

**Post-Traumatic Growth in Survivors of the 2013 EF-4 Central Illinois Tornado: A
Qualitative, Phenomenological Study**

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Abstract

With natural disasters increasing in frequency and severity, understanding the impact on mental health is crucial. For those who experience tornados, the most common and most damaging type of storms in the US, the psychological impact can be devastating and long-lasting. However, it can also provide opportunities for post-traumatic growth (PTG) which is what this study has explored. With a qualitative, phenomenological design, six survivors of the 2013 EF-4 central Illinois tornado were interviewed using a semi-structured format to examine their subjective experiences of the tornado and the resulting PTG. The study was conducted more than ten years after the event. Tedeschi and Calhoun's Five Factor theory of PTG was the framework for the study. The results supported this PTG theory with participants reporting experiences reflective of the five domains. Five of the six participants experienced PTG with the sixth participant experiencing positive change, but not actual PTG. Interpretive Phenomenological Analysis was used to analyze the data. From a societal standpoint, as climate change continues to be a growing concern with storms becoming increasingly severe, understanding the impact on mental health is vital. Mental health professionals need to understand the trauma of surviving a natural disaster such as a tornado and be prepared to help support recovery and the potential of PTG.

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Chapter 1: Introduction

As disasters appear to be increasing in frequency and severity, both natural disasters and human-made, the need to understand their impact on mental health is more important than ever (Insurance Information Institute (iii), 2021). Severe convective storms such as tornadoes are the most common and most damaging type of storms in the US. According to the World Meteorological Organization (2020), the number of natural disasters has increased by a factor of 5 in the 50-year span between 1970 – 2019. Data from the National Oceanic Atmospheric Administration’s National Centers for Environmental Information (2021) also supports this idea that disasters are increasing over time along with the cost. In 2019 the US experienced 14 natural disasters that totaled at least 1 billion dollars each. With more frequent and severe weather events, learning how some individuals can adapt and even grow following a disaster is vital. The mental health of survivors of natural disasters is a social issue and can have debilitating effects that reverberate outward affecting communities far beyond the immediate area. When a natural disaster survivor experiences not only recovery to the level of functioning from before the event (resiliency), but actual growth in understanding and assimilating their worldview (post-traumatic growth) PTG, this results in healing and moving forward with a renewed sense of meaning in life; the ideal outcome following disaster (Triplett et al., 2011). The more knowledge that is gained in understanding and then fostering post-traumatic growth (PTG), the greater chance for such desired outcomes.

There is a great deal of existing research on the concept of posttraumatic growth (PTG), but relatively little about how the process occurs in varying populations. PTG is defined as “the experience of positive change that occurs because of the struggle with highly challenging life

crises” (Tedeschi et al., 2004, p 1). In the past, it was believed that if one was showing distress after a crisis, one was not showing recovery or growth, but over time research has shown that one can experience distress while also experiencing growth after trauma (Abbott et al., 2021; First et al., 2018; Mesinor, 2019; Prohaska, 2020; Weber et al., 2020; Zeligman et al., 2019).

Existing research has also examined the negative effects of disasters as in the development of post-traumatic stress (PTS) symptoms in trauma survivors (Abbott et al., 2021; Weber et al., 2020; Sattler et al., 2018), as well as positive outcomes (Zhang et al., 2021; Spialek et al., 2016; Spialek et al., 2019; Kono et al., 2019), but few specifically on tornado survivors. Additionally, although there is existing research on post-traumatic growth (PTG) in trauma survivors (First et al., 2018; Abbott et al., 2021; Hamama-Raz et al., 2017; Zeligman et al., 2019), there is relatively little on tornado survivors specifically to understand the process of PTG in this population (First et al., 2018). As suggested in studies by Carbone et al., 2017; Houston et al., 2015; First et al., 2018, Spialek, et al., 2019 and Prohaska in 2020, future research should utilize a long-term approach to examine PTG post-disaster.

Statement of the Problem

The problem addressed in this study is the significant, negative impact on mental health that many tornado survivors experience (An et al., 2022; Anderson et al., 2022; First et al., 2021; Harwood, 2017; Houston et al., 2015; Khankeh et al., 2020; Lee et al., 2022; Makwana, 2019; Sattler et al., 2018; Spialek et al., 2019; Zhang et al., 2022). Existing studies on tornado survivors were conducted 2-5 years after the disaster (First et al., 2018; Houston et al., 2015; Houston et al., 2017; Prohaska, 2020). This study was conducted more than 10 years after the disaster, thereby taking a more long-term approach as has been suggested by previous researchers. The more that can be learned from tornado survivors’ experiences including the

development of PTG, the better our understanding of how PTG can occur. There is a distinct difference between tornadoes and other types of natural disasters in that tornadoes often occur with little to no warning as compared to hurricanes and other weather disasters (University of Miami News, 2019). Due to this distinction of tornadoes, conducting a study with tornado survivors specifically could expand our knowledge of this group. The negative effects on tornado survivors' mental health are far reaching and detrimental to not just the individual, but to those around them from their family to their community (Triplett et al., 2011) Without this study, important information about the long-term consequences on mental health of tornado survivors will not be available. There is little existing research that focuses on PTG in tornado survivors long-term; therefore, this study is vital to understanding and developing appropriate interventions (Carbone et al., 2017; First et al., 2018; Houston et al., 2015; Houston et al., 2017; Prohaska, 2020; Spialek et al., 2016; Weber et al., 2020). If mental health professionals can increase their understanding of this phenomenon, they can include this information in their clinical work with survivors. Psychosocial support is not always available to natural disaster survivors as many recovery efforts following a disaster focus on the physical damage and recovery (Choi et al., 2018). Therefore, determining what support is available to survivors is key to understanding and evaluating responses.

Purpose of the Study

The purpose of this qualitative study with a phenomenological design was to identify contributing factors to PTG through the perceptions of tornado survivors. Exploring human behavior via subjective experiences is the basis of phenomenological designs which is a solid match for this type of study using descriptive language. Future research has been suggested for a more long-term approach as many studies of this population occur shortly after the event (First et

al., 2018). Learning about each survivor's perception of the experience long after the disaster itself may aid us in better understanding various ways PTG develop over time. There is existing research on tornado survivors, but relatively little in the area of PTG years after the event (Carbone et al., 2017; First et al., 2018; Houston et al., 2015; Houston et al., 2017; Prohaska, 2020; Spialek et al., 2016; Weber et al., 2020).

The target population is the survivors of the central Illinois 2013 EF-4 tornado with the research setting of a small town. The sampling frame consisted of those survivors whom this researcher was able to contact via the social media platform, Facebook. This researcher interviewed six individuals as a small number is recommended for this type of research design, (Research Foundation, 2020), seeking "information-rich cases" (Polkinghorne, 2005, p. 140). A goal of qualitative research is to look for meaning and to deepen understanding of a collective experience; therefore, purposive sampling was used rather than random sampling. Purposive sampling allows participants who have experienced the phenomenon of PTG to give their subjective accounts. Qualitative research is usually focused on a small number of participants as the goal is not to gather large amounts of data, but instead to gather enough data to provide sufficient detail to determine commonality of the experience through subjective accounts. Data saturation occurs when no new information gathered is helpful to the study; in this case that number was six (Vasileiou et al., 2018). The semi-structured interviews were conducted via Zoom video and/or phone after the informed consent to research was obtained. This researcher used Interpretive Phenomenological Analysis for data analysis which is commonly used in qualitative studies (Smith et al., 2009; Spiers et al., 2019).

The goal of this study was to examine survivors' experiences more than 10 years after a destructive tornado that occurred in November of 2013 in central Illinois. This devastating EF-4

tornado occurred during a major tornado outbreak across the Midwest in November, which is typically a low tornado occurrence month (National Weather Service, 2021). The Enhanced Fujita scale is a measurement of the intensity of a tornado, specifically wind speed and damage with EF-0 to EF-5. According to the National Weather Service Statistics, there were three fatalities and 135 injured in the central Illinois towns most impacted by the EF-4 tornado. In terms of damage, 1255 homes were damaged or completely destroyed. Thousands of people came from all over the country to volunteer in the recovery efforts. A Facebook page was designed to offer support and resources for survivors. This study allowed survivors to tell their story which could add to our understanding of surviving tornadoes and not only recovering, but for some, experiencing new meaning and growth.

Introduction to Theoretical Framework

The concept of Posttraumatic Growth, which was developed by Tedeschi and Calhoun in 1995 is defined as “positive psychological change experienced as a result of the struggle with highly challenging life circumstances” (Tedeschi et al., 2004, p 1). This term refers to a positive change involving growth, not just a return to pre-level functioning before the trauma, which is considered resiliency (First et al., 2018). There are five key factors in this theory: “relating to others, spiritual change, personal strength, appreciation of life and new possibilities” (Tedeschi et al., 2017, p 11). The kind of support a tornado survivor receives after the event is a crucial component in the development of PTG (Spialek et al., 2019). Learning about each survivor’s support system can lead to a better understanding of how the five key areas of PTG apply to each individual. In addition, examining each participant’s experience of the event through the lens of these five key areas, allows for a deeper understanding of how their worldview was challenged by the event and consequently their struggle to realign their view of the world and their role in it

(Tedeschi et al., 2004). The internal struggle survivors often find themselves caught in involves cognitive processes (Triplett et al., 2011). These processes may result in the development of PTG (Henson et al., 2021). In this study, this researcher looked for these factors along with any other factors that participants identify as contributing to their PTG.

Introduction to Research Methodology and Design

As the research method chosen for this study was qualitative with an interpretive phenomenological design, the interview questions are ones of a descriptive nature about each subject's experience. How and what questions often fit best with a qualitative design (National Center for Biotechnology Information, 2022). By utilizing an interpretive phenomenological design, this researcher conducted semi-structured interviews with open-ended questions allowing the survivors to tell their stories and these interviews were recorded. The goal of data collection was to capture each participant's perspective on their experience of the event which again fits well within the phenomenological design (Bradley-Levine, 2015).

The following are the research questions that guided this study:

RQ1. What is the lived experience of tornado survivors related to positive changes in their lives?

RQ2. What strategies or coping skills were used to help tornado survivors experience posttraumatic growth?

Significance of Study

Disasters, both natural and human-made, are increasing in frequency and intensity and the psychological effect on survivors is significant (Abbott et al., 2021; Agyapong et al., 2022; Dickinson, 2021; Everly et al., 2021; First et al., 2018; First et al., 2021; Fu et al., 2021; Ghosh et al., 2022; Houston et al., 2015; Khankeh et al., 2020; Lee et al., 2022; Mesidor et al., 2019;

Prohaska, 2020; Weber et al., 2020; World Meteorological Organization 2020). Understanding how some people can overcome these traumatic events and experience post-traumatic growth (PTG) is vital; therefore, additional research is clearly needed in this area. The goal of this study was to add to existing PTG theory by increasing existing knowledge of the contributing factors of PTG in the specific population of tornado survivors. Identifying themes in the data led to a better understanding of how tornado survivors develop PTG thereby adding depth to the current knowledge and potentially providing important information that could help in developing effective ways of supporting survivors.

Definition of Key Terms

Coping

Coping is defined as the effort to manage stressors in one's environment (Abbott et al., 2021).

Posttraumatic Growth (PTG)

Post-traumatic growth is the positive result of an individual who overcomes significant challenges due to a crisis in their life (Tedeschi et al., 2004).

Posttraumatic Stress (PTS)

PTS is a normal, common reaction to a traumatic event; most people who experience trauma will exhibit signs of PTS (First et al., 2018).

Posttraumatic stress disorder (PTSD)

PTSD is a clinical diagnosis for someone who has experienced or witnessed a serious trauma and whose life is significantly affected, symptoms last longer than a month (National Institute of Mental Health, 2022).

Resiliency

Resiliency is defined as the capability to recover and return to prior level functioning following a traumatic event (Mesidor et al., 2019).

Trauma

Trauma is defined as the emotional reaction to a horrible incident or situation (American Psychological Association, 2022).

Summary

This qualitative research study examined the subjective experiences of tornado survivors more than 10 years after the event. As natural disasters such as tornadoes are increasing over time, it is essential that we learn about the impact these events have on survivors' mental health (World Meteorological Organization, 2020). Existing research shows us the devastating impact these disasters often have on individual survivors' mental health as well as the echoes on entire communities (Triplett et al., 2011). Tornadoes are unique in that they are unlike other natural disasters where there is usually more lead time to issue warnings; tornadoes often allow only minutes (Brown, 2013). This factor is important when considering the impact on survivors' mental health as it addresses the shock factor.

This first chapter introduced the topic of PTG and the gaps in literature on tornado survivors and their experiences with PTG. Due to an increase in the number of tornadoes each year, expanding our understanding of how individuals cope can help in developing effective interventions for survivors. Included in this chapter are the statement of the problem, purpose of the study, introduction to the theory/framework, the research method/design, the research questions, significance of the study, and definition of key terms.

Chapter 2: Literature Review

The problem addressed in this study is the significant, negative impact on mental health of tornado survivors. The study is qualitative with an interpretive phenomenological design with the goal of identifying any of the five key factors of PTG theory along with any additional factors related to the development of PTG in the experience of the survivors of the 2013 central Illinois tornado. This literature review includes natural disaster literature as well as tornado disaster literature. There are only a few studies that take place several years after a natural disaster and relatively few studies on tornado survivors specifically. As this study takes place more than ten years after the event, this study differs greatly as most existing research was done within the first few years' post-disaster. As the authors of the study of survivors of the 2011 Alabama tornado found, long-term recovery often looks different than the initial aftermath following a disaster for many people and often for those who are most vulnerable such as low-income groups and other marginalized groups who may experience long-term financial and emotional struggles (Prohaska, 2016).

Due to climate change which is increasing both the frequency and severity of natural disasters across the world, the need to conduct research on the negative impacts on mental health of survivors of natural disasters is urgently needed (Ghosh et al., 2022). Examining the negative impact on both individuals and communities long-term rather than immediately in the aftermath as most research has done is crucial, as is the need to focus on at risk populations as their needs are often more significant. Disaster research shows elevated risks for anxiety, depression, cardiovascular disease, respiratory disease, heart disease and stroke in the aftermath of a natural disaster (Ghosh et al., 2022). These negative outcomes are often the result of displacement, economic struggles and the challenge of accessing healthcare. There are few studies that examine

long-term effects of natural disasters especially on vulnerable populations. The authors of this study, Ghosh, Shapiro and Abramson, suggest a multi-faceted approach to combining community disaster preparation and disaster resilience with social scientists and clinical epidemiologists. This approach was previously suggested by both the National Academies of Medicine, Engineering and Science and the National Institute of Health. Currently the Center for Disease Control (CDC) and a program called Prevention Building Resilience Against Climate Effects (CDC BRACE) have joined to address effects of climate change on health outcomes. The authors of this study suggest more collaborations like these which directly impact research and policy.

The topics in this literature review include trauma, natural disasters, the conceptual framework of PTG, negative impacts of natural disasters, specifically, behavioral health impacts, physical health impacts, and financial impacts, factors that promote PTG including cognitive factors, coping, personality traits, action-taking, social support, demographic factors, meaning-making, religious and non-religious factors, communication following a disaster, and psychological interventions including disaster mental health counseling, psychological first aid (PFA) and eye movement desensitization and reprocessing (EMDR) and PTG. The concept of PTG developed by Tedeschi and Calhoun is presented as the best fit for the proposed phenomenological study. This review included several peer-reviewed journal articles, scholarly books, and professional websites. The main databases used in this search for existing literature were EBSCOhost and Google Scholar. Professional websites used included American Psychological Association (APA), Insurance Information Institute (iii), National Weather Service (NWS), National Oceanic and Atmospheric Administration (NOAA), and National Institute of Health (NIH).

