place of tribes in the family of American governments, and improve the quality of life for Native communities and peoples (NCAI, n.d.). The IRA and OIWA were steppingstones in gaining sovereignty in Native populations, but they hindered the ability for tribes to become separate and fully independent from the US government.

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This created a situation where many tribes and Native Americans to suffer from poverty, housing issues, health issues, and many other problems, lowering general wellbeing.

Even with the largest American Indian alone population in the United States, the American Indian population in Oklahoma is underserved and lacks access to many vital resources, including mental health care. The state of Oklahoma is ranked 46th in the U.S. for mental health funding (Turner 2019). The suicide rate for American Indian/Alaskan Native population is 1.7 times greater than the general U.S. population (Moon et al. 2018). Not only is the suicide rate higher, but American Indian/Alaskan Natives are reporting 2.5 times more psychological distress than the general population (U.S. Department of Health and Human Services and Indian Health Service 2015). There are a number of barriers when it comes to accessing mental health services in Native populations including distance to providers, lack of financial resources, and stigma surrounding treatment (O'Keefe et al. 2021). Only one in three American Indians/Alaska Natives have private health insurance, compared with 80 percent of whites, 52 percent of African Americans, and 50 percent of Hispanics (Jennie, 2003). Otherwise, Indian Health Services (IHS), provides healthcare. However, in 2016, Congress set the Indian Health Service budget at $4.8 billion. Only 7 percent of that budget is put towards mental health services. From 2016 to 2019, the IHS declined payment for over 500,000 patients, out of the approximate 2.56 million patients they serve (Grow 2024). The aforementioned factors contribute to a substantial mental health gap for American Indians in Oklahoma.

Mental health is not the only disparity that Native populations experience. Additionally, Native Americans might have an increased risk for severe weather in Oklahoma. Indeed, Native Americans have approximately five times increased risk of heavy rainfall by the end of the century – notably 68 percent higher than the state's general population (Li et al. 2024). The state averages more than 50 tornadoes per year, with the month of May averaging 20 tornado observations (Arndt 2003). Oklahoma has favorable conditions for thunderstorms, which occur about 55 days per year (Arndt 2003).

It is not uncommon for populations to experience psychological impacts from severe weather events. This field of study is characterized by a wide variation in findings. Recent reviews suggest that between 20 percent (North, 2013) and 40 percent (Neria et al. 2008) of survivors develop PTSD. There are not many resources available for mental health after severe weather, but the Suicide and Crisis Lifeline (988) is a helpful resource offered on a regular basis to anyone struggling. Similarly, the Substance Abuse and Mental Health Services Administration (SAMHSA) offers coping strategies and warning signs for people experiencing emotional distress. It also offers resources and options for asking for help such as finding local support groups and talking to loved ones (SAMHSA 2023).

Recovery resources specific to Native populations are insufficient. Data from the NCAI show that U.S. citizens receive, on average, about $26 per person, per year, from the federal government after a severe weather event, while tribal citizens receive approximately $3 per person, per year (Herrera 2019). Without a FEMA-approved mitigation plan in place, tribes are not able to receive funding for permanent, non-emergency repairs or long-term mitigation measures (Herrera 2019). As of June 28, 2024, only 10 tribes in Oklahoma had an approved plan in place. 4 tribes were awaiting revisions, 2 tribes were in review/in progress, and 10 tribes had expired plans. The remaining 13 tribes in Oklahoma have no FEMA mitigation plan in place.

Lack of mental health care and the commonality of severe weather in Oklahoma places the Native American Population with the potential to be at an increased risk for experiencing psychological distress after severe weather events. Keeping this in mind, we ask: What is the connection between severe weather experiences and emotional wellbeing in American Indians in Oklahoma? Due to the potential increased risk, it is important to investigate the connection between severe weather experiences and emotional wellbeing in Native populations, especially in Oklahoma.

2. LITERATURE REVIEW

Studies have shown that extreme weather and other climate-related events can have significant psychological impacts on individuals, leading to depression, post-traumatic stress disorder (PTSD), sleep difficulties, social avoidance, irritability, and drug or alcohol abuse (National Institute of Environmental Health Sciences, 2022). Most prior research has focused

on life satisfaction and happiness as a measure of wellbeing (Sprigg & Steinberg 2016). In many instances, life satisfaction and happiness are negatively affected by severe weather events (Berlemann 2016). This is especially the case in under-developed countries, meanwhile only life satisfaction is negatively affected in developed countries after natural disasters (Berlemann 2016). Moreover, chronic mental health problems can be aggravated by severe weather, particularly when severe weather conditions disrupt service, including in-person therapy and outreach programs (Shukla 2013). This was the case following Hurricane Katrina, where a survey of 1043 hurricane Katrina affected residents found that the 30-day prevalence rate for anxiety disorders was 49.1 percent and 26.4 percent for Post Traumatic Stress Disorder (PTSD) (Shukla 2013). These impacts endured, with high mental morbidity observed even two years after Hurricane Katrina. In addition to evidence suggesting that severe weather negatively impacts psychological wellbeing, people with prior psychological problems are at a higher risk of decreased wellbeing and suffer the more following extreme weather events (Shukla 2013).