Theoretical Framework

Tedeschi and Calhoun's concept of posttraumatic growth (PTG) has its roots across several disciplines including history, literature, sociology, philosophy, the arts, biology, and psychology (Tedeschi et al., 2018). The idea of something positive emerging from suffering is not new to us as a society, but the concept of the growth mindset has developed over time into posttraumatic growth (PTG). The German philosopher, Friedrich Nietzsche once said "What doesn't kill me makes us stronger" (Joseph, 2011, p ix). It is important to understand the distinct difference between PTG and resilience; PTG is growth beyond pre-trauma functioning, whereas resilience is a return to pre-trauma functioning (Triplett et al., 2011). For PTG to occur, the individual was unable to return to pre-trauma functioning but instead had to forge a new path which involved adapting to new ways of thinking and viewing the world (Joseph, 2011). As trauma can be a subjective term, it is crucial to understand the traumatic event must be life altering to the person and therefore necessitate a new worldview.

The term post-traumatic growth (PTG) was developed in the 1990's by Tedeschi and Calhoun and is defined as "the positive psychological change experienced as a result of the struggle with highly challenging life circumstances" (Tedeschi et al., 2004, p 1). The construct of post-traumatic growth developed by Tedeschi and Calhoun in 1996 includes five key areas: "personal strength, new possibilities, relating to others, appreciation of life and spiritual change" (Tedeschi et al., 2017, p 11). The PTG model focuses on the survivor's ability to assimilate and reconfigure their thoughts and beliefs about self and the world to adapt to post-trauma.

Trauma

Trauma is defined as “the result of an event that is particularly jarring for someone, whether it’s life threatening or harmful physically or emotionally, and has lasting effects on their psychological health” (FHE Health, 2023). Trauma is a worldwide problem with natural disasters impacting 250 million people each year (Farrell et al., 2017). Approximately 150 million people across the globe have post-traumatic stress disorder (PTSD) with women and children experiencing the highest number of incidents.

When examining trauma, 61% of men and 51% of women report they have experienced at least one traumatic event at some point in their life per the Substance Abuse and Mental Health Services Administration (SAMHSA, 2023). Therefore, one could conclude that trauma is the most experienced mental health condition. Given this concept, conducting research on trauma would seem imperative and indeed there is much existing research devoted to this topic; however, as trauma is indeed a broad term and subjective in many ways, narrowing it down to specific trauma is key.

While trauma in and of itself is not a diagnosable condition in the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5) at least as of yet, it can lead to several clinical diagnoses that are in the DSM-5 such as anxiety, depression, post-traumatic stress disorder (PTSD) and others (FHE Health, 2023). Psychological trauma can come from many sources including interpersonal violence, childhood abuse, accidents, injuries, diseases, combat, sexual assault, man-made disasters and natural disasters. As trauma is a subjective term, it must be thought of in the context of each person’s perception of the experience. According to the statistics stated previously from SAMHSA, over ½ of the US population will experience

trauma. With natural disasters and man-made disasters, large groups of people are affected, therein increasing the probability of higher trauma exposure.

In an article by Farrell et al., in (2017), the authors explored the origins of trauma by studying violence and categorized it into 4 types: direct, cultural, structural, and natural. Direct violence included war, gender-based violence, child abuse and neglect, forced displacement, criminal activity, human trafficking and exploitation and political violence. Cultural Violence included discrimination, racism, and gender inequality. Structural violence included hunger, poverty, disability and unemployment. Natural violence included drought, wildfires, volcano, death, earthquakes, tsunamis, and storms and weather systems. All of these factors contribute to trauma to humans, which again is a complex concept best understood by allowing for individual perceptions of these experiences.

Understanding the links between childhood trauma, post-traumatic stress symptoms (PTSS) and mental health in adults, in addition to examining the impact of coping styles, both active and passive was the focus of a study by Lee et al., in (2022). An online questionnaire was given to 436 female undergrads attending a Korean university. A significant correlation was found between childhood psychological trauma, current PTS symptoms and poor mental health as adults. Both passive and active coping styles appeared to moderate these relationships; however, passive coping appeared to be utilized more for childhood trauma whereas active coping seemed to match well with current PTSS. Examples of active coping include problem-focused coping and seeking social support, whereas passive coping examples include emotion-focused coping, wishful thinking and avoidance. This study adds to our understanding of the lasting negative impact of childhood trauma as well as providing continued support for understanding the different types of healthy coping.

In the groundbreaking study of childhood trauma by Anda and Felitti from 1995 to 1997, the Adverse Childhood Experiences (ACE) questionnaire was developed to help assess the impact of childhood abuse, neglect and other challenges on adult health and well-being (CDC, 2024). This self-report questionnaire of 10 questions provides potential insight into an individual's mental and even physical health. In 2011, the ACE was expanded to Adverse Childhood Questionnaire-International Questionnaire (ACE-IQ) by the World Health Organization to include 43 items and intended for use globally (WHO, 2024). In a recent study in 2023, the ACE was the focus in a study of patients in a mental health clinic to determine if high ACE scores resulted in a higher number of co-occurring of mental health disorders (Sucich et al., 2023). In the study, 40% of the 856 participants with a score of 4/10 or higher had co-occurring mental health disorders with the most common areas in having experienced emotional abuse, emotional neglect, and physical abuse in childhood. Each of these studies reinforces the importance of trauma-informed training for mental health professionals to better understand the impact of childhood trauma on adults.

In another study that examined gender differences in experiencing trauma, the authors concluded that more men than women experience trauma, yet women are 2 to 3 times more likely to develop PTSD (Olf et al., 2022). In the general population, 10% of people who experience a traumatic event develop PTSD, with women at 10-12% and men at 5-6%. As sexual abuse and interpersonal violence are types of traumas that often occur in childhood and often occur repeatedly, they result in a higher risk for PTSD than other types of traumas that are accidental in nature such as disasters, accidents, etc. These types of traumas are more common in women than men and additionally, women are more likely than men to seek social support to help manage and when social support is not available, the effect is a higher likelihood of

developing PTSD. In terms of coping styles, men more often choose active coping whereas women tend to choose emotion-focused coping. Active coping involves managing external stressors whereas emotion-focused coping explores the internal stressor such as the feelings about the trauma (Brown, 2013). Emotion-focused coping can take the form of breathing exercises, journaling, cognitive reframing, and/or meditation. Active coping may include taking a walk, exercising, setting a goal and/or engaging in problem solving. One's culture is also a factor when considering the impact of trauma and gender differences as in some cultures it is common for women to openly express their feelings, but men are discouraged from doing so (Olf et al., 2022). Clearly, there are many differences in the effects of trauma on people and gender differences is just one area to consider.

Trauma from Natural Disasters

Natural disasters are defined as “major adverse events resulting from natural processes of the earth. They have the capacity to negatively impact large groups of individuals at once, often causing destruction and injuries, as well as mortality” (Witt et al., 2022, p 1). As previous exposure to trauma is a known predictor of higher incidences of mental health struggles, a study was done on pre-pandemic resilience to examine its effect of the pandemic on mental health (Choi et al., 2023). The population was 16,900 female nurses with previous trauma and the results reflected what the authors expected, higher levels of resilience pre-pandemic mitigated negative effects of the pandemic. They suggested mental health professionals address mental health issues following a traumatic event from the standpoint of looking for protective factors which may help mitigate the negative effects of future traumatic events such as disasters.

In another study involving the COVID pandemic, residents of Northern Alberta Canada were the focus of a study that examined the effects of multiple traumas, wildfires in 2016, floods

in 2020 and the COVID pandemic in 2020 (Agyapong et al., 2022). Again, the concept of multiple traumas having a negative, cumulative effect on individuals is not new, but understanding the impact of natural disaster trauma is less known with little research at this point. In the last twenty years, more than 800 million people have been adversely affected by natural disasters with 3 million deaths world-wide. Scientists predict climate change will significantly increase natural disaster frequency and severity which will negatively impact not only individuals, but whole communities in terms of loss, mental health struggles, threats to safety and well-being as well as damage to personal property. Depression, anxiety and post-traumatic stress disorder (PTSD) are common mental health struggles that survivors of natural disasters may face both in the immediate aftermath and long-term (Agyapong et al., 2022). The researchers in this study posited that those who were exposed to wildfires and/or flooding along with the trauma from the pandemic would have poorer mental health than those who had only experienced the trauma from the pandemic. A cross-sectional survey was done via a self-administered questionnaire with 186 respondents. Their hypothesis was supported concluding that those who experienced the previous trauma from the wildfires and /or flooding along with the trauma from the COVID pandemic experienced significantly more mental health struggles than those who did not experience the previous traumas from the wildfires and/or flooding.

The impact of trauma from natural disasters on children is often more significant than on adults as children's brains are in the developing stage and are thus more susceptible to negative effects of trauma (Wang et al., 2022). Following the Wenchuan earthquake in China in 2008, a study was conducted to examine the use of sand play to assess trauma and healing in children and adolescents. There were 96 participants, ages 6-18, in the study and assessments were conducted at 5 intervals, one month, six months, twelve months, eighteen months and twenty-

four months. The earthquake was of catastrophic proportions with more than 3 million children impacted, 10,000 deaths and 4,700 children lost their parents. The total figures including adults were: 69,227 deaths, 374,643 injured and 17,923 missing. While debriefing after this type of major disaster is common, there is debate about the value of debriefing and concerns it is retraumatizing for those involved. The authors in this study chose sand play for both assessment and as a measure of expressive therapy rather than traditional debriefing methods. As most studies on this topic occur shortly after the traumatic event, this study took a longitudinal approach giving a broader view of measurement. Another difference was the population for most studies on trauma from natural disasters are conducted with adults; this study was focused on children and adolescents in both individual and group settings. The results reflected higher levels of distress later at 12, 18, and 24 months compared to the first two intervals thus adding support to the need to provide mental health services long-term. Another conclusion the authors reached was the importance of utilizing one's culture for available resources.

As stated previously, climate change is resulting in an increase in natural disasters worldwide, therefore, there is a growing need to understand the impact these events have on society. In Europe in 2022, a systematic review of current literature on children's responses to the trauma of natural disasters and negative outcomes was conducted (Witt et al., 2022). The review focused on resilience, healing and persistent patterns of negative outcomes. There was a total of 15 studies in the review with 11,519 children and adolescents, ages 3-18 years old with resilience or recovery patterns the most prominent. The authors found the effects of climate change can be threefold; firsthand impact of natural disasters, related consequences of natural disasters such as home or property loss and displacement, changes in their environment such as

loss of social support and/or financial losses, and the overall fear and worry about the threat of climate change.

The study results provided continued support for the need for long-term mental health services as some children experience delays or worsening symptoms well after the initial event (Witt et al., 2022). The authors suggested providing group interventions, possibly in a school setting where a large part of the population was negatively affected by a natural disaster. Teaching the children healthy coping, including utilizing social support could be helpful in preventing negative outcomes. As it has been determined worldwide that children are the most affected population by natural disasters, the need to study and understand their responses is vital. The long-lasting negative effects of natural disasters in childhood can be present in adulthood thus developing interventions for this group following disasters is crucial. If these maladaptive responses can be identified and alleviated, they are less likely to negatively affect these children as adults.

Post-traumatic Growth (PTG)

In a mixed-methods study in 2019 of 32 low-income black mothers who were survivors of Hurricane Katrina, one of the five factors of PTG, new possibilities, was reflected in many of the survivors who cited new opportunities that were a result of the disaster (Manove et al., 2019). In having to relocate out of the area, the women cited more diversity, more resources and better opportunities for employment and better education for their children. These women reported experiencing PTG. As Tedeschi and Calhoun have shown in their studies about PTG, new possibilities can come from experiencing trauma. This was the case in a study of widows who had begun taking on tasks and responsibilities that their husbands had done previously like managing finances, taking care of household and auto maintenance and the like (Manove et al.,

2019). These widows reported positive feelings of confidence and new possibilities from taking on these new responsibilities.

In another study in 2017 of 1369 survivors of the Wenchuan, China earthquake eight years after the event, results supported previous research that positive coping styles were strongly correlated with 3 of the 5 PTG factors, new possibilities, personal strength, and appreciation for life (Guo et al., 2017). This again supports the 5-factor model that results in PTG and is one of the few studies that was conducted several years after the event. Another finding of this study was that negative coping which most closely correlates with the PTG factor of relating to others, and can be expressed as denial, disengagement and/or self-blame, could also lead to PTG, whereas previous research only reflected positive coping to be related to PTG. Further research could focus on negative coping styles and the connection to PTG.

When considering disaster responses following natural disasters, ideally survivors will adapt and recover returning to pre-disaster functioning (resilience) or even better, experience PTG, moving beyond pre-disaster functioning. In 2020, a cross-sectional study was conducted 8 years after the Wenchuan earthquake in China in 2008 on adult survivors (Fu et al., 2020). As we know resilience or PTG does not always happen as unfortunately some survivors suffer mental health struggles instead. Most disaster response recovery programs concentrate on the physical aspects of recovery, such as housing and income challenges. Increasingly, mental health is becoming more of a focus and with good reason as we see the detrimental effects on survivors' mental health worsening especially due to the influence of climate change as a growing threat. This particular study examined the importance of livelihood and social support recovery as part of PTG. In addition, the researchers of this study examined the concept of how inadequate disaster recovery was related to increased PTSD and depressive symptoms. Their hypothesis that

inadequate livelihood recovery and social ties recovery were positively correlated with increased levels of PTSD and depression although mediated by PTG were supported by the data. In terms of recovering from a natural disaster, the results reflected the need to address areas of mental health as well as physical needs following natural disasters with a focus on assisting survivors in developing PTG.

In a study conducted in 2021 that explored how current societal issues such as self-esteem struggles, depression, decrease in physical activity and isolation may affect our ability to heal and grow following trauma (Dickinson, 2021). The article examines each of these factors and proposes several ways to address these issues to foster PTG including Eye movement and desensitization and reprocessing (EMDR) therapy. EMDR is a powerful, effective therapy that helps those who have experienced a trauma such as a tornado (Shapiro et al., 2004). It involves a process where the brain is directed to a particular image embedded in the memory of the trauma survivor along with whatever negative cognition is attached to the memory. Bilateral stimulation via visual, auditory, or tactile methods is then applied to essentially kick-start the brain into completing the processing needed to properly store these memories which had been maladaptively stored previously. EMDR is an eight-step process and can only be utilized by trained therapists. It was developed in the late eighties by Dr. Francine Shapiro and is used across the globe to treat trauma survivors as well as other mental health issues. EMDR will be explored later in this paper.

Depression, which is approximately 10 times more common now than it was 50 years ago, can make it difficult to see the good in life (Dickinson, 2020). In PTG, 3 of the 5 key areas; appreciation for life, new possibilities, and individual strength are negatively affected by depressive symptoms such as negative thinking and cognitive distortions, which are inaccurate

perceptions of reality. As it is more and more common for people to live away from family and rely on digital communication, isolation becomes increasingly more prevalent which again can lead to depression. When a traumatic event occurs, being isolated and lacking social support can add to mental health struggles. Another factor of PTG, relating to others, can also be affected thus potentially preventing that person from recovering and experiencing PTG.

The decline in physical activity in recent years has also contributed to depression. On the whole, people in the US are not making healthy lifestyle choices, poor diet and lack of exercise can result in depression. The fifth area of PTG, spiritual change has also been impacted negatively over time with less and less involvement in religion. Not only Christians, the most prominent group in the US, but other religions as well such as Judaism have decreased in their numbers. Conversely, those who identify as agnostic, or atheist are growing in numbers (Dickinson, 2020).