Not all prior studies have found that wellbeing is negatively affected by natural disasters. One study found that there is a positive correlation between chronic vulnerability and wellbeing (Li and Li 2022). However, this may show that people respond differently to chronic threats rather than acute threats.

It is commonly agreed that disaster preparedness, community engagement, and mitigation policies help to lessen the impacts of severe weather. It is important that communities engage early and establish trust before an extreme weather event (Steinberg 2016). Meaningful networks and place-based plans are important after severe weather events to better help the community (Steinberg 2016). Without proper planning and trust, communities tend to suffer more from disasters. Unfortunately, disaster preparedness is not often consistent. The concept of allocating resources to a ‘what if’ scenario hinders communities’ ability to properly prepare for disasters when there is a high demand for resources in other areas (Shukla 2016). However, the potential negative effects of severe weather events are becoming increasingly clear, and demand effective disaster preparedness.

In addition to challenges in disaster preparedness, many underserved populations have a harder time recovering from severe weather events (Blackman et al. 2023). In some cases, traps--defined as problem-generating system structures that commonly cause surprising ‘perverse’ behaviors--hinder the recovery process. These include burden to the intervener, where the burden of recovery sits with an outsider who does not have the knowledge to help with recovery and success to the successful, where those less in need recover quicker than those with pre-existing needs, and seeking the wrong goal, where recovery initiatives try to solve the wrong problem (Blackman et al. 2023).

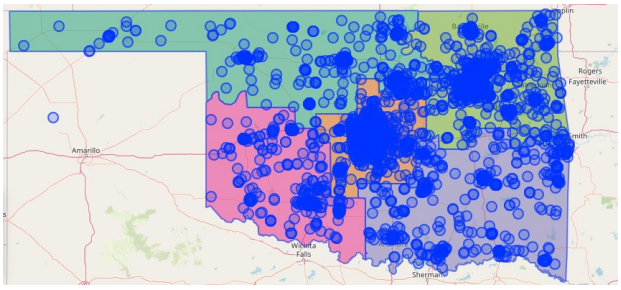
Moreover, there is a need for cultural competency in research relating to the effects of natural disasters (Simpson et al. 2011). Much of the literature in this area fails to examine how factors like race and ethnicity influence post severe weather wellbeing. Additionally, much of the research in this area focuses on post-event assessments of wellbeing and often lacks pre-event baseline data from impacted communities. Knowing that there is little to no research done focusing on how Native Americans’ wellbeing is affected by natural disasters, especially in Oklahoma, our paper will hopefully initiate more research in investigating how wellbeing can be affected by severe weather in different cultural and underserved communities.

3. DATA AND METHODS

3.1 Dataset

The data used for the analysis comes from the Oklahoma Meso-Scale Integrated Socio-Geographic Network (M-SISNet). The M-SISNet is a network of approximately 1500 social monitoring stations or geolocated households across the state of Oklahoma that provide data on household perceptions and responses to weather and climate (Jenkins-Smith et al. 2017).

FIG. 1. Map of the 1500 households from MSIS-Net (Jenkins-Smith et al. 2017)