All of these factors can be roadblocks to PTG following a traumatic event. Mental health professionals need to be aware of these potential obstacles to help survivors overcome tragedy and experience the possibility of PTG. Encouraging healthier lifestyle choices, seeking support including therapy to process the trauma, practicing mindfulness including reaching out to their faith community when fitting are all ways to help survivors recover and grow.

PTG and Tornado Survivors

Existing research shows us the PTG model applies to tornado survivors as it does to other natural disaster survivors with several factors affecting the development of PTG. In a study in 2018 following the catastrophic EF-5 tornado that decimated Joplin, MO 438 survivors completed online surveys (First et al., 2018). The purpose of the study was to examine what factors contributed to PTG 2.5 years after the disaster. The results reflected those individuals

with higher levels of exposure to the tornado as well as increased PTS symptoms had higher incidences of PTG. Additionally, the more a survivor communicated about the tornado the higher their levels of PTG. In 2020, a study was conducted with 2 groups of individuals at a university in a tornado prone area of the US (Weber, 2020). One group included 412 students, and the other was 388 staff and faculty. The purpose of the study was to examine the relationship between perceived meaning in life and resilience and PTG and the results showed this positive correlation. The study also established support for the idea that individual resilience is linked to individual disaster preparedness which is similar to the concept that community resilience is linked to community disaster preparedness which has already been well established. Both groups experienced similar outcomes thereby adding to the growing body of research on factors contributing to resilience and PTG. In experiencing a trauma such as a tornado which can lead to negative impacts on mental health, survivors can also experience PTG if they experience any of the five PTG factors, therefore experiencing personal growth.

Negative Impacts of Financial and Property Loss in Natural Disasters

As tornadoes are the most common natural hazard in the US with 1,200 plus tornadoes each year, further research in this area is warranted (National Centers for Environmental Information). In a forty-year period from 1980 to 2020, severe storms cost the US \$268.4 billion dollars, second only to hurricanes and typhoons (USA Facts, 2020). According to the Insurance Information Institute, the unpredictability of tornadoes adds to the devastating impact on one's mental health as often there is little to no warning therefore people are often unprepared. Nocturnal tornadoes (tornadoes that occur at night) can be even more damaging as most people are asleep and therefore unaware of the approaching danger (First, et al., 2021).

Behavioral Health Impacts of Natural Disasters

The impact on mental health of survivors of natural disasters is an ever-growing problem with astronomical costs, not only financial but also to our society as a whole with regard to the negative psychological and emotional effects (Cong et al., 2022; First et al., 2021; Gill et al., 2021; Lee et al., 2022; Makwana, 2019). Triggers such as anniversary dates of the disaster or certain sounds or smells can have a devastating effect on survivors and awareness of this issue is vital (SAMHSA, 2023). People may be unaware of this phenomenon and therefore understanding and recognizing this information is important for survivors and mental health professionals.

It has long since been established in research that post-traumatic stress (PTS) and Post-traumatic stress disorder (PTSD) are correlated with natural disasters (Agyapong et al., 2022; Harwood, 2017; Houston et al., 2015; Khankeh et al., 2020; Lee et al., 2022; Maclean et al., 2016; Makwana, 2019; Mesidor et al., 2019; Nguyen et al., 2023; Ross et al., 2019; Spialek et al., 2019; Witt et al., 2022; Zhang et al., 2022). In addition, depression, and anxiety are also found to be common negative mental health effects of natural disasters (Carbone et al., 2017, First et al., 2018; Houston et al., 2015; Hrabok et al., 2020; Khankeh et al., 2020; Lee et al., 2022; Makwana, 2019; Mesidor et al., 2019). The level of exposure to the tornado is also an important factor when considering the impact on survivors' mental health. The study by Houston et al., in 2015 addressed this concept. The authors in the study of survivors of the 2011 Joplin, MO tornado compared individuals who had directly experienced the tornado to those who lived in the area but were not directly impacted and found significant differences. Surveys were conducted 6 months after the event and again 2.5 years after with 380 participants in the first study and 438 in the second. The rate of PTSD in those who had directly experienced the tornado was definitely higher with 30-40% reporting PTSD compared to only 5-10% reporting PTSD of those who were not directly impacted.

Existing research shows us that often the more distressed a survivor is following a trauma, the more potential for growth exists (Weber et al., 2020; First et al., 2018; Prohaska, 2020; Zeligman et al., 2019; Abbott et al., 2021; Mesidor et al., 2019). The bulk of these studies were conducted online with only two utilizing in person interviews. Each of these study results supported existing data that greater PTS symptoms positively correlated with greater levels of PTG. Previous thinking in this area focused on a survivor having either PTS or PTG, but more current research shows us the two often co-exist. Therefore, from a clinical perspective, one can acknowledge the distress of the client while still encouraging growth. This concept is further supported by a study that examined PTG in tornado survivors via online surveys where the results did indeed reflect the greater the severity of the disaster itself, the greater potential for PTG (Weber et al., 2020). In addition, researchers in a study of 256 survivors of the Haiti earthquake reported those who had already experienced PTG before the event were less likely to show PTG after the target event (Mesidor et al., 2019). The participants were given packets with assessment instruments to complete. The authors of this study suggested future research focus on compound trauma, clinically referred to as complex trauma, meaning exposure to subsequent traumatic events (American Psychological Association) to better understand its impact on PTG. In the systematic review which included 281 articles from 1998-2019 comprised of 38 longitudinal studies and 243 cross-sectional studies by Henson et al., 2021, results were congruent with previous research indicating higher levels of distress equaled higher levels of PTG. Specifically, the area of resource loss, which in this context is defined as “the things that individuals value within their culture and to survive” the greater the loss of resources correlated with higher levels of PTG (Science Direct) .

Physical needs are often the priority for most disaster risk management plans, but research shows the need to address psychological needs as well (Khankeh et al., 2020). There is a very real need for education about long-term needs of survivors following natural disasters which must include access to mental health services. The ripple effects of other problems that often occur after natural disasters include increases in domestic violence incidents and increased substance abuse.

In a study in 2016, the authors examined the potential effect of natural disasters in childhood on the mental health and substance use of adults (Maclean et al., 2016). For adults who experienced at least one natural disaster by the age of five, study results reflected an increase in mental health struggles, but not in substance use. In addition to the cost of mental health services, decreased job productivity, increased crime, and increased negative effects on children of adults who suffered a natural disaster in their childhood were also noted in the study.

In a study of Black and Latinx communities impacted by the nocturnal tornado outbreak in Tennessee in 2020, results reflected the added vulnerability of these groups including language barriers to receiving warning of the storms and other socioeconomic factors as the inability to afford smart phones or other devices that issue warnings (First et al., 2021). Two groups totaling 279 highly religious individuals who were survivors of the 2016 Louisiana floods, were surveyed at 9 months post-disaster and at 18 months post-disaster about their spiritual fortitude and its impact on their recovery (Zhang et al., 2021). Strong spiritual fortitude positively impacted recovery from the disaster as was expected by the authors of the study. Natural disasters often have negative effects on sleep, relationships and other areas of life that lead to the development of anxiety and depression and sometimes suicide. According to the World Health Organization (WHO), 703,000 deaths each year world-wide are due to suicide.

These are alarming statistics that direct those in mental health services to explore and better understand potential causes such as natural disasters.

Physical Health Impacts of Natural Disasters

The impact on the physical health of survivors of natural disasters is quite extensive. The Joplin, MO tornado in 2015 was the deadliest tornado on record since the 1950's when record keeping of these types of events began. It resulted in 161 deaths and 1,150 injured individuals (Houston et al., 2015). This one disaster "resulted in almost three times the average annual number of tornado deaths in the entire US (Houston et al., 2015, p 2).

Financial Impacts of Natural Disasters

In the US alone, over 1.79 trillion dollars have been spent on natural disasters in the last 44 years. This is obviously an exorbitant amount of money and experts predict these costs to increase due in large part to climate change (USA Facts, 2020). Existing research has shown that the type of trauma and the population are key indicators in the development of PTG (Triplett, 2018). Vulnerable populations such as children, the elderly, and marginalized groups such as minorities often suffer greater negative impacts than those in less vulnerable populations. Natural disasters such as tornadoes not only cause individual trauma including such challenges as resource loss and forced relocation, but also community losses where basic services are not available for a time post-disaster. Power outages, the closing of community services such as banks, grocery stores, gas stations, and the loss of cellular services are just a few of the post-disaster challenges communities may face. Loss of employment due to damaged businesses is another consideration with financial impact. Additional challenges include damage to infrastructure which can result in reduced access to medical and mental health services. Another

challenge may be lack of homeowners or renters' insurance as well as lack of medical insurance (Sattler, 2020).

As stated previously, in 2019, the United States experienced 14 natural disasters that each totaled at least 1 billion dollars (NOAA). These costs are increasing as climate change is affecting natural disasters with more frequent and more severe weather disasters. In the Joplin, MO tornado in 2015, the total economic cost for just this one disaster was 2.8 billion dollars (Houston et al., 2015).

Factors that Promote Posttraumatic Growth

According to PTG theory, the development of PTG can involve positive growth in any or all of the 5 key areas; appreciation for life, personal strength, relating to others, new possibilities, and spiritual change (Tedeschi et al., 2018). In order to develop PTG, there are many factors that may contribute to its development. The next section of this literature review will discuss these many potential factors.

Cognitive Factors

In the systematic review by Henson et al., in 2020 on what promotes post-traumatic growth, the authors found there were many factors involved in the development of post-traumatic growth. The review consisted of 281 articles on PTG from 1998-2019 with 38 of them longitudinal in design and 243 of cross-sectional in design. They found support for Tedeschi and Calhoun's theories that those who employed "cognitive engagement", thinking about the traumatic event on a regular basis and trying to find meaning, and "cognitive processing", asking why the event happened to them and how did it affect their lives, often lead to the development of PTG. When a survivor engages in "deliberate rumination" long after the event occurred, study results showed higher occurrences of PTG as compared to survivors who do not engage in

deliberate rumination over time. In addition, Tedeschi and Calhoun emphasize the role of social support and how talking with others who are supportive about the event leads to PTG and in fact decreases depression. To go even further, when a survivor shares their feelings and thoughts about the event with other survivors, the positive effect is even stronger as those individuals can directly relate to the experience.

Coping

Another factor found in the 2020 review by Henson et al., involved two competing coping styles, namely avoidance and problem-focused coping. In essence, when an individual utilizes both styles when appropriate, as in, avoiding thinking about the event when feeling overwhelmed and conversely utilizing problem-focused methods when feeling stronger and able to face thoughts of the event result in higher levels of PTG. This method is often discussed in psychotherapy when the therapist encourages the patient to learn about their window of tolerance, a concept developed by Dr. Dan Siegel where the person is encouraged to stay within a balanced state of hyperarousal and hypo arousal for optimum functioning. Thus, helping patients understand when they feel strong and capable, they can allow thoughts of the trauma to come to mind which allows the necessary processing, i.e., problem focused. Then at other times, outside their window of tolerance when they are feeling too stressed or aroused or conversely too low, they will need to employ avoidance in order to wait for a better time when they can confront the trauma (NICABM, 2023).

Emotion-focused coping has been shown as a positive method that can lead to PTG (Olf et al., 2022). Emotion-focused coping involves exploring internal feelings and addressing those emotions via adaptive coping which can include meditation, relaxation breathing, cognitive reframing, and/or distraction.

Personality Traits

The authors of the systematic review conducted in 2020 also found personality traits, specifically 4 of the Big 5, Openness, Conscientiousness, Extraversion, Agreeableness (Not Neuroticism), developed by Fiske in 1949, to be positively correlated to PTG (Henson et al., 2021). These results are not surprising as previous research has shown the Big 5 to be positively correlated to positive mental health. Openness seems to be the most predictive of PTG, but all 4 are related to adaptive coping which is key to both resilience and PTG.

Two of the 5 key factors of PTG theory, personal strength and new possibilities, can include personality traits such as optimism. The role of optimism in mental health following a disaster was the focus of a study of survivors of the April 2011 tornadoes in Mississippi and Alabama (Carbone et al., 2017). Participants were given surveys via telephone. There were 3,216 participants and each were given the Life Orientation Test-Revised (LOT-R) to measure dispositional optimism. The results supported their hypothesis that optimism would have a positive impact on mental health outcomes following a disaster; therefore, optimism can then be considered a protective factor which can lead to PTG (Carbone et al., 2017).

Action-Taking (Problem-focused Coping)

Action-taking, another contributing factor found in the 2020 systematic review by Henson et al., explores the idea that not just cognitive actions can lead to PTG, but also physical actions, essentially mind and body work. In 2011 Japan experienced a triple disaster which consisted of an earthquake, a tsunami and a nuclear accident that had a devastating impact on the country (Anderson et al., 2016). In 2016, the authors conducted a study to examine the psychological impact of volunteering by a group of medical students at a nearby university. Of the 494 students who responded to the online survey, 132 did volunteer work after the disaster.

The results of the study supported the author's concept that volunteering after a disaster is positively correlated with PTG. In another study of citizens who had experienced terrorism, those who had actively participated in the political resistance that took place before the event reported more PTG than those who did not take part. By taking action, survivors report feeling a sense of control, a semblance of comfort in doing something to take their lives back (Shallcross, 2012).

Action taking through advocacy is another factor that promotes PTG (Fields et al., 2020). In a study conducted in 2020, trauma survivors who were engaged in mental health services and doing well in their healing participated in social advocacy via public speaking. These survivors experienced PTG through this action taking by finding purpose and a sense of direction and focus. By sharing their experiences of trauma with others, they found healing and growth.

Social Support

“Neighbor helping neighbor” is often a vital part of recovery for a community that has experienced a natural disaster, such as a tornado (Shallcross, 2012). Encouraging disaster survivors to help one another when possible and to take action to restore their sense of safety is key in recovery and potential PTG. For crisis workers, helping a survivor to connect with family or other support people can make a difference in their response and subsequent adaptation or maladaptation to the event. In a study about gender differences in response to trauma, women are more likely to utilize social support exhibiting a “tend-and-befriend” response which essentially involves nurturing and bonding behavior (Olf, 2022). When a woman's social support system is not available, this then becomes a significant predictor of the development of PTSD.

Community resiliency is an important factor in understanding trauma recovery and the development of PTG (Spialek et al., 2016). In a study of community resiliency following a

catastrophic tornado in central Illinois in 2013, the researchers found that strong community resilience positively affected the residents of the community. For survivors of the tornado in this small community, feeling confident that resources were available and that they would receive fair treatment fostered a strong sense of community resiliency. In addition, community leaders who connect with counseling services and religious institutions to help inform residents of available support instill confidence and reassurance for their communities.

Demographic Factors

Two other factors, gender and age, were found to be important in the development of PTG (Henson et al., 2020). As in previous research, women were correlated with higher levels of PTG possibly due to the idea that women are often more likely to share their feelings than their male counterparts and existing research has shown that communicating about the trauma can be beneficial (First et al., 2018; Tedeschi et al., 2004). Younger people were shown to have higher levels of PTG than older individuals, possible due to the number of additional stressors older individuals may be dealing with as well as their proximity to death.

Surprisingly, individuals in marginalized groups may be more likely to develop PTG than others (Henson et al., 2020). This may be due to the increased distress and increased PTG connection as found in previous studies (Weber et al., 2020; First et al., 2018; Prohaska, 2020; Zeligman et al., 2019; Abbott et al., 2021; Mesinor et al., 2019) Another consideration the authors of the review listed was the possibility of the shared trauma as a group and their familiarity with facing adversity. Those individuals in marginalized populations are often overlooked in large-scale disasters such as tornadoes and other natural disasters; therefore, many turn to one another for support (First et al., 2021).

Meaning-Making

Meaning-making following a natural disaster can include a greater appreciation of life, increased self-awareness of one's strengths, and a deepening in relationships with loved ones, all part of the 5 key factors of the PTG model (Park, 2016; Triplett et al., 2011). The meaning-making model has been used in research to better understand the psychological factors involved in post-traumatic growth in trauma survivors, although not a great deal has focused on natural disaster survivors. Viktor Frankl studied the existential struggle humans face through the concept of meaning-making which is an essential part of the theory of PTG (Tedeschi et al., 2018). Logotherapy which Frankl developed is the idea that the primary purpose of life is to find meaning and therefore approaches therapy from this standpoint (Olmos et al., 2022). Additionally, meaning-making was found to be positively correlated with PTG in a study following a tornado that impacted students and staff at a university (Weber et al., 2020). Two groups, one of students and the other of staff and faculty at a university in an area of the country where tornadoes are frequent completed a brief online survey. Measurement tools included: Impact of Events Scale – Six-Item Version (IES), Purpose of Life Test – Short Form (PIL-SF), Brief Resilience Scale (BRS), Posttraumatic Growth Inventory-Short Form (PTGI-SF), Tornado Impact Questionnaire, Tornado Experience Questionnaire, and Disaster Preparedness Questionnaire. As hypothesized, the perceived meaning in life was positively correlated with PTG and resilience.

Volunteering, which is often considered a way of meaning-making can be associated with greater levels of PTG (Anderson et al., 2016). In addition, volunteering can be thought of as action taking which is another positive factor that promotes post-traumatic growth. Following an earthquake, tsunami, and nuclear accident in Japan in 2011, sometimes called the triple disaster of 3/11, 20,000 people lost their lives and thousands more were injured and/or lost their homes

(Kaye-Kauderer et al., 2019). Medical students from the nearby hospital, most impacted by the disaster, Fukushima Medical University (FMU) were the participants in the study. They volunteered their time and energy to help those who survived, and many were impacted personally by the disaster. The results supported the idea that volunteering is associated with higher levels of PTG.

Religious and Non-religious Factors

Spiritual change is one of the 5 key factors of the PTG model and as this idea can be broad in interpretation, it's important to include both religious and non-religious groups when studying PTG in tornado survivors. As spirituality can have many different meanings and is not always religious in nature, this factor is highly subjective. Previous research supports the idea of individuals with stronger religious orientation systems (ROS) may have improved mental health outcomes (Pargament et al., 2013). The subjects of the study conducted by Zhang et al., were survivors of the 2016 flood in Baton Rouge, LA. Online questionnaires were given at 9 months post-disaster and at 18 months post-disaster. The authors' hypothesis that higher levels of spiritual fortitude would result in higher incidences of PTG was supported. Additionally, this population was the subject of a study done previously by another set of researchers who also examined the proposed positive correlation between positive attitudes about God and PTG (Zeligman et al., 2019). This study too resulted in reinforcing the idea that positive attitudes about God were correlated with PTG. The clinical implications from these studies emphasize the need for counselors to include discussions of religion if it is important to the client as it is often an important part of their recovery.

In another study involving positive religious coping, survivors of the 2010 earthquake in Haiti were given several measures to complete to examine the impact of positive religious coping

on PTG (Mesidor et al., 2016). Most studies of PTG are conducted in developed countries, whereas this study was done with individuals living in a developing country therefore resources were a great deal more limited. Even with that consideration, many of the survivors experienced PTG utilizing family and friends to help cope with and heal from the trauma. The PTGI (Post-traumatic Growth Inventory), which is the most common tool for measuring PTG, was used in the study (Tedeschi et al., 1996).

Alternatively, non-religious individuals were part of a study by Abbott et al., to examine methods of coping following a tornado (2021). Problem-focused coping was a common method for many of these survivors suggesting that mental health professionals consider the potential for this type of healthy coping along with spiritual or faith-based coping. The results reflected the idea that problem-focused coping was correlated to higher levels of PTG and lower levels of PTS. The authors suggest future research focuses on non-religious individuals as there appears to be an increase in this group.

Communication

Relating to others, one of the 5 key factors of the PTG model may involve communication. Helping connect disaster survivors to loved ones is a crucial part of disaster mental health response (Shallcross, 2012). In a recent study of survivors of Hurricane Matthew, the authors examined the link between citizen disaster communication and PTG & PTS via online surveys approximately 6 weeks after the disaster (Spialek et al., 2016). The results showed communicating with others about the disaster and recovery efforts was positively correlated with PTG ($F = 17.133, < .001$). Future research suggestions included longitudinal studies to determine if PTG levels remain high over time. In another study the researchers utilized communication infrastructure theory to examine the link between disaster

communication and community resilience in survivors of the 2013 EF-4 tornado in central Illinois, the same tornado this proposed study will be focused on (Spialek et al., 2016).

Participants completed online surveys including questions about tornado media use, tornado social media use, tornado talk with others, tornado mental health and community resilience.

Results of the study supported the concept of communication with communities following disasters is key to positive outcomes. Generalization to other populations cannot occur as the study used a convenience sample as opposed to a probability sample; however, the results are still valuable as they provide support for the need to consider communication with communities as a vital part of disaster response plans. When survivors of natural disasters are given pertinent information about the disaster including resources, they are then better able to recover (Spialek et al., 2016). This too allows survivors to communicate with others, which is also crucial in recovery and potential PTG development.

Individual perceptions of community resilience were the focus of a study by Houston et al., in 2017. This study consisted of online surveys of survivors of the 2011 Joplin, MO tornado approximately six months after the deadly tornado. The results reflected similar outcomes to previous studies showing communication about the event resulted in more positive perceptions of resilience, in this case community resilience as opposed to individual resilience. Clearly talking about traumatic events with others appears to be a vital part of positive outcomes for the survivors.

In another study of the survivors of the 2011 Joplin, MO tornado, communication with friends/family/community was also linked to higher incidences of PTG (First et al., 2018). “The effects of trauma depend greatly on whether those wounded can seek comfort, reassurance, and safety with others” (First et al., 2018, p 15). Having the opportunity to turn to others to process

traumatic events like tornadoes is vital in recovering from such a decimating event and can lead to PTG.

Psychological Interventions

Disaster Mental Health Counseling is a key factor in responding to natural disasters such as tornadoes. Psychological First Aid (PFA) is the accepted evidence-informed approach for disaster mental health according to the World Health Organization (WHO), Centers for Disease Control (CDC), American Red Cross, Federal Emergency Management Agency (FEMA), Substance Abuse and Mental Health Services Administration (SAMHSA), American Counseling Association (ACA), and the American Psychological Association (APA). PFA first came into existence during World War II where it was taught to marines in order to help with psychological distress as there was a shortage of medical doctors on board military ships (Everly, 2021). PFA was developed further by the National Child Traumatic Stress Network and the National Center for PTSD (American Psychological Association, 2023). PFA consists of 4 main areas: safety, stabilization, self-care, and coping skills. Traditional counseling or therapy is not appropriate in the aftermath of a disaster where people are often in a state of shock and unable to reflect and process emotions which are typical in the case of therapy (Shallcross, 2012). Instead, they are in response mode and need support and stabilization.

The majority of people in counseling have experienced trauma and traumas such as natural disasters are increasing in frequency and severity (Insurance Information Institute, 2021). Most people will have a normal response to a disaster (abnormal event) and will return to normal functioning, but others may struggle and develop PTSD and/or other mental health conditions (Shallcross, 2012). According to the World Health Organization (WHO), the need for mental health services following disasters is increasing as psychological casualties will exceed physical

casualties. This is known in public health as a disaster mental health surge. There is a definite need to utilize communities in responding to mental health disaster survivors as there are increasingly not enough mental health professionals to respond to the growing number of disasters. Training in PFA is not only for mental health professionals but can be given to anyone who wishes to help disaster survivors.

According to Jane Webber, Associate Professor and Coordinator of the Counseling Program at New Jersey City University, “Like medical first aid – psychological first aid reduces immediate distress as well as the potential for long-term psychological problems such as PTSD” (Shallcross, 2012, para. 16). PFA does not include diagnosing or traditional therapy components, but instead focuses on providing a sense of safety, helping survivors connect with loved ones and providing them with information about available resources including mental health services as some will need further psychological care.

For those trained in PFA, responding in a calm, non-intrusive way is the best approach (Shallcross, 2012). One of the techniques of PFA can include bi-lateral stimulation, where one can gently squeeze the hands of the survivor alternatively which can help the person focus and feel grounded, coming out of a feeling of shock. They are then able to move and begin to move forward in dealing with the disaster. Bi-lateral stimulation is a key component in the therapy technique known as Eye Movement Desensitization and Reprocessing (EMDR).

The 2 acronyms to help disaster mental health responders remember the PFA approach are “STOP, Sit, Think Observe & Plan and SOLER, Sit or stand squarely, with Open posture, Lean forward, make Eye contact, and Relax. Helping restore a sense of safety, assisting in connecting with loved ones and helping to connect them with resources are all a part of PFA. Responding in a culturally appropriate way is also an important part of PFA, avoiding

generalizations and instead acknowledging cultural beliefs and values especially with regard to grief and loss.

For those individuals who do not return on their own to pre-disaster functioning and instead develop PTSD or other mental health conditions and need mental health services, one type of therapy stands out as one of the most effective approaches to treating trauma, Eye Movement Desensitization and Reprocessing (EMDR). Post-traumatic stress disorder (PTSD), post-traumatic growth (PTG) and Eye movement and desensitization and reprocessing (EMDR) are all intertwined. EMDR is a powerful, effective therapy that helps those who have experienced a trauma such as a tornado (Shapiro et al., 2004). It involves a process where the brain is directed to a particular image embedded in the memory of the trauma survivor along with whatever negative cognition is attached to the memory. Bilateral stimulation via visual, auditory, or tactile methods is then applied to essentially kick-start the brain into completing the processing needed to properly store these memories which had been maladaptively stored previously. EMDR is an eight-step process and can only be utilized by trained therapists. It was developed in the late eighties by Dr. Francine Shapiro and is used across the globe to treat trauma survivors as well as other mental health issues. There is great potential for PTG in those individuals who have experienced EMDR. This researcher is trained in EMDR and utilizes it on a regular basis with private practice clients. When compiling the list of potential resources for participants in this proposed study, EMDR trained therapists in the area will be included. As the researcher in this proposed study, my name will not be included in the list.

EMDR and PTG

There is a fair amount of research on EMDR therapy and PTG, (Lowenthal, 2022; Jeon et al., 2017; Mukba et al., 2020; Galvan et al., 2021; Saltini et al., 2018). One study of survivors of

a maritime disaster in 2014 in South Korea examined how EMDR therapy was related to PTG (Jeon et al., 2017). The 10 subjects were given 8 EMDR therapy sessions every two weeks, each session was 90 minutes. Measurements were taken 3 months after treatment ended, and the results were a definitive increase in PTG and resilience levels and a decrease in PTSD. In EMDR therapy, traumatic memories which are often fragmented and stored maladaptively are transformed into semantic memories with a beginning, middle and end. The trauma memory no longer causes distress after EMDR and allows the person to change their perception and often gain new insight which can lead to self-transcendence. EMDR can help a person to find new meaning in the experience, making peace with the past and moving forward with a healthier, more adaptive way of thinking. This type of change is what can be seen as PTG.

In a systematic review in 2022, the author looked at whether a positive change in religious/spiritual beliefs is a result of EMDR or simply a part of PTG (Lowenthal, 2022). The author concluded that more research is needed as data did not reflect PTG as a result of EMDR therapy, but it was not clear that positive changes in religiosity/spirituality were a direct result of EMDR. The authors suggested further research be done on this topic via the quantitative method to give more specific data.

As natural disasters often occur with little to no warning, people are caught unaware which can increase the negative impact of the traumatic event (Mukba et al., 2020). In this study (Mukba et al., 2020), the researchers interviewed a single individual who had experienced a devastating earthquake. This individual sought therapy 3 years after the event due to post-traumatic stress symptoms (PTS). EMDR therapy was implemented during the interview process of the study and results showed a significant decrease in PTS symptoms following the treatment.

In a meta-analysis and systematic review in 2023 by Pierce, Johnson, Kim, Lear, Mast and Black, the researchers examined the roles of cognitive processing therapy (CPT), Eye movement desensitization and reprocessing (EMDR), and Prolonged exposure therapy (PE) on PTG in adult trauma survivors (Pierce et al., 2023). CPT was first developed from cognitive behavioral therapy (CBT) and was used primarily to treat sexual assault survivors but is now also used to treat trauma. The client is directed to focus on the traumatic memory along with beliefs about self or others that are negative or unhelpful. They are then encouraged to imagine healthier, more positive thoughts to reprocess the trauma. Prolonged exposure therapy (PE) is a gradual approach that encourages the client to sit with the fear and distressing thoughts and feelings attached to the trauma in slow intervals. This approach allows for desensitization of the distressing thoughts and feelings and for reconstruction of those thoughts and feelings to become more adaptive and healthier. The authors identified 298 studies that met the criteria and concluded all three types of therapy techniques positively correlated with PTG, but the strongest link was between EMDR and PTG thus reiterating the efficacy of the EMDR therapy for trauma survivors, including natural disasters such as tornadoes.

Summary

Disasters, both natural and human-made, are increasing in frequency and intensity and the psychological effect on survivors is significant. Understanding how some people can overcome these traumatic events and grow (PTG) is vital. Examining the five key tenets of the PTG model through the eyes of the survivor who has experienced PTG will add to our knowledge of this concept. In addition, exploring the possibility that other factors exist that lead to PTG was the goal of this qualitative, phenomenological study. Determining the perception of

each participant on how their PTG developed in relation to the five factors and any other unknown factors was the focus of this study.

The literature review in this study includes information on trauma, natural disasters, the conceptual framework of PTG, the negative impacts of natural disasters on mental health, specifically behavioral health, physical health and financial health, factors that promote PTG including cognitive factors, coping, personality traits, action-taking (problem-focused coping), social support, demographic factors, meaning-making, religious and non-religious factors, and communication, information on psychological interventions including disaster mental health counseling, specifically Psychological First Aid (PFA), and Eye Movement Desensitization and Reprocessing (EMDR), a therapy technique for PTSD, and PTG.

As tornadoes are unique in comparison to other natural disasters by their lack of adequate warning time (University of Miami News, 2019), as well as the increase in both severity and frequency due to climate change, and as they are the most common natural disaster in the US, understanding the psychological impacts on the survivors is crucial.

There is minimal existing literature that examines this population specifically and certainly even less that focuses on PTG. Of those existing studies, almost none were done several years after the event (Carbone et al., 2017; First et al., 2018; Houston et al., 2015; Houston et al., 2017; Prohaska, 2020; Spialek et al., 2016; Weber et al., 2020). As this study took place more than ten years after the event, it is unique and necessary in increasing current knowledge of the long-term consequences of tornadoes on survivors' mental health.

Chapter 3: Research Method

As severe storms including tornadoes continue to increase in frequency and severity, the impact on individuals and communities continues to be significant (First et al., 2022; Cong et al., 2022; Gill et al., 2021; Lee et al., 2022; First et al., 2021; Hambrick et al., 2017). The problem addressed in this study is the significant, negative impact on mental health that many tornado survivors experience. While negative mental health outcomes are associated with surviving natural disasters, including tornadoes, there are individuals who experience post-traumatic growth (PTG). Understanding the factors that lead to PTG may help in preventing negative mental health outcomes related to experiencing a tornado. Thus, the purpose of this qualitative study with a phenomenological design, was to identify contributing factors to PTG through the perceptions of tornado survivors. In this chapter, the methodology and design are discussed along with the population and sample, materials used in the study, study procedures, data analysis, assumptions, limitations, delimitations, and ethical assurances.