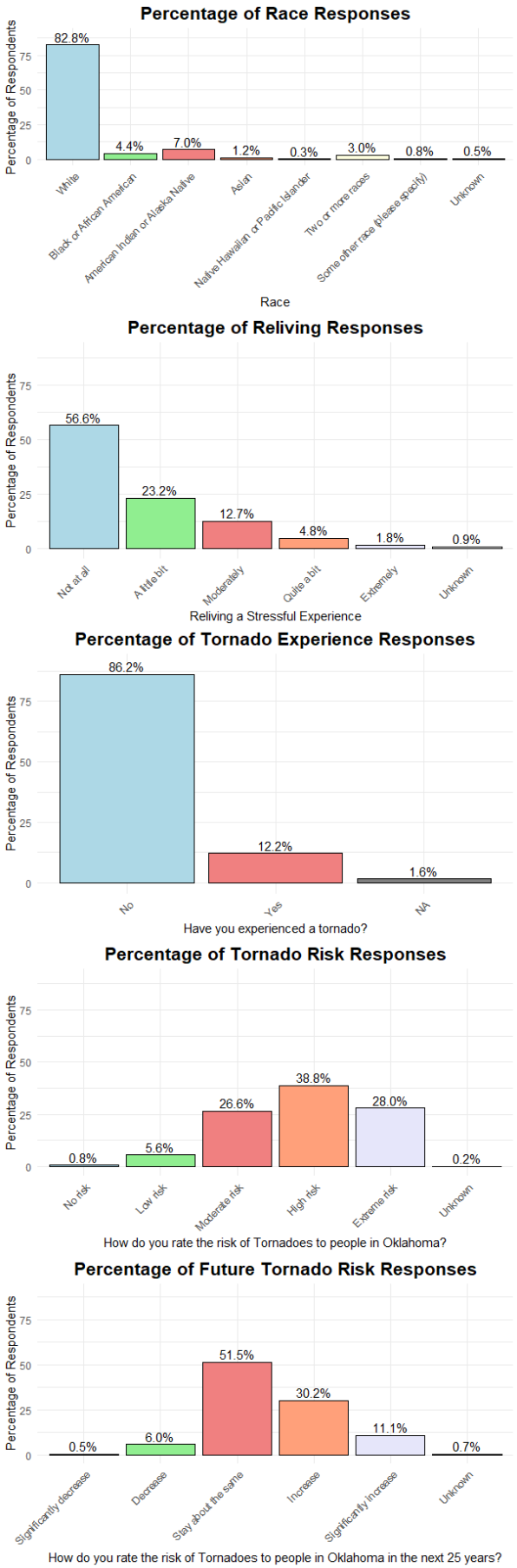


FIG. 2 (right). Distribution for responses for race, reliving (sf_pcl_reliving), tornado experience, tornado risk, and future tornado risk (Created by author)

The dataset used comes from Wave 5, the most recent survey wave, fielded February 21, 2024, through April 29, 2024. There were 1969 total respondents, with 138 of them being Native American (about 7.1 percent of total respondents). The survey asks a variety of questions including demographics, education, income, stress response, weather experiences, weather risk, future weather risk, weather forecasts, water availability/quality, and infrastructure (Jenkins-Smith et al. 2017). The stress response questions are baseline and exploratory and have no relation to stress response after severe weather. The variables used for the purpose of this research are race, stress response (sf_pcl_reliving), severe weather experience (experience_tornado), and tornado risk (risk_tornado and future_tornado). For race, respondents are given a range 1-7 to choose from: White (1), Black or African American (2), American Indian or Alaska Native (3), Asian (4), Native Hawaiian or Pacific Islander (5), Two or more races (6), Some other race (please specify) (7).

For reliving, respondents are asked how often they suddenly feel or act as if the stressful experience were actually happening again (as if they were actually back there reliving it). Respondents are then given a range 1-5 to choose from: Not at all (1), A little bit (2), Moderately (3), Quite a bit (4), and Extremely (5). This question is one of multiple designed to measure stress response. It should also be noted that the reliving question is not related to severe weather experiences, it is asking about any stressful experience.

For all severe weather experiences, respondents are asked if they have experienced a certain weather hazard and are given 0 or 1 to choose from: No (0) and Yes (1). For tornado risk, respondents are asked how they rate the risk of tornadoes to people in Oklahoma and are given a range 1-5 to choose from: No risk (1), Low risk (2), Moderate risk (3), High risk (4), and Extreme risk (5). Future tornado risk asks respondents to rank the risk (frequency and severity) of tornadoes and if they will increase, decrease, or stay about the same in the next 25 years in Oklahoma. The range for responses is the same as the range previously mentioned for tornado risk.

3.2 Statistical Analysis

Using R, results from cross-tabulation calculations, descriptive statistics, T-tests, and Chi-square tests were analyzed to discover any trends or relationships in the data. R is a program used for statistical analysis and creating graphs/plots. For this analysis, R version 4.4.1 was used. For descriptive statistics, mean, median, mode, standard deviation, minimum, maximum, range, and sample size (n) were computed for analysis. Cross-tabulations were created for race and tornado experience, race and reliving, race and tornado risk, and race and future tornado risk. To explore a difference of means, a t-test was run on reliving in Native respondents compared to Non-native respondents. Finally, Chi-square tests were computed on race and reliving and tornado experience and reliving (with comparisons between Native and Non-native respondents) to assess correlation between these factors.

4. RESULTS

4.1 Cross-tabulation

To answer our research question, we first used cross-tabulation to analyze the Native versus non-Native responses. The cross tab on race and tornado experience showed that 13.77 percent of Native respondents have experienced a tornado in the last 6 months, while 12.29 percent of non-Native respondents experienced a tornado in the last 6 months. The cross tab for Native versus non-Native and stress response showed that 7.97 percent of Native respondents experienced quite a bit of reliving compared to 4.6 percent of non-Native respondents. It also showed that 4.35 percent of Native respondents reported extremely reliving stressful experiences while non-Native reported 1.61 percent. The cross tab for race and tornado risk showed that 15.22 percent of Native respondents said there is an extreme risk for tornadoes in Oklahoma while 10.85 percent of non-Native respondents reported extreme risk. The race and future tornado risk cross tab was similar to tornado risk, with 15.22 percent of Native respondents reporting extreme risk for future tornadoes and 10.76 percent of non-Native respondents chose extreme risk.