Research Methodology and Design

This study is qualitative with a phenomenological design as the goal is to better understand individual experiences of the survivors of the 2013 EF-4 Central Illinois tornado. The problem addressed in this study; the significant, negative impact on mental health that many tornado survivors experience fits well with a qualitative design. This type of study allowed the researcher to fulfill the role of collecting data in a natural setting, look for the subject's perception of meaning and use descriptive language to convey the information to the readers (Creswell, 1998). When utilizing a phenomenological design, the researcher's role is to suspend all preconceived notions or biases about the phenomenon to allow for a clear understanding of

the experience through the participant's telling (Creswell, 1998). This is called epoche in phenomenology.

As stated previously, there is limited research on tornado survivors who experience PTG and even less that examines the context in which the experience occurred. Risk factors as well as protective factors need to be considered when exploring the participant's perceptions, thus a phenomenological, qualitative design for this study is the best fit. In previous research, risk factors such as previous trauma, pre-existing mental health conditions, tornado exposure, age, gender, socio-economic status have been shown to significantly affect the survivor's mental health (Lee et al., 2022). In addition, protective factors such as hope or optimism, religiosity, and access to resources have been shown to result in more positive outcomes for survivors. By using a phenomenological design, this allows participants to speak to their experiences through their own individual lens which can provide a broader perspective than other research designs.

Alternative methods such as a quantitative study would not be as good a fit as the desired data in this study is that of experiences from a subjective standpoint and quantitative studies do not allow the depth in context that qualitative studies do. (Creswell, 1998). Human emotions and individual perspectives are not a good fit for quantitative research. A quantitative approach would involve numbers, and this study is concerned with words describing the individual's experience of the event; therefore, a quantitative approach would not be appropriate. In addition, a quantitative design would explore only known factors of PTG, whereas a qualitative study design allows for known factors as well as any that are as of yet unknown that may come up with this particular population. In terms of the design of the study, a phenomenological approach is the best fit as the goal is to better understand subjective experiences of the event by each individual's perception. The purpose of this study; to identify contributing factors to PTG

through the perceptions of tornado survivors, fits a qualitative approach as well as it again is focused on individual perceptions which is a good match for a qualitative study (Creswell, 1998). Open-ended questions, such as how or why questions are used in qualitative studies to allow for subjective experiences (Vasileiou et al., 2018). The research questions in this study, “What is the lived experience of tornado survivors related to positive change in their lives?” And “What strategies or coping skills were used to help tornado survivors experience posttraumatic growth?”, are the type of questions that fit well within a phenomenological approach.

Of the five types of traditional inquiry in qualitative designs; case study, grounded theory, biography, ethnography and phenomenology, the last one, phenomenology fits best with this proposed study (Creswell, 1998). An interpretive phenomenological design allows for an examination of each person’s lived experience which would match the proposed study design in that it examines the nuances of the participant’s awareness of the phenomenon. Interpretive phenomenological analysis (IPA) was developed by Smith, Larkin, and Flowers in the 1990’s (Smith et al., 2009). In a case study design, the emphasis is on the event, so in this case the tornado itself, but this researcher has focused on the people’s interpretation of their individual experience. A second type of inquiry, a biography, would also not fit well as it would focus on a single person’s experience rather than a collective perception of the phenomenon. A third type, grounded theory, would not be a good fit as the purpose of this study was not to generate new theory. A fourth type, ethnography would not be the best fit as it is focused on a specific culture (Creswell, 1998).

Utilizing semi-structured interviews with open-ended questions allows the personal reflections of the participants which is why the qualitative, phenomenological design is the best fit (Bradley-Levine, 2015). Utilizing how and what questions are part of the qualitative design

and allow for descriptive language to reflect the participants' account of the event. The questions for this study are open-ended, providing participants with the freedom to express their feelings about the event in their own, unique way.

The semi-structured interviews were conducted via Zoom video and/or phone. Open-ended questions were utilized including the 13 interview questions. Each interview was recorded and then transcribed using Turboscript. Member checking, which is essentially sharing the data with the participants to allow their feedback, was done with the participants to address concerns for accuracy (Creswell, 1998).

Population and Sample

The population for this study is survivors of the 2013 EF-4 tornado in central Illinois. Purposive sampling was used rather than random sampling as purposive sampling involves the selection of specific cases which contribute to the phenomenon to be studied (Vasileiou et al., 2018). The purposive sample was drawn from a post that was made on Facebook describing the study and requesting participants. The damage from the tornado was catastrophic with 3 fatalities, 135 injuries and approximately 1255 homes were destroyed or severely damaged. (NWS. 2013). Given this type of widespread loss, many residents were significantly affected. As previous research has shown, the greater the trauma, the greater the potential for Post-traumatic Growth (PTG) Weber et al., 2020; First et al., 2018; Prohaska, 2020; Zeligman et al., 2019; Abbott et al., 2021; Mesinor et al., 2019).

Recruitment of participants occurred with the posting on FaceBook which introduced the study, listed my contact information, and directed interested individuals to an online, two-question, pre-screening form to determine eligibility. The participant screening involved an explanation of the participation criteria, my professional and ethical obligations as a licensed

clinical professional counselor and my role as the researcher. Those who did not meet eligibility criteria were thanked for their time and were given an explanation as to the reasons they were not eligible for participation. Eligible individuals were directed to a webpage with the informed consent form, that addresses areas such as confidentiality, study risks and benefits and the consent to participate. Information was given on how to withdraw from the study at any time by contacting this researcher via email or phone. The participants were also given a list of available support services within the area to utilize if needed. The researcher contacted individuals who signed the informed consent form and provided their contact information to schedule a Zoom video or phone meeting. At the start of the meeting, the researcher reviewed the informed consent form, ensured understanding of the study, and answered any questions regarding study participation.

Materials

Prior to data collection prospective participants completed a brief online screening to determine if the respondent matches the study criteria of directly experiencing the tornado. The screening questions were as follows: 1) Were you directly impacted by the November 2013 tornado in central Illinois? And 2) Are you 18 years of age or older? Inclusion criteria included having experienced the tornado directly and being 18 years of age or older. Exclusion criteria included either not having experienced the tornado directly and/or not being 18 years of age or older.

Data collection occurred with participants who met inclusion criteria and included a semi-structured interview via Zoom video or phone with those individuals to record their experience. The goal was to conduct interviews with three to ten individuals which is recommended in this type of design, but the final number of six was determined when data

saturation occurred (Research Foundation, 2020). The semi-structured interview questions were developed around the two study research questions as well as the 5 PTG factors (see Appendix B).

Digital video or audio recordings were made of the interviews after the participants had given their informed consent. These recordings along with this researcher's notes were reviewed with the participants to establish trustworthiness and credibility by the triangulation of sources which involves utilizing multiple sources of data including the interviews, observation of body language and verbal cues as well as utilizing member checking with the study participants to gain feedback for accuracy (Creswell, 1998).

Data Analysis

This researcher transcribed all participant video recordings and utilized an interpretive phenomenological analysis (IPA) to identify themes and patterns within the data collected (Creswell, 1998). Interpretive phenomenological analysis which was developed by Smith, Larkin, and Flowers in 1990, involves the "lived experience" of the individual and is participant-oriented", essentially providing unique information rather than utilizing existing theory (Smith et al., 2009). IPA involves the concept of the double hermeneutic which is the concept that along with the participants' interpretation of the experience, there is also the researcher's interpretation of the participant's experience. This researcher has over eleven years of experience as a licensed clinician; therefore, possesses a thorough understanding of human emotions which is crucial to the accurate interpretation of the participants' experience. This researcher looked for meaning in each subjective account of the phenomenon of PTG. Member checking was conducted with 3 participants after the initial data analysis of interviews. The 3 participants were presented with initial findings from data analysis and asked about the accuracy of the initial interpretations.

Feedback from member checking was used to revise any inaccuracies in data analysis and to inform subsequent data analysis. Triangulation was addressed by utilizing several sources of data, the screening process, the interview and via observation. The screening process determined if the participant is at least 18 years of age and directly experienced the tornado. The semi-structured interview consisted of 13 questions about each known PTG factor and any new as of yet unknown factors that contributed to the participant experiencing PTG. Observational data included utilizing the senses of the researcher to gain insight into the phenomenon by way of what the researcher can see and hear of the participant's behavior. Body language can be a helpful tool in gaining insight into a subject's perceived meaning or interpretation of the event.

As it is important to understand the researcher's perspective in qualitative research via the ontological assumption, the following will identify this factor (Creswell, 1998). This researcher first became interested as a young child in how people responded to tragedy. It appeared as though some were able to bounce back more easily than others and, in some cases, come away with something positive (An et al., 2022; First et al., 2018; Kaye-Kanderer et al., 2019, Mesidor et al., 2019). While unfamiliar with the terminology at the time, the concepts of resiliency and post-traumatic growth became a central focus later in life and are the subjects of many research studies.

Assumptions

The four philosophical assumptions in qualitative research include: Ontological, Epistemological, Axiological, and Methodological (Creswell, 1998). The Ontological assumption is that multiple realities exist, the researcher, the subjects, and the readers of the study. In this study, this researcher explored each participant's experience of the tornado with the understanding the perception of each person is their reality which will include this researcher.

The Epistemological assumption is that knowledge is gained from the subjects and uses direct quotes as a way to best represent their perspective. By using quotes to more accurately capture the participant's story, the hope is a greater understanding of each survivor's experience will unfold. The Axiological assumption acknowledges that biases exist in both the researcher and the subjects and that the values of each affect the story being told. While one survivor may feel the impact of the tornado affected their faith, another may feel their family life was most impacted. These differences will be evident as each person has different values and beliefs. The fourth assumption, the Methodological uses inductive logic and acknowledges the process will include details which become patterns. In this study this assumption was reflected in the nuances of each experience lending an overall theme to the research.

As this study was conducted from a phenomenological approach relying on subjective accounts, this researcher relied on the participant's willingness to be open to sharing their experiences and to do so as accurately as possible. Another potential assumption about the study is that the participants had a general understanding of what PTG is. This researcher provided an explanation of what PTG is to each participant during the interview process.

Limitations

Small sample size is a limitation with this study with only six participants; however, it is recommended to derive depth of the experience. In addition, as all participants who volunteered to do the study could have chosen to withdraw at any time, those who did complete the study may not have been a full, accurate representation of the population. Another limitation is that the study took place nearly ten years after the event, which means recall may have been affected as memories can shift over time. Some subjects may have been hesitant to share personal, private details with this researcher and this may well affect their responses and the outcome of the study.

Additionally, due to the amount of time between the event and this study, many factors may have contributed to a subject's perception of the experience, and they may be unaware of this occurrence. Unintentional influence by this researcher may have occurred and should also be considered as a potential limitation as is the case with any qualitative research (Ross, 2019).

Delimitations

As the study only includes survivors that responded to the Facebook post, generalization is not automatic with regard to other groups. Survivors of the 2013 EF-4 tornado who did not see the Facebook post may have experiences that differ from those in the group who participated in the study. In addition, the geographical delimitations will need to be considered as only those individuals who lived in the affected area were included in the study thereby not allowing for those who may have been impacted but lived elsewhere at the time of the event. As this study is intended to better understand impacts on mental health, other types of impacts such as financial, physical or other areas will not be included.

Ethical Assurances

All participants were treated in accordance with the ethical guidelines of the American Psychological Association (APA) and the National University Institutional Review Board (IRB). This researcher only proceeded when the National University IRB gave approval for the study. An informed consent process was conducted with participants, and all efforts were made to ensure the participants felt safe and comfortable and had the knowledge they could withdraw at any time. If at any point a participant had become distressed during the interview process, this researcher was prepared to stop the interview and refer the participant to a previously arranged licensed counselor with no cost to the participant. All data collected in this study was kept confidential and each participant was assigned a pseudonym to protect their privacy. Materials

including the digital recordings of the interviews, notes made by this researcher, consent forms, and online survey responses have been stored in this researcher's computer in a select file that is password protected.

Summary

A phenomenological, qualitative study is the best fit for this type of study. Risk factors as well as protective factors need to be considered when exploring the participant's perceptions of the lived experience. As stated previously, a quantitative design would explore only known factors of PTG, whereas a qualitative study design will allow for known factors as well as any that are as of yet unknown that may come up with this particular population. In this chapter, this researcher has discussed the methodology of a phenomenological, qualitative approach for this study which includes the methodology, population and sample, materials, data analysis including the role of this researcher, assumptions, limitations, delimitations, and ethical assurances.

The population and the sample of six participants were survivors of the 2013 EF-4 central Illinois tornado and were recruited via a post on FaceBook. Materials for the study included a brief online screening tool and a semi-structured interview via Zoom Video or phone. Data analysis was conducted by using Interpretive Phenomenological Analysis. The role of the researcher was addressed by understanding how the researcher became interested in the topic of PTG in tornado survivors which essentially developed in childhood as an interest in how people responded to tragedy. The 4 philosophical assumptions, Ontological, Epistemological, Axiological and Methodological were addressed by acknowledging individual perceptions of reality, beliefs and values, unique knowledge and by looking for patterns and an overall common theme. The limitations and delimitations were addressed by understanding that the memory of the participants may be affected due to the considerable length of time between the event and the

study as well as the understanding that not all survivors of the event will participate in the study. All reasonable steps were taken to address ethical concerns including approval of the IRB, informed consent and confidentiality.

The remaining chapters include a summary of the data collected along with conclusions of the study and future research suggestions regarding the phenomenon of PTG in tornado survivors. As little research exists on the mental health of tornado survivors specifically, this study will add to our knowledge and provide important information for assessing and understanding survivors' needs following a tornado.

Chapter 4: Findings

The problem addressed in this study is the significant, negative impact on mental health that many tornado survivors experience. While negative mental health outcomes are associated with surviving natural disasters, including tornadoes, there are individuals who experience post-traumatic growth (PTG) as well. Understanding the factors that lead to PTG may help in preventing negative mental health outcomes related to experiencing a tornado. Thus, the purpose of this qualitative study with a phenomenological design, was to identify contributing factors to PTG through the perceptions of tornado survivors. The study findings included data supporting the five factor PTG theory developed by Tedeschi and Calhoun, (2004) with the study participants experiencing the five factors: relating to others, spiritual change, personal strength, appreciation of life and new possibilities.

This chapter addresses trustworthiness of the data, demographics, the data analysis process used in the study, and a summary. The trustworthiness section includes a discussion of member checking to ensure credibility, the transferability to other studies, confirmability by exploring researcher/participant bias and a detailed description of the methodology and design of the study to address dependability. The results of the study are reported as they relate to the two research questions, and the demographics are described as well. The process used to analyze the data; Interpretive Phenomenological Analysis is described in detail. Finally, a summary of the findings completes the chapter.

Trustworthiness of the Data

In order to ensure that trustworthiness of the study has been established, four elements are to be considered: credibility, transferability, dependability and confirmability. The first

factor, credibility, is defined as the congruence of the data with reality (Adler et al., 2022). One method of establishing credibility is through triangulation which is defined as the cross checking of data (Adler et al., 2022). In this study, triangulation occurred via member checking which is the sharing of the data with the participants to assess for accuracy (Creswell, 1998). This researcher reached out to three of the six participants checking the information with each participant for verification. In addition, triangulation through the utilization of several sources of data was utilized. These sources included the screening process, the interview and observation of the participants' body language and verbal cues.