Race and Tornado Experience

	No		Yes
Native American	86.23%		13.77%
Non-Native	87.71%		12.29%

Race and Stress Response

	Not at all	A little bit	Moderate	Quite a bit	Extremely
Native American	55.07%	19.57%	13.04%	**7.97%**	**4.35%**
Non-Native	57.24%	23.74%	12.81%	4.60%	1.61%

Race and Tornado Risk

	No risk	Low risk	Moderate risk	High risk	Extreme risk
Native American	2.17%	7.25%	44.93%	30.43%	15.22%
Non-Native	0.39%	5.98%	52.30%	30.49%	10.85%

Race and Future Tornado Risk

	No risk	Low risk	Moderate risk	High risk	Extreme risk
Native American	2.17%	7.25%	44.93%	30.43%	15.22%
Non-Native*	0.38%	5.93%	51.89%	30.26%	10.76%

*0.77% did not respond

FIG. 3. Cross-tabulation proportions (Created by author)

4.2 Descriptive Statistics

Descriptive statistics were done on the whole dataset as well as Native and non-Native responses. In the whole dataset, there were 1,959 responses for race with the median and mode being white (1). The mean for the responses was 1.432. For sf_pcl_reliving, there were 1,969 responses with the median and mode being not at all (1). The mean was 1.708. For tornado experience, there were 1,938 responses with the median and mode being no (0) and the mean 0.124. There were 1,969 responses for tornado risk with the median and mode being high risk (4) and the mean 3.878. For future tornado risk, there were 1,969 responses with the median and mode being stay about the same (3) with a mean of 3.457. There were 138 Native responses for our variables. The median and mode of sf_pcl_reliving was not at all (1), and the mean was 1.87. For tornado experience, the median and mode is no (0), with a mean of 0.138. The median and mode for tornado risk is moderate risk (3) and high risk (4) respectively. The mean was 3.493. The median and mode for future tornado risk is moderate risk (3) with a mean of 3.493. For the non-Native dataset, the median and mode for sf_pcl_reliving is a little bit (1), while the mean is 1.696 for 1,803 respondents. For tornado experience, there were 1,790 respondents and the median and mode is no (0), and a mean of 0.123. There were 1,807 responses for tornado risk with a median and mode of moderate risk (3) and a mean of 3.454. Future tornado risk was the exact same with 1,821 responses.

Table I: Descriptive statistics for whole dataset

Variable	Coding	Mean	Median	Mode	Standard Deviation	Min	Max	*n*
Race	1(White), 2(Black or African American), 3(American Indian or Alaska Native), 4(Asian), 5(Native Hawaiian or Pacific Islander), 6(Two or more), 7(Some other race)	1.432	1	1	1.156	1	7	1,959
Reliving (sf_pcl_reliving)	1(Not at all) to 5(Extremely)	1.708	1	1	0.984	1	5	1,969
Tornado experience (experience_tornado)	0(No) to 1(Yes)	0.124	0	0	0.329	0	1	1,938
Tornado risk (risk_tornado)	1(No risk) to 5(Extreme risk)	3.878	4	4	0.909	1	5	1,969
Future tornado risk (future_tornado)	1(Significantly decrease) to 5(Significantly increase)	3.457	3	3	0.909	1	5	1,969

Source: Created by author.

Table 2: Descriptive statistics for Native American responses

Variable	Coding	Mean	Median	Mode	Standard Deviation	Min	Max	*n*
Reliving (sf_pcl_reliving)	1(Not at all) to 5(Extremely)	1.870	1	1	1.177	1	5	138
Tornado experience (experience_tornado)	0(No) to 1(Yes)	0.138	0	0	0.346	0	1	138
Tornado risk (risk_tornado)	1(No risk) to 5(Extreme risk)	3.493	3	4	0.914	1	5	138
Future tornado risk (future_tornado)	1(Significantly decrease) to 5(Significantly increase)	3.493	3	3	0.914	1	5	138

Source: Created by author.

Table 3: Descriptive statistics for non-Native responses

Variable	Coding	Mean	Median	Mode	Standard Deviation	Min	Max	*n*
Reliving (sf_pcl_reliving)	1(Not at all) to 5(Extremely)	1.696	1	1	0.968	1	5	1,803
Tornado experience (experience_tornado)	0(No) to 1(Yes)	0.123	0	0	0.328	0	1	1,790
Tornado risk (risk_tornado)	1(No risk) to 5(Extreme risk)	3.454	3	3	0.780	1	5	1,807
Future tornado risk (future_tornado)	1(Significantly decrease) to 5(Significantly increase)	3.454	3	3	0.780	1	5	1,821

Source: Created by author.