A second factor, transferability, is the degree to which the study findings could be applied to studies similar in context (Stahl et al., 2020). This was established through the variations in the participants with regard to an extensive age range as well as the differing degrees of property damage/loss. In essence the participants were not all of the same approximate age, nor did they all suffer the same amount of property damage.

The third factor, dependability, providing sufficient detail in the study design and methods to allow for replication of the study (Kakar et al., 2023). The type of study, a phenomenological, qualitative study, was explained along with the method in which the study was completed and analyzed.

The final factor, confirmability, defined as the level of trust that the study results are derived from the data collected from the participants rather than bias on the part of the participant or researcher (Kakar et al., 2023), was addressed by acknowledging the inevitability of human bias, but by adhering to the factual data for the results.

Results

This qualitative study with a phenomenological design focused on the lived experience of each survivor's experience of the 2013 EF-4 central Illinois tornado. The 5 factors of the PTG concept were considered in each of the participants' accounts of the experience. An initial brief screening was completed which addressed the qualifying criteria to be included in the study: the participant must be 18 years of age and have been directly impacted by the 2013 EF-4 tornado in central Illinois. There were eight respondents that met the screening criteria. Of those initial eight participants, interviews were conducted with six individuals after detailed information about the study was given and each participant signed informed consent forms after being provided with an opportunity to ask any questions for clarification. The semi-structured interviews were conducted via Zoom video or phone if Zoom was not an option, and 13 interview questions (see Appendix B) were asked of each participant. These interview questions were developed from the two study research questions, 1) *What is the lived experience of tornado survivors related to positive changes in their lives?* And 2) *What strategies or coping skills were used to help tornado survivors experience post-traumatic growth?* Along with the interview questions, participants were encouraged to share their experience of the tornado and how it has affected their lives. Each interview was recorded then transcribed utilizing Turboscript. Data saturation occurred with the sixth interview; therefore, no additional participants were needed. Following the transcription of each interview, this researcher analyzed the data using Interpretative Phenomenological Analysis (IPA). As the focus of IPA is on the individual's perception of the lived experience, this researcher looked for meaning in each participants' account thus providing a distinct, individual viewpoint rather than a collective reflection of the experience. The data was read and re-read, and codes were developed from identifying key areas of interest in the data. Categories were then

developed of the multitude of codes and finally themes were the end result of the data analysis process.

The data collected in the study provided support for the PTG theory developed by Tedeschi and Calhoun (2004). In addition to the PTG factors, the data supported existing research on the negative effects of the psychological trauma tornado survivors experience. An overview of each participant's responses to the research questions organized into themes was provided.

Demographics

Tornado Survivor	Age Range <20, 20-40, >40	Degree of Property Damage/Loss (minimal, moderate, severe)
Marie	>40	Severe
Patty	>40	Minimal
Jennifer	20-40	Severe
Kevin	20-40	Severe
Ben	<20	Severe
Sarah	20-40	Severe

The six participants in the study were assigned pseudonyms to protect their privacy (Adler, 2022).

Research Question 1

What is the lived experience of tornado survivors related to positive changes in their lives?

The following themes emerged from the data: greater appreciation of life-people over things, desire to help others, and deepening of faith.

RQ1 – What is the lived experience of tornado survivors related to positive changes in their lives?
Greater appreciation of life (people over things)
Desire to help others
Deepening of faith

Appreciation of Life

All six participants expressed a greater appreciation of life after experiencing the tornado. Marie talked about having a new appreciation for life after the tornado, “you realize what’s important to you and it was our relationship, our marriage, our children.” She went on to say, “what is important is having each other and that all the material stuff can be replaced, but our love, our lives, our children, our family and friends cannot.” Marie said regarding her relationship with her husband, “We talk to each other differently now. That’s another positive thing. We communicate a lot better with each other. A lot of our friend’s marriages didn’t make it; we weren’t going to let that happen.” Marie said she now has a mantra that she repeats every day when she leaves her house “count your rainbows, not your thunderstorms.” She goes on to say, “take the picture, take the trip, make the memory because you just never know and hold on to them.”

Patty expressed similar sentiments when she talked about the fragility of life, “Life can change in an instant and I think I tend to reach out more to help people. I check in on my son and daughter-in-law more now because they were really traumatized by the tornado, they lost

everything.” While Patty and her husband had only minimal damage to their home from the tornado, her son’s home was completely destroyed. Her trauma from the tornado was less direct with her concerns mainly focused on her son and his family.

Jennifer’s home was severely damaged, but she and her family were able to live in it while the repairs were made. She too described experiencing an awareness of what’s truly important in life, “material things aren’t as meaningful, it’s like you know, people lost things, but they didn’t lose their lives and their families.” Jennifer also talked of how “humanity came through for us. “I worked at the school and school supplies and pajamas and gift cards were given for all of the staff that had losses and just seeing how everybody in the community came through was amazing. And it was such a wide response, you know, it was very heartwarming.” Fortunately, this community received significant support from all over the country which clearly helped the survivors feel less alone.

Ben, another survivor talked of his experience after the tornado and how while he was only 13 years old at the time, he experienced a deeper appreciation of life with an understanding of what’s important, “after that, it was just that I felt like material things didn’t matter.” He also talked about another positive change for him related to appreciation of life “I guess another positive thing is like, I really appreciate weather more, I pay more attention, I treat it more seriously, but at the same time I like to go storm chasing, help people.” He went on to say how he really “likes the adrenaline rush of storm chasing and of working in the emergency department which is intense.”

Kevin described his experience of the tornado and how he nearly lost his life. He talked about how he was home asleep and how because he was such a deep sleeper, his brother left his job at a nearby restaurant and raced home to wake him up when the warning sirens went off.

Kevin said, “If it wasn’t for my brother, I wouldn’t be here.” He expressed experiencing an awakening “when you have a face-to-face with death” and “you gotta find the courage to keep going or it’s gonna eat you alive.” He talked of how his children are his number one priority and how “I like to leave people in a happy way, like my family, I want to leave with them knowing I love them, I don’t want to leave in an argument.” Here again is a new appreciation of life which is a common theme in trauma survivors.

Sarah too expressed a similar response with a greater appreciation of life by “Now I take the moments and the memories versus things. I know I can replace things; I’ve been through this before.” And another positive change Sarah talked about involved her relationship with her parents, “my parents and I are in a very different relationship now; we are much closer. I feel like I can talk to them about anything now because we went through something so traumatic that I know obviously whatever the next step is in our lives for traumatic-ness, we would be able to get through it together.”

Trauma survivors often form bonds as living through such a traumatic experience heightens the senses and can help people see more clearly what is really important. They share something unique which can bring them closer. Fortunately, this community received significant support from all over the country which clearly helped many of the survivors feel less alone.

Desire to Help Others

Three of the six participants reported experiencing the desire to help others. Marie’s entire home was destroyed in the tornado, she and her family lost everything. She said “We want to go help others. So, like when there’s a disaster or somebody loses their house in a fire, I’m the one getting everything and taking it to them and helping them. And so that’s kind of what we’re going to do, maybe go help with the FEMA organization. Because it’s personal, I know how

those people feel.” It is not uncommon to help others after a disaster occurs, but for Marie, eleven years later and she continues to do so and now may take an even bigger step by getting involved in FEMA which shows the lasting effect of the experience.

Ben and his family lost their entire home in the tornado as well. He talked about how after that event, he remembers wanting to help others, “I always wanted to work with people after that. And it might partly be why I chose the nursing field and pay it forward. I work in the emergency department and just like having the traumatic experience of the tornado, I can kind of try to help my patients through a very traumatic day that they have.”

Kevin and his family also lost their entire home in the tornado. He talked about how immediately after the storm he and his brother went around the neighborhood to help others. There was so much devastation, hundreds of houses were gone with only the foundations left. He said, “We were pulling bricks off of the guy across the street to get him out. And as my brother and I walked a two-block radius to see if others needed help getting out, we came across a person that was covered by a sheet, we could just see an arm laying out of it. So just trying to help, sadly we were exposed to seeing that.” This type of exposure to injury or death can also impact a survivors’ appreciation of life.

Deepening of Faith

Four of the six participants expressed feeling stronger in their faith. Patty and her husband’s home suffered minimal damage to the exterior. When asked about faith, she said “I have a very strong faith, but I think it has become stronger. I tend to lean on God a lot more since the storm. Since my husband had surgery, I can’t do it by myself, I need God to pick me up and carry me if that’s what it takes to take care of my husband. I’m much quicker to ask for God’s help now.”

Jennifer too expressed a deepening of her faith and said, “I think it was validation that God was looking out for us and looking out for our congregation because we had left after first service and the church was full of people for the second service and they were sheltering and had spotters looking out and seeing it coming towards them and just knowing God’s hand was in it. None of the churches in the town were hit.” For Jennifer this feeling of protection strengthened her faith as is often the case when experiencing a natural disaster of this magnitude.

Ben expressed a similar sentiment, “I think my faith is stronger because of the storm too. From that day, I think God was with me that day and with a lot of people and saved a lot of people. Cause I mean if you think about it with the tornado hitting the town, it was not the right time of year and it was on a Sunday, everybody was at home or at church and the tornado missed a bunch of churches.” This idea of being spared seemed to resonate with many of the survivors.

Sarah too expressed a deepening in her faith, she said, “Actually the first couple of months I really struggled with my faith, but then my dad had given my mom this nativity scene for Christmas the year before and after the tornado the only part left of it was Joseph, so we put it in front of our house after the tornado and it was always there. Anytime we would go back to the house to check on things, it was always standing, and it was a rough winter. After that I guess I was just like, I need to stop being so resentful. I just took it more like, ok I obviously had to go through this for some type of weird lesson.” For Sarah, she expressed a need to understand why the tornado happened and what was she supposed to learn from it.

Research Question 2

What strategies or coping skills were used to help tornado survivors experience posttraumatic growth?

The following themes emerged from the data: telling their story, thinking positively, and being better prepared for future disasters.

RQ2 – What strategies or coping skills were used to help tornado survivors experience post-traumatic growth?
Telling their story
Thinking positively
Being better prepared

Telling Their Story

Three of the six participants expressed feeling positive about their experience of talking about what they went through. Marie said “Talking about my story has helped me heal over the years. I honestly think people need to make the time to talk and accept mental health support. I look back and wish I would have taken the mental health support that was offered. I was like ‘I can’t, I have too much going on’. And I have more patience now so when people tell their story, I sit back and listen.”

Jennifer talked about community support, “That winter following the tornado, there were block parties, neighborhood parties. They would list the neighborhoods and streets divided up into like five sections or whatever and they were held at different churches on Sunday afternoons. We were assigned to St. Mark’s church, and you went there and all the people from the neighborhood gathered there. So, you could see others and see that they were ok, and you could share your stories. They had therapy dogs, and I have a small lap quilt that I picked up there. And there was a support group called Twisted Sisters where they would have a coffee

evening at somebody's house and share stories, and it was healing." This sense of belonging where others can understand and relate to each other's experience can be very helpful in healing and recovering from trauma.

Kevin talked about how he developed post-traumatic stress disorder (PTSD) after the tornado, and he met with a psychiatrist for a time to talk about the tornado and to help with his nightmares and sleep struggles. "I don't remember the bad dreams anymore, but I still wake up about four times a night." As Kevin was asleep when the tornado occurred, it makes sense that he struggles with sleep. However, Kevin shared how talking with his psychiatrist about his experience with the tornado has eliminated his nightmares. Engaging in therapy as he has done has helped him heal and recover.

Thinking Positively

Four of the six participants reported thinking positively after the tornado helped them to recover and grow. Marie said, "I learned you don't let the little stuff get to you and I try to help other people too, like 'is it really worth getting upset over' and I'm a lot more patient now. But at the time, for a while I was really angry. And then because my daughter saw us fighting and bickering, she basically said to my husband and me, 'This tornado has taken a lot of stuff from us, please don't let it take my mom and dad's marriage' And you know and I do remember, we kind of looked at each other at that point and were like, you know what, we gotta make this work. And once we moved back into our home and everything settled down, that's when we realized, we can make it through anything now. We communicate a lot better with each other now, we're very, very supportive and protective of each other now, we're a team, our marriage is stronger. Changing one's attitude or outlook can make all the difference in recovering from a trauma.

For Sarah, who experienced a second trauma, she shared that she had experienced a hurricane a few years after the tornado while living in another state and while the damage to their home was significantly less than that of the tornado, it was still traumatizing. She said her husband said to her ‘if you can’t handle this, you just need to step out’ And I was like nope, I got it. I walked right into the room, and I was like ok the bed’s a loss, but honestly it was just a bed. When we evacuated, we took pictures of our belongings and in our house that we’re currently in, every room is videotaped and, on our phones, so if this happens again, I can just pull it out and give it to insurance.” Having a positive attitude was a key for Sarah, facing the trauma head on with the knowledge she could handle it.

Ben too talked about how having a positive attitude was key, “I reach out more to friends and family and when there’s bad weather, I check in on them. Having lived through the tornado and having the feeling that we’re lucky, we have each other.” And “I feel like I stay calm during the highly stressful situations. Like I’m in the trauma bay with somebody and I have to get a huge needle in their arm, and they’ve got not so great veins and its chaos in the room, but I’m like very, very calm. I get done what needs to be done and stay focused, not get caught up in the chaos.” Here again the knowledge that he has already faced a very difficult and scary situation gave him the power to know he is capable of handling a crisis.

Jennifer talked about realizing there were things to be grateful for, “We had damage on three sides of our house, but the structure was still there, and we had our stuff, the stuff that was damaged could be replaced. A couple of doors down from us, the houses were just leveled.”

Being Better Prepared

Three of the six participants talked of being better prepared for future disasters following the tornado. Marie reported still feeling significant fear when severe weather is predicted. She

said, “When the siren goes off, I’m getting all my stuff into the basement. I’ve got clothes down there, all my jewelry, my passports, a flashlight. It could happen again and I’m gonna be a little better prepared than I was before. After the tornado I couldn’t find my grandmother’s diamond ring, it was by my bed before the storm. Then miraculously it was found and now I keep it in my room, but when a storm hits, it’s on my finger.” The idea of feeling prepared can be reassuring to someone who has lived through the unthinkable.

Jennifer said, “When the warning sirens go off or your phone goes off with a warning, we don’t take that for granted anymore. Preparation is different than it was before, because now down in the bathroom in the basement, I have a whistle in case you’d be trapped there, and I have a flashlight and a phone charger. I’ve learned you take your purse, your medicine, your car keys, and you make sure you have shoes. I have a duffel bag with an extra set of clothes in it and shoes.”

Sarah said, “Every room in the house we now live in is videotaped and is on our phones, because if this happens again, I can just pull out my phone and give it to insurance. And years later, when we had to evacuate when the hurricane was coming, and we took pictures of everything.” For many, feeling better prepared for any potential future disaster brings a sense of comfort; it’s the taking action, taking control which can be crucial after being powerless which is often the case in tornados and other natural disasters.

Evaluation of the Findings

This study was based on the two research questions of: 1) What is the lived experience of tornado survivors related to positive changes in their lives? And 2) What strategies or coping skills were used to help tornado survivors experience PTG.

Research Question 1

The data reflected that all six participants experienced positive changes as a result of the tornado. Those changes fit within the PTG theory's five factors thereby supporting this existing theory (Tedeschi et al., 2004). As there is little existing research on this topic from a long-term perspective, one of the key factors in this study was that it took place nearly 11 years after the tornado thus providing a long-term look at effects of the event. Some of the positive changes that participants described occurred shortly after the tornado and other changes came later, but nearly all were maintained over time. Three themes emerged from the data: "greater appreciation of life", "desire to help others", and "deepening of faith". The first theme, "greater appreciation of life" matched two of the 5 factors of the PTG model, appreciation of life and relating to others. Five of the six participants reported feeling a greater appreciation for life. A common theme of realizing the value of people over material things was evident in all five lived experiences. Collectively they reported feeling closer to loved ones and realizing things can be replaced, but lives cannot. The second theme, "desire to help others" fits within the PTG factor, relating to others. Three of the six participants reported this factor. Evidence of this was apparent not only in the immediate aftermath of the storm, but also years later for some of the survivors. Right after the storm, some talked about looking for neighbors and helping them get out of their damaged homes. For two of the survivors, helping others took the form of volunteering and even working in one of the helping professions as an ER nurse. The third theme, "deepening of faith" relates to the PTG model factor, spiritual change and four of the six participants stated they experienced a positive change in their spiritual beliefs. Previous research suggests that higher levels of spiritual fortitude can lead to higher incidences of PTG (Pargament et al., 2013; Zeligman et al., 2019; Zhang et al., 2021). The results from this study supported this concept as all four talked of how their faith had always been an important part of their lives, but how it grew

stronger after the tornado. As this study took place nearly eleven years after the tornado, it was important to determine if these positive changes leading to PTG lasted over time. This appeared to indeed be the case, as the five participants who experienced PTG maintained these changes over time.

Research Question 2

Three themes emerged from this question: Telling their story, thinking positively, and being better prepared for future disasters. The first theme, telling their story, was part of the lived experience of three of the participants. Similar to existing research (Henson et al., 2020) where survivors who engaged in cognitively engaging and processing the traumatic event which led to the development of PTG, the participants found the same to be true. In talking with others about the tornado, they experienced comfort and healing which led to PTG.

The second theme, thinking positively, was reported by four of the study participants as something they deliberately chose to do. Having a positive outlook, choosing to be optimistic was an important part of their growth and recovery. Just as the study by Weber et al., in 2020 explored how perceived meaning in life was positively correlated with PTG and resilience, the current study supported this concept.

The third theme, being better prepared for future disasters was found in three of the participants' accounts of their lived experiences of the tornado. For many natural disaster survivors, taking some type of action to better prepare for any future disasters is reassuring and gives them some sense of control. Action taking has been long since researched as a healthy coping method for trauma (Henson et al., 2020).

As the problem in this study was the significant negative impact on mental health of tornado survivors, the results clearly showed all six participants reported negative effects on their

mental health from the tornado. All talked of having a heightened sense of anxiety when severe weather is predicted with some still struggling with post-traumatic stress symptoms such as flashbacks and nightmares. Stress on relationships with others was also reported along with some experiencing survivors' guilt. One participant nearly lost his life, and he reported still struggling with sleep as he was asleep right before the tornado hit. In speaking with these 6 survivors, the message was clear, surviving a tornado changes a person, there is the "before" and the "after."

In terms of whether or not these tornado survivors experienced PTG, as described by Tedeschi et al., in 2004, the conclusion based on the data would suggest that 5 of the 6 study participants did experience PTG, with the 6th participant experiencing positive changes as a result of the tornado, but not PTG. As PTG is defined as the "positive result of an individual who overcomes significant challenges due to a crisis in their life" and the five key areas of growth include: relating to others, spiritual change, personal strength, appreciation of life and new possibilities, the data supports this conclusion (Tedeschi et al., 2004; Tedeschi et al., 2017; First et al., 2018, Spialek et al., 2019).

Summary

This chapter included a discussion of how trustworthiness was established, including methods used to achieve credibility, transferability, confirmability and dependability. A detailed description was given of the study design and the data analysis process. The results were reported as to their relation to the two research questions as well as the 5 Factor PTG theory and the negative mental health outcomes associated with natural disasters as the psychological trauma.

As the purpose of this study was to identify contributing factors to the development of PTG based on the 5 Factor PTG theory, the study results did indeed provide support to this

existing theory. In addition, the findings provided support to the concept that negative mental health outcomes are associated with natural disasters. These findings were present in the participants' lived experiences in the form of anxiety and fear of severe weather, nightmares and sleep disturbances and post-traumatic symptoms and one individual who was diagnosed with post-traumatic stress disorder (PTSD).

Trustworthiness of the study was addressed including a detailed description of the study design as well as a breakdown of the interpretive phenomenological analysis (IPA) used. Member checking was completed to ensure credibility and confirmability, and by utilizing several forms of data, triangulation was addressed.

The two research questions for this study examined what positive changes if any, tornado survivors experienced and what coping strategies they used to experience PTG. The study results reflected that all participants experienced positive changes related to the tornado and 5 of the 6 participants experienced PTG, with PTG defined as "the positive result of an individual who overcomes significant challenges due to a crisis in their life" (Tedeschi et al., 2004).

The various coping strategies reported by the participants included: taking action, helping others, communicating in a positive way with others, sharing their story of the event, realizing the importance of people over things, having a positive attitude, relying on one's faith, utilizing the support of others and being prepared for a disaster. These various methods coalesced into three themes: telling their story, thinking positively and being better prepared for future disasters.

Chapter 5: Implications, Recommendations and Conclusions

The problem addressed in this study is the significant, negative impact on mental health that many tornado survivors experience. While negative mental health outcomes are associated with surviving natural disasters, including tornadoes, there are individuals who experience post-traumatic growth (PTG) as well. Understanding the factors that lead to PTG may help in preventing negative mental health outcomes related to experiencing a tornado. Thus, the purpose of this qualitative study with a phenomenological design, was to identify contributing factors to PTG through the perceptions of tornado survivors. The study consisted of six participants and included semi-structured interviews via video or phone with thirteen interview questions as well as an invitation for each participant to share their experience of the tornado. Each interview was recorded with the participant's permission and then transcribed. Data analysis was conducted using Interpretive Phenomenological Analysis (IPA). The results included data supporting the five factor PTG theory developed by Tedeschi and Calhoun, (2004) with the study participants experiencing the five factors: relating to others, spiritual change, personal strength, appreciation of life and new possibilities. With regard to limitations, as the study took place more than ten years after the event, recall could be affected as memories can shift over time. In addition, some participants may hesitate to share personal details of their feelings about the experience as it was a highly distressing event, and this could impact the study results as well. Steps to mitigate were taken to include member checking to address credibility; the participants were a wide range of ages and experienced varying degrees of property loss to address transferability, a detailed description of the design and methods were given to address dependability, and an adherence to factual data and acknowledgement of bias was conducted to address confirmability. This final

chapter will include the implications of the study, recommendations for practice as well as future research and a conclusion.

Implications

The first research question; *What is the lived experience of tornado survivors related to positive changes in their lives?* generated responses that centered around three themes: a deeper appreciation of life, a desire to help others, and a deepening of faith. These three areas align with the five factor PTG theory which consists of relating to others, spiritual change, personal strength, appreciation of life and new possibilities (Tedeschi et al., 2017). One need not experience all of these to experience PTG which is defined as “positive psychological change experienced as a result of the struggle with highly challenging life circumstances” (Tedeschi et al., 2017, p 1). In a systematic review in 2025 of studies on PTG where 22 out of 628 longitudinal studies were considered to match the review criteria, those individuals who employed active-adaptive coping experienced greater PTG which is in keeping with existing research (Majdandzic et al., 2025). Although the review examined long-term trauma such as terminal illnesses rather than single event trauma such as a tornado, the results still add to the existing research on PTG. The article reiterated how the development of PTG is truly a unique experience for each trauma survivor; therefore, for clinicians working with these patients, tailoring treatment to each client is appropriate.

In this current study, the first theme that emerged was appreciation of life, one of the five factors in the PTG theory which essentially means looking at life differently and seeing joy in even the smallest moments. After a true-life disruption such as a tornado, a person’s view of the world can change which often results in a new appreciation of the little things where one describes noticing the color of the sky or the smell of coffee in the morning, things that were

taken for granted before the trauma, but now take on far greater meaning (Tedeschi et al., 2004). Those who have expressed the presence of meaning in their life positively correlate with PTG (Weber et al., 2020). In addition, existing research has shown that feeling an appreciation of life and feeling distressed about the trauma can co-exist (Abbott et al., 2021; First et al., 2021; Guo et al., 2017; Mesidor et al., 2019; Prohaska, 2020; Triplett et al., 2012; Weber et al., 2020; Zeligman et al., 2019). All six of the participants in this study expressed experiencing an appreciation of life which provides support for the PTG five factor theory. All six participants also expressed feeling distressed about the event: therefore, giving additional support to the idea of both distress and PTG may co-occur.

A second area of responses, the desire to help others correlates with three of the five factors of the PTG theory: appreciation of life, relating to others and new possibilities. Relating to others is often seen as a positive change in how one feels about the people in their life, such as valuing relationships more than before the trauma occurred. It can also include the desire to help others in need. New possibilities may mean pursuing something new and more meaningful such as a career in serving others. In an article in 2004 about the foundations of PTG, a parent who had experienced loss said, "I've become more empathetic towards anybody in pain and anybody in any kind of grief." (Tedeschi et al., 2004, p 6). In this same article, one of the people interviewed by the authors talked of the decision to become an oncology nurse to help others facing loss. Just as one of the participants in this study decided to pursue a career in nursing to help others, this kind of life choice can be a result of experiencing PTG. The third area of responses, deepening of faith, correlates with one of the remaining five factors of the PTG theory, spiritual change which often results in a strengthening of one's faith. For some who experience trauma, it is their faith that provides a foundation for trauma recovery just as one

individual stated, “You think about getting through something like that and it’s downright impossible to even conceive of how you ever could. But that’s the beauty of the thing...it’s gonna have to be said because I believe that God got me through it. Five or six years ago I didn’t have these beliefs. And I don’t know what I would do without Him now.” (Tedeschi et al., 2004). Four of the six participants in this study expressed similar sentiments regarding their faith. A realignment of one’s priorities can be a positive change that can happen following a trauma such as a tornado and five of the six participants in the study echoed this sentiment, thus experiencing PTG.

Appreciation of Life

Sometimes trauma can lead to a greater sense of gratitude and a reassessment of what an individual truly values. Often people take life for granted living day to day, but when a person experiences a traumatic event such as a devastating tornado, they may adopt a very different view of the world with a greater appreciation for the little things. which is essentially where the PTG factor, appreciation of life, comes into play. Appreciation of life can happen when a person experiences a realignment of values following a traumatic event (Dickinson, 2021). Part of the process of recovering from trauma and experiencing PTG can include a redefining of core beliefs and an adjustment of one’s world view. “Benefit reminding” a term used to describe what one may do following a traumatic event to realign values and find one’s purpose in life (Triplett et al., 2011). Utilizing a positive coping style correlates with appreciation of life which results in higher incidences of PTG (Guo et al., 2017). In this current study, all six participants expressed a greater appreciation of life. As Marie stated, “you realize what’s important to you and it was our relationship, our marriage, our children. What is important is having each other and that all the material stuff can be replaced, but our love, our lives, our children, our family, and friends

cannot.” For Sarah, she talked about how she values “a lot more family time, so instead of giving physical gifts, I’d rather we go and do something together.” In Kevin’s case, he talked about his priorities in life shifting after the tornado, “When you come face-to-face with death, you experience an awakening.” For some, experiencing a life-changing event such as a tornado, they speak of their lives in terms of before and after with the event as a dividing point in their life (Tedeschi et al., 2004). This new way of thinking and evaluating their life can lead to the development of PTG.

Another component in appreciation of life is meaning-making which is defined as searching for purpose and/or meaning in life which was positively correlated with the development of PTG (Triplett et al., 2011). Viktor Frankl, a psychiatrist that survived the Holocaust developed Logotherapy, which is a therapeutic approach that involves the search for meaning as one’s primary purpose (Olmos et al., 2022). When one faces a devastating event such as a tornado, the need to understand and find meaning is vital to many who seek to make sense of their world. Finding meaning and gaining a greater appreciation of life is often the road that leads to experiencing PTG. Marie talked about finding meaning in what is profoundly important, “I think of all the photos we lost. So now I’m always like, ‘Take the picture, take the trip, make the memory. Because you just never know and hold on to them.’” For Sarah, a new appreciation of life was about family truly being there to help, “So it was like we learned the saying ‘we’ll drop everything and be there for people’ really was true. And that really affected us and changed relationships.” For Ben finding meaning became about checking on loved ones, “A lot of people now ask us to text to make sure we get home ok, and I do that as well.”

Desire to Help Others

In the five factor PTG theory, the domain of relating to others may include wanting to help other people in some way. In a study of medical students who experienced an earthquake, tsunami, and nuclear accident in Japan in 2011, volunteering after the disaster was found to be positively correlated to PTG (Anderson et al., 2016; Kaye-Kauderer et al., 2019). Taking action by giving assistance to others in need and showing kindness and compassion can yield positive growth opportunities and provide meaning. For many of the students who volunteered their time to help survivors of the disaster, they experienced less guilt than non-volunteers as well as PTG. In this current study, three of the participants, Marie, Ben and Jennifer, expressed this desire to help others. For Marie, she spoke of wanting to join FEMA to help others who experience a natural disaster such as a tornado, “I’m a big believer in giving back and helping others and now that we’re retired, we don’t want to just sit around, we want to go help others. We want to apply to FEMA because it’s personal, I know how those people feel. I walked in those shoes.” For Ben he became an ER nurse. “I always wanted to work with people after the tornado happened. I can try to help my patients through a very traumatic day that they have because I can relate. When you’ve lived through something like that, that huge, that traumatic, it does help you and then you can help other people because you get it.” In Jennifer’s account of the experience, she talked of having a tighter relationship with the neighbors that she shared the experience with. She described attending block parties, “They were held at different churches and so you went there and all the people from the neighborhood gathered there. They had therapy dogs for us.” The idea of “neighbor helping neighbor,” a concept that was explained in an article by Shallcross in 2012 explored how engaging community resources to help survivors following a disaster can be crucial in terms of recovery. Not only does it help to have the support of one’s neighbors, but it benefits the ones doing the “helping.”

Relating to others can also take the shape of having warmer, deeper relationships with loved ones (Tedeschi et al., 2004). All six of the participants in the current study expressed a positive change in their relationships with others. Sarah said, “I think my parents and I were always close, but after the tornado it brought us much closer. I feel like I can talk to them about anything now because we went through something so traumatic.” For Marie, it was a strengthening of her marriage, “We are a team now”, she said. “We talk to each other differently. We’re very, very supportive and protective of each other now.” Kevin talked of how his children are the most important thing to him, “We don’t know when our time is up, so I always leave them knowing I love them.”

Deepening of Faith

Another factor of the five factor PTG theory is spiritual change which can have many interpretations, but essentially a strengthening of one’s faith can lead to PTG as reported in a study by Zeligman et al., in 2019 which examined survivors of a flood in Louisiana in 2016. The researchers hypothesized having a strong spiritual fortitude would result in higher levels of PTG and this hypothesis was supported. A strong sense of faith or spiritual fortitude (SF) can lead to more positive coping following a disaster (Zang et al., 2022). For some, attributing the disaster as an “Act of God” can provide a sense of understanding (Park, 2016). For those who utilize positive religious coping, including the act of prayer can lead to less distress and actually more PTG. In this current study the results gave further support to this concept in four of the six participants. Patty stated, “I have a very strong faith, but I think it has become stronger. I tend to lean on God a lot more since the storm. Jennifer said, “I think it was validation that God was looking out for us and looking out for our congregation because we had left after first service and the church was full of people for the second service and they were sheltering and had spotters

looking out and seeing it coming towards them and just knowing God's hand was in it." Ben said, "I think my faith is stronger because of the storm too. From that day, I think God was with me that day and with a lot of people and saved a lot of people." For Sarah, she shared she initially struggled with her faith after the tornado, but over time decided she needed to stop being so resentful, "I just took it more like, ok I obviously had to go through this for some type of weird lesson." Possessing a strong sense of spirituality or religious orientation can help to conceptualize suffering in a larger context which can be beneficial and result in PTG (Dickinson, 2021).