4.3 T-test

The first t-test was run on Native responses who have experienced a tornado and reliving. The sample mean was 2.368 with a p-value of 0.035 and a t-value of -2.272. The next t-test was run on non-Native who have experienced a tornado and reliving. The sample mean was 1.983 with a p-value of < 2.2e-16 and a t-value of -12.234. The sample size was too small to run other t-tests.

4.4 Chi-Square Analysis

Chi-Square tests were run on sf_pcl_reliving in Native responses and tornado experience (yes and no). The x-squared result from the test was 14.428, with a p-value of 0.006. The test was also run on sf_pcl_reliving in Native responses who have not experienced a tornado. The x-squared value from the test was 1.987 and a p-value of 0.738. Next, the test was run on

T-test Results

	T-value	Sample mean	p-value
Stress Response in Native respondents and Tornado Experience (Yes)	2.272	2.368	0.035
Stress Response in non-Native respondents and Tornado Experience (Yes)	12.234	1.983	< 2.2e-16

FIG. 4. T-test results (Created by author)

Chi-Square Analysis

	x-squared	df	p-value
Stress Response in Native Americans and Tornado Experience (Yes and No)	14.428	4	0.006
Stress Response in Native Americans and Tornado Experience (No)	1.986	4	0.738
Stress Response in Native Americans and Tornado Experience (Yes)	12.442	4	0.014
Stress Response in Native versus non-Native Respondents	9.518	4	0.0494

FIG. 5. Chi-square results (Created by author)

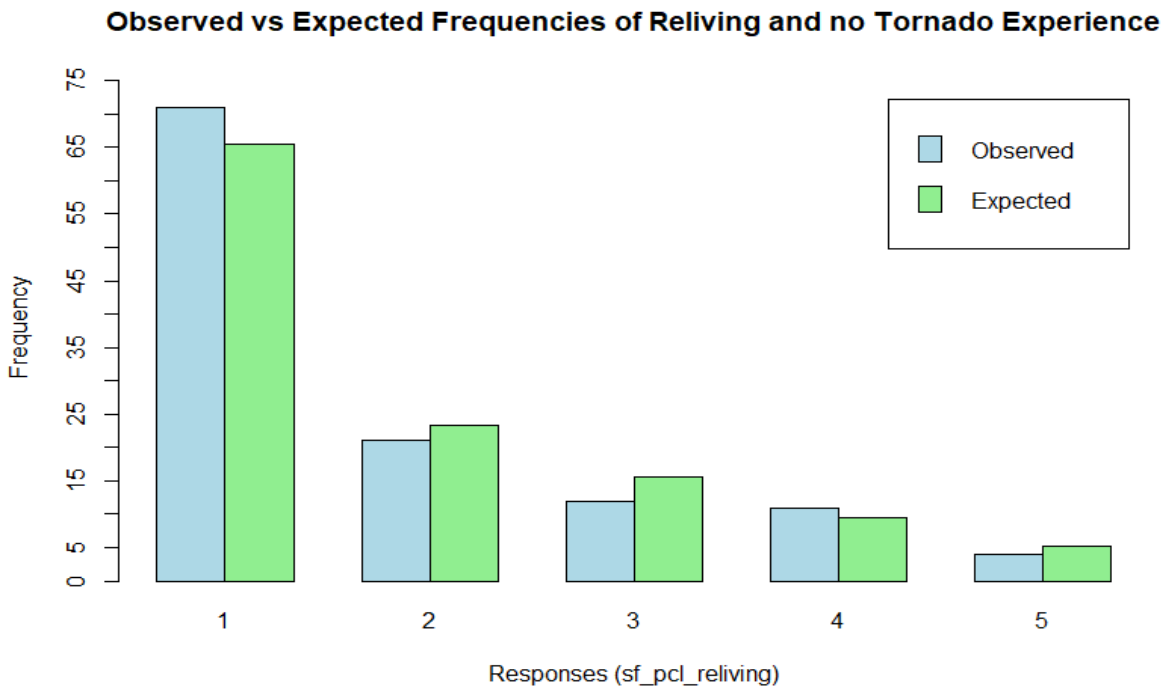


FIG. 6. Observed vs. expected frequencies of reliving and no tornado experience (Created by author)

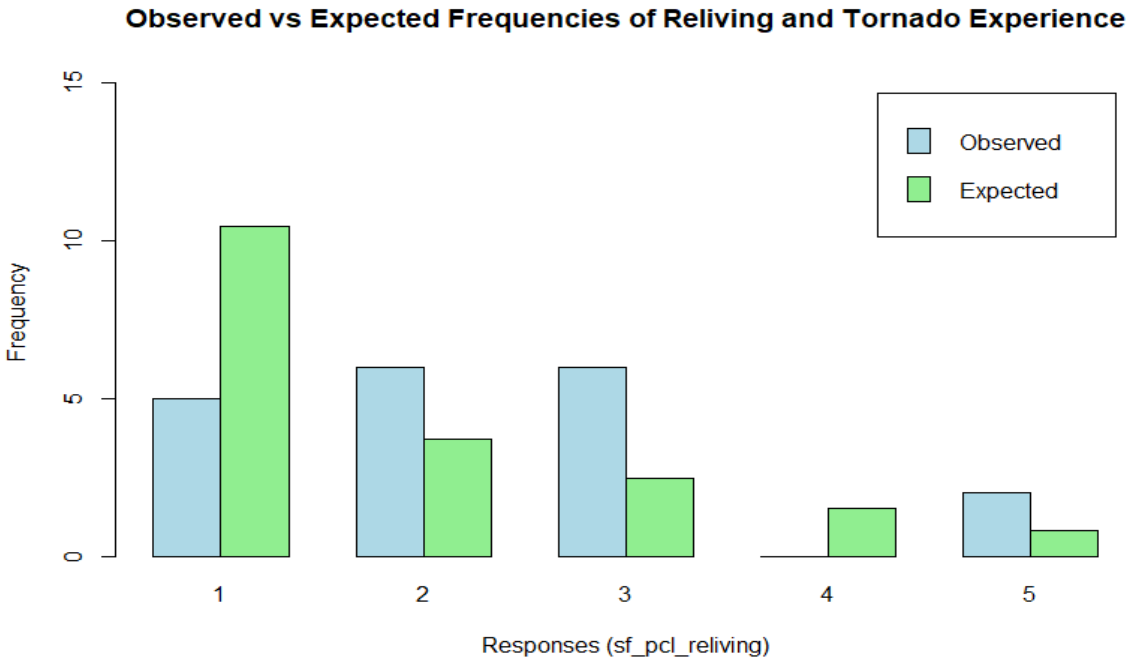


FIG. 7. Observed vs. expected frequencies of reliving with tornado experience (Created by author)

sf_pcl_reliving in Native responses who have experienced a tornado. The x-squared value was 12.442 and a p-value of 0.014. In addition, chi-square tests were run on race and sf_pcl_reliving as well as Native versus non-Native response and sf_pcl_reliving. For the test done on race and sf_pcl_reliving, the x-squared value was 39.089 and a p-value of 0.027. Lastly, the x-squared value was 9.517 and a p-value of 0.049 for Native versus non-Native responses and sf_pcl_reliving.

5. DISCUSSION/INTERPRETATION OF RESULTS

The frequency statistics show that the mean stress response (sf_pcl_reliving) for Native respondents is 1.87, higher than the whole dataset and the non-Native responses. A mean of 1.87 for reliving is between the “Not at all” and “A little bit” response options. The mean for experience_tornado was also higher for Native respondents, at 0.138, closer to the “No” response for experiencing a tornado. However, it is important to note that the sample size for Native respondents is small, and the mean could change with a larger sample size. The means for risk_tornado and future_tornado was the same for Native responses at 3.493, meaning on average, Native respondents feel that the risk and future risk for tornadoes was between “Moderate risk” and “High risk.” The mean for future_tornado was higher than the non-Native responses, but risk_tornado was only higher in the whole dataset. This could also be due to the small sample size. Cross-tabulation shows that Native respondents have higher responses of sf_pcl_reliving than non-Native respondents. 7.97 percent of Native respondents report reliving stressful experiences quite a bit, while only 4.60 percent of non-Native respondents report reliving stressful experiences. The same thing can be seen with respondents who reported extreme reliving stressful experiences; 4.35 percent of Native respondents compared to 1.61 percent of non-Native respondents. Also, only 13.77 percent of Native respondents experienced a tornado and 12.29 percent of non-Native respondents experienced a tornado, showing that a low proportion of respondents, regardless of race, experienced a tornado. The results also show that slightly more Native respondents experienced tornadoes than non-Native respondents, however it was not statistically significant.

A two-sample t-test was run between Native and non-Native respondents who experienced a tornado to see if Native respondents experienced a tornado significantly more than non-Native respondents. The two-sample t-test had a p-value of 0.6251 with a 95 percent confidence interval and a t-statistic of 0.489, showing that the difference of means of the Native versus non-Native respondents who experienced a tornado was not statistically significant and the observed data could have been due to chance. However, a higher sample size could change the results of the t-test. Additionally, a two-sample t-test was run on sf_pcl_reliving in Native versus non-Native respondents who have experienced a tornado. The test resulted in a p-value of 0.2093 with a 95 percent confidence interval and a t-statistic of 1.29, which shows that the difference in means is not statistically significant. Once more, this could also be due to the small sample size and indicate that stress response in terms of reliving is not very common.

To explore the association between reliving and tornado experience further, we completed Chi-square analysis on sf_pcl_reliving in Native respondents and all responses for experience_tornado. The chi-squared value was 14.428 and a p-value of 0.006 with a 95 percent confidence interval. The results show that in general, tornado experience correlates with reliving a stressful experience and the data was unlikely to be due to chance. Another test was run on sf_pcl_reliving in Native respondents who have experienced a tornado. This test had a chi-squared value of 12.442 and a p-value of 0.014 at a 95 percent confidence level. The results show that there is a statistically significant association between sf_pcl_reliving and experiencing a tornado. Additionally, a chi-square test was run on sf_pcl_reliving in Native respondents who have not experienced a tornado. The test resulted in a chi-square value of 1.986 and a p-value of 0.738 for sf_pcl_reliving in Native respondents who have not experienced a tornado. The results show that there is likely not an association between sf_pcl_reliving and no tornado experience. Lastly, a chi-square test was run on sf_pcl_reliving in Native respondents versus non-Native respondents. The p-value was 0.0494 at a 95 percent confidence level and a chi-squared of 9.518, showing that there is a difference in sf_pcl_reliving in Native versus non-Native

respondents. It also shows that there is a significant association between race (Native versus non-Native) and reliving stressful experiences. Our results show that there is an association between experiencing severe weather events and reliving stressful experiences.

Additionally, our data shows that Native respondents tend to have higher reliving responses than their non-Native counterparts. Looking at the descriptive statistics, the mean for reliving in Native responses was higher than the mean for reliving in non-Native responses.

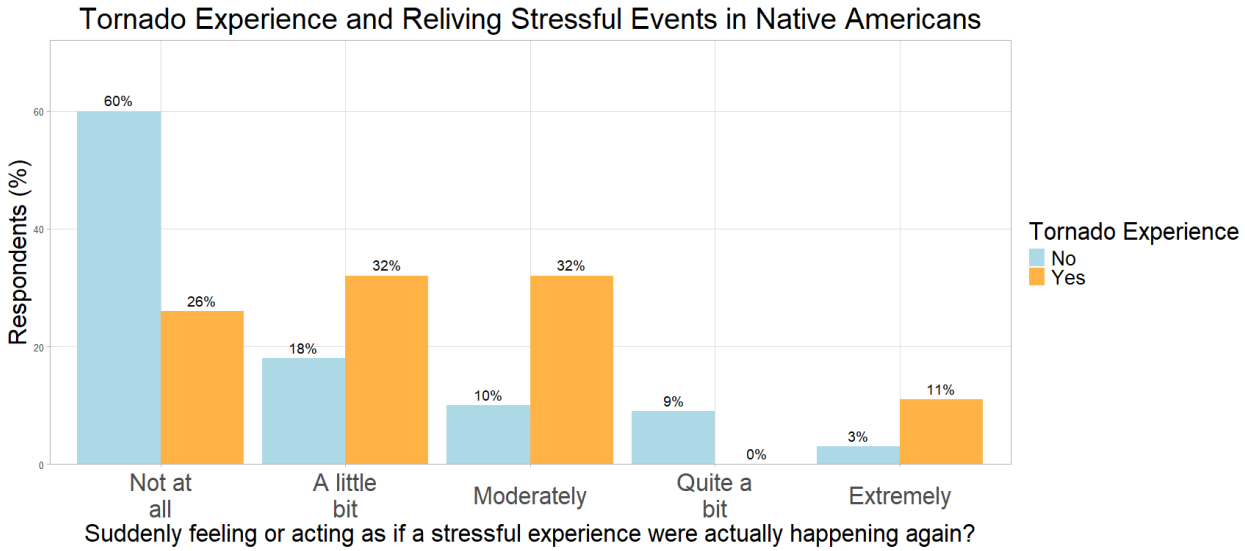


FIG. 8. Reliving stressful experiences in Native American respondents who have experienced a tornado (Created by author)

However, the t-test showed that the difference in means is not statistically significant. This shows that on average, Native respondents incurred higher reliving of stressful experiences than their non-Native counterparts. Also, the cross tab for

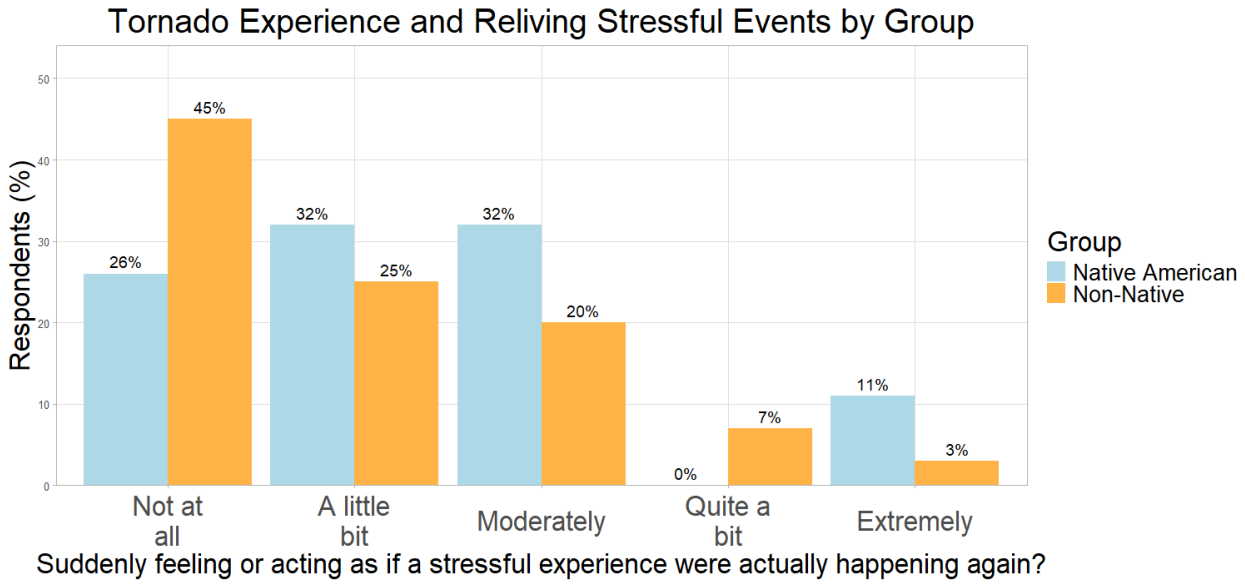


FIG. 9. Reliving stressful experiences in Native vs non-Native (Created by author)

Native versus non-Native and stress response showed that 7.97 percent of Native respondents experienced quite a bit of reliving compared to 4.6 percent of non-Native respondents, which supports the conclusion from the mean, indicating that Native respondents experience higher measure of post-traumatic stress than their non-Native counterparts.

Prior research has shown that severe weather experiences have a negative impact on emotional wellbeing (Sprigg & Steinberg 2016). Our research supports that conclusion; however, our research is primarily focused on whether Native populations are affected differently than the non-Native population. Using baseline data, our preliminary and exploratory results show that there is an association between severe weather experiences and reliving stressful events. However, the analysis shows that there is not a statistically significant difference in means between reliving in Native versus non-Native respondents who have experienced a tornado. Alternatively, the chi-square test did show that there is a significant association between race (Native versus non-Native) and reliving stressful experiences. Future studies should use a higher sample size to prove whether or not Native populations experience higher reliving or measures of post-traumatic stress than their non-Native counterparts in relation to severe weather events. Also, there is a need for exploring measures of post-traumatic stress post severe weather event. This would more closely assess whether there is an increase in measures of post-traumatic stress by taking a post-event assessment to the pre-event assessment examined here. In this study, only one variable for measures of post-traumatic stress was looked at, so future studies should include more variables.

6. CONCLUSION

Native American populations are underserved and have little access to mental health care (Native Oklahoma 2022). Previous studies have shown that Native Americans are at an increased mental health risk and a higher risk for severe weather (DeLozier 2023). Additionally, studies have found that severe weather experiences negatively impact wellbeing (Shukla 2013). Our research found that Native Americans in Oklahoma have higher measures of one dimension of post-traumatic stress compared to their non-Native counterparts. Furthermore, there is a negative connection between severe weather experiences and wellbeing in Native Americans in Oklahoma. However, it could not be concluded that Native Americans who have experienced severe weather events have higher measures of post-traumatic stress than their non-Native counterparts.

Future studies should prioritize a larger sample size, primarily Native American respondents. Additionally, there is a need for exploring causation between severe weather experiences and measures of post-traumatic stress in Native Americans in Oklahoma. Further research is also needed to discover if Native Americans experience higher measures of post-traumatic stress after severe weather events, combining pre- and post-event assessments, in comparison to non-Native populations.

This research has been an important addition to our knowledge of how severe weather relates to wellbeing, specifically measures of post-traumatic stress, in Native populations. More research is needed to investigate if Native populations experience higher measures of post-traumatic stress after severe weather events than non-Native populations. By focusing on Native populations, policymakers and communities can work together to increase community engagement, implement proper disaster mitigation, and increase funding as it relates to severe weather recovery.

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