When considering the importance of the results of the study, it is also vital to consider the limitations of the interpretation. The interpretation of study results can potentially be influenced by several factors and in this case, one factor might be the tendency of this researcher to see things in a positive light. To combat this, the data was reviewed many times to ensure the participant's interpretation of the experience was what was recorded, not the researcher's interpretation. Another potential factor that may have influenced the interpretation of the results is the type of study as qualitative studies such as this one rely on the subject's interpretation of the experience rather than in a quantitative design which would use a standardized measurement tool such as the PTG inventory.

The first research question addressed the problem of the psychological trauma that survivors of natural disasters experience as was clear by the participant's responses including fear, shock, anger, sadness, anxiety. Some of these were experienced immediately after the event and others are still evident today. The first question also supported the study purpose of identifying the long-term impacts of trauma on tornado survivors as well as contributing factors to PTG. As the study was conducted more than ten years after the event, the negative impacts

such as post-traumatic stress symptoms were evident in each of the participants to varying degrees. From feeling a heightened sense of anxiety when storms approach to one participant's diagnosis of post-traumatic stress disorder (PTSD), all were negatively affected by the tornado. All six participants experienced at least one of the five factors of PTG as well.

The responses to the first research question reflected the presence of Tedeschi and Calhoun's theory of the five factors of PTG as was the intent of the study. The three themes that were found in the results related to the first research question; appreciation of life, desire to help others and deepening of faith, all correlate with the five factors of the PTG theoretical framework.

Existing research shows us that one can experience PTG while experiencing trauma as the two are not mutually exclusive (Abbott et al., 2021; First et al., 2018; Mesinor, 2019; Prohaska, 2020; Weber et al., 2020; Zeligman et al., 2019). This study provided further support to this concept.

The second research question, *what strategies or coping skills were used to help survivors experience post-traumatic growth?* produced responses that coalesced into three themes; telling their story, thinking positively, and being better prepared for future disasters. As there are many different coping skills that can lead to the development of PTG, identifying these coping skills can be helpful to mental health professionals when determining the individual treatment plan.

Telling Their Story

Telling their story which can be thought of as narrative therapy, was developed by Michael White and David Epston and is based on the idea that one can gain a more positive viewpoint of a specific problem or struggle by sharing their experience with others, "saying it out

loud” or “re-authoring” their experience (looking at it as separate from themselves and focusing on their strengths and past successes (National Institute of Health, 2003). Being a part of a support group for others who have suffered the same traumatic event or one that is similar can be a crucial part of healing as the idea of others who have “been there” offers a level of understanding and support (Tedeschi et al., 2004, p 8). For some, they describe their lives in terms of before and after the event with the event itself as a pivotal moment where everything changed. Three of the six participants of this current study reported that they had utilized this concept which helped them to experience PTG. Marie stated, “Talking about my story has helped me heal over the years. I honestly think people need to make the time to talk and accept mental health support. I look back and wish I had taken the mental health support that was offered. I was like, ‘I can’t, I have too much going on.’ I have more patience now so when people tell their story, I sit back and listen.” For Jennifer it was the community support that helped her, “The winter following the tornado, there were block parties, neighborhood parties. You could see others and see that they were ok, and you could share your story.” For Kevin who developed PTSD after the tornado, it was talking with a psychiatrist about his nightmares, “I don’t remember the bad dreams anymore, but I still wake up about four times a night.” Telling one’s story has been shown to be helpful for many and to result in PTG for some, but there is also another option to address this type of trauma, specifically for those who develop PTSD, it is a type of therapy called, Eye Movement Desensitization and Reprocessing, (EMDR). One of the many symptoms of PTSD is nightmares and this kind of therapy can be greatly beneficial (Shapiro et al., 2004). Although Kevin did not receive EMDR, he was able to begin living nightmare free due in great part to the therapy he received which again makes the case that talking about one’s trauma can truly help the recovery and healing process.

Part of the EMDR process does involve sharing one's story of the trauma, but not in depth. Instead, the protocol utilizes the brain's ability to visualize the image of the worst part of the trauma and then facilitates bi-lateral stimulation using left to right eye movements or auditory tones to essentially kick start the brain into restarting the processing of the traumatic event which had been stalled. This is needed in order to store the memory adaptively which stops such post-traumatic symptoms from continuing. In a study of earthquake survivors, EMDR was given and PTSD symptoms lessened significantly after the therapeutic intervention (Mukba et al., 2020).

In a study of the survivors of the 2011 Joplin, MO tornado, which is the strongest tornado on record in the US, (National Weather Service, 2025) communication with friends/family/community was linked to higher incidences of PTG. "The effects of trauma depend greatly on whether those wounded can seek comfort, reassurance, and safety with others" (First et al., 2018, p 15). Telling one's story can help ease the heavy burden of carrying it alone and can lead to recovery and even PTG.

Thinking Positively

Adopting an optimistic attitude can make all the difference in recovering from a trauma (Carbone et al., 2017). In a study of survivors of the 2011 tornado outbreak, the existence of optimism was found to have a positive effect on recovery related to mental health. Possessing an optimistic attitude can lead to active problem solving as was evident in many of the survivors of the 2011 tornado who participated in the study. Similarly, four of the six study participants in this current study expressed utilizing this concept. Marie said, "I learned you don't let the little stuff get to you and I try to help other people too, like 'is it really worth getting upset over?' and I'm a lot more patient now." Marie said she has a mantra she repeats to herself daily, "Count your rainbows, not your thunderstorms." For Sarah it was evident that having lived through the

tornado, she had the ability to handle a second trauma when years later she and her husband experienced damage to their home after a hurricane. Her husband said to her in the aftermath of the hurricane, “If you can’t handle this, you just need to step out.” And her response was, “Nope I got it. I walked right into the room, and I was like ok the bed is a loss, but honestly it was just a bed.” According to a study that was conducted eight years after the 2008 Wenchuan earthquake, survivors who utilized a positive coping style which can consist of cognitive reframing from a positive perspective led to PTG (Guo et al., 2017). Additionally, a positive coping style has been linked to an appreciation of life, one of the five factors of the PTG theory. Utilizing positive thinking has been shown to help survivors of natural disasters recover and grow, experiencing PTG. Adopting a “the glass is half-full vs half-empty” can make a significant difference in recovery following a disaster (Tedeschi et al., 2004).

Being Better Prepared

For those who survive devastating natural disasters like tornadoes, being better prepared for future storms seems to bring some comfort and reassurance. When a person experiences a sudden disaster such as a tornado, there is an element of shock and a feeling of being unprepared. While there is limited research exploring the relationship between preparation and PTG, it is possible that by taking steps to better prepare for any future disasters, one can gain a sense of control which can contribute to PTG. Dickinson (2021) found that being prepared for a disaster such as having an emergency plan of where to go along with adequate basic supplies such as food, water, first-aid kit, medications, and a flashlight, helped people feel some sense of control. This was a common sentiment expressed by three of the six participants in this study, where after they experienced the tornado, they were much better prepared for a future tornado which seemed to bring each of them a sense of comfort. Whether it means learning about tornados, gathering

important belongings, or being more vigilant about dangerous weather, each of these actions can lessen anxiety about any potential future storm threats. While Marie reported still feeling significant fear when a storm is predicted, she said, “When the siren goes off, I’m getting all my stuff into the basement. I’ve got clothes down there, all my jewelry, my passports, a flashlight. It could happen again and I’m gonna be better prepared than I was before.” Jennifer said, “When the warning sirens go off or your phone goes off with a warning, we don’t take that for granted any more. Preparation is different than it was before, because now down in the bathroom in the basement, I have a whistle in case you’d be trapped there, and I have a flashlight and a phone charger. I’ve learned you take your purse, your medicine, your car keys, and you make sure you have shoes.” Sarah shared what she and her husband have done since the tornado to better prepare, “Every room in the house we now live in is videotaped and is on our phones, because if this happens again, I can just pull out my phone and give it to insurance.” Feeling helpless after a disaster can be mitigated to some degree by taking action and in this case the action is preparing to be ready in case it ever happens again, which can feel empowering.

Here again it is important to remember that the interpretation of the results can be influenced by various factors. In qualitative phenomenological studies, the data is the participant’s subjective experience therefore there can be some variation in what is perceived as a coping skill from one individual to another. In this case, telling their story, thinking positively and being better prepared for future storms are methods that worked for the individuals in this study, but may not work for everyone.

The second research question addressed the problem of the psychological trauma that disaster survivors experience as was evident in their need to utilize coping skills to combat the psychological trauma. In addition, it also supported the purpose of the study to identify the long-

term impacts of trauma on tornado survivors as well as contributing factors to PTG. All six of the participants talked about still feeling the negative effects of the tornado even ten plus years after the event which is when the study was conducted.

The three themes of the data from the second research question, telling their story, thinking positively, and being better prepared for future storms correlate with the framework of the five factor PTG theory of Tedeschi and Calhoun. Telling their story correlates with relating to others, thinking positively correlates with appreciation of life and being better prepared for future storms corelates with personal strength.

Existing research has shown us that telling one's story, having a positive attitude and utilizing personal strength are all common responses to those who experience trauma such as a natural disaster and can result in experiencing PTG (Carbone et al., 2017; First et al., 2018; Guo et al., 2017; Hamana-Raz et al., 2017; Henson et al., 2021; Lowenthal 2022; Spialek et al., 2019).

Recommendations for Practice

As climate change continues to be a concerning factor for society with severe storms increasing in intensity and frequency, it is imperative that we seek to understand the effects on mental health and further, how best to support the recovery of the survivors (Weber et al., 2020). Essentially the responses to the first research question are impactful on a societal level as they provide supporting evidence that PTG can be maintained even years after the trauma. Further, the idea that although tornado survivors who often receive very little warning as compared to other natural disaster survivors, can bounce back to pre-trauma functioning and even go beyond to personal growth is evident in the study results. Community resiliency is another important factor which can lead to individual resiliency and growth (First et al., 2018; Spialek et al.,

2016;). In this study, the community of Washington received an outpouring of support and resources, and this may very well have contributed to the development of PTG in five of the six participants. As tornadoes are increasing, communities need to be prepared, and resources must be available to those in need. Mental health professionals can recognize and understand this process and assist in connecting survivors to community resources and in doing so can better support these individuals in their recovery. In addition, mental health professionals have an obligation to become trained in trauma and specifically in disaster preparedness if possible as the need for support will only increase as severe storms continue to occur more frequently (Shallcross, 2012). In addition, mental health professionals can use PTG theory and the results of this study as a guide in helping clients determine if the development of PTG has occurred and if not, how it may be developed by highlighting effective coping strategies that can lead to PTG. Positive religious coping, active coping and perceived social support have been shown to support the development of PTG (Mesidor et al., 2019). In this study telling their story was a positive coping skill that three of the six participants utilized. Perceived social support as noted above is a known contributing factor to PTG and for those who feel safe and supported by others, sharing their story can be incredibly healing and lead to PTG. It is in this area that mental health professionals can assist clients in connecting with others such as family, friends, neighbors and communities to seek support in their healing journey. Having a positive attitude or choosing to be optimistic can be connected to having a strong sense of faith or spirituality which is a known positive coping skill and can lead to PTG (Mesidor et al., 2019; Zhang et al., 2022). Four of the six participants in this study reported utilizing this positive coping strategy. For mental health professionals working with trauma survivors, exploring the client's faith or spirituality may be helpful in their recovery. Active coping which can show up as rebuilding after the tornado or

taking steps to be better prepared for any potential future disaster which is what three of the participants reported as their way of coping (Mesidor et al., 2019; Shallcross, 2012). Again, this is where mental health professionals can help clients to identify if taking action in some concrete way may be helpful and healing for them.

As there are many coping strategies which have been shown to help with the development of PTG, the three listed above are not conclusive, but they were present in this current study. Helping others, such as volunteering or even working in a field where serving others is the focus, is another common path to recovery and PTG (Anderson et al., 2016; Kaye-Kauderer et al., 2019). Three of the participants in this study reported being involved in this area, from volunteering to attending support groups to choosing a career in emergency medicine. For those mental health professionals treating trauma survivors, it appears to be beneficial to the client to explore these possibilities.

Recommendations for Future Research

In the area of PTG research, it has been suggested in several studies (Carbone et al., 2017; Houston et al., 2015; First et al., 2018; Prohaska, 2020; and Spialek et al., 2019) that a longitudinal approach should be used to understand PTG following disasters. As this study was conducted more than ten years after the tornado, it did take a long-term approach in providing data many years after the event, but it did not provide a basis for comparison by conducting assessments within the first ten years after the tornado. Future research that examines PTG in tornado survivors shortly after and in incremental stages over time could give important information that could further help to define how PTG develops in tornado survivors.

As one of the six participants experienced positive change but not actual PTG, one could posit a plausible reason this individual did not experience PTG was due to the fact that they were

less severely impacted than the other participants and did not experience significant trauma from the tornado. Along these lines, a suggestion for future research might be to examine the potential link between the degree of property damage and the development of PTG. While the degree of property damage survivors' experience has not been determined specifically to have a direct link to the development of PTG, the severity of the trauma as a whole is known to be related to the development of PTG (First et al., 2018). In a quantitative study of survivors of the 2011 Joplin, Missouri tornado, the researchers examined the impact of the tornado across several areas including property damage and found the more significant the damage, the higher incidences of PTG (First et al., 2018). This quantitative study utilized several reliable and valid measurement tools including the Post-traumatic Growth Inventory, Short Form (PTGI-SF) as well as the Impact Event Scale-Revised (IEV-R). In addition, the results of the Joplin study provided further support to the idea that telling one's story, communicating with others about the event has a positive association to PTG just as this current study has done. Future research with a quantitative, longitudinal design may be beneficial as quantitative studies provide more generalizability than phenomenological, qualitative designs such as this current study which provides a more in-depth description of the subject's experience. Another consideration for future research may be examining how the amount of warning time affects the severity of the trauma when compared to other natural disasters which typically provide more warning time to allow people to prepare and/or evacuate.

Conclusion

A gap in the literature indicated a need for a qualitative, phenomenological study of tornado survivors on a long-term basis exploring the problem of significant negative impacts on mental health. The purpose of this study was to identify contributing factors to the development of PTG in tornado survivors. This study explored the subjective experiences of six individuals who were directly impacted by the 2013 EF-4 central Illinois tornado that occurred on Nov 17, 2013. Semi-structured interviews were conducted with each study participant, and the resulting data was analyzed using Interpretive Phenomenological Analysis. The theory utilized in the study was the five factor PTG theory developed by Tedeschi and Calhoun, 2004.

Previous research has focused on PTG in natural disaster survivors and some on tornado survivors specifically, but relatively few were done several years after the event. As this study was conducted nearly eleven years after the event, the participants' recovery and growth were evident whereas for some survivors that are interviewed shortly after a disaster, PTG may not have yet developed. PTG is not static, but instead an evolving process therefore the need to explore its existence after a fair amount of time has passed is crucial. For many survivors of natural disasters such as tornadoes, initially there is an element of shock and even anger. In this study, Marie expressed such feelings, "I didn't realize how angry I was. I look back and I was very bitter, mad, and angry. And now I feel like I'm a better person. I know what's important in life, its people, not things. I think the tornado put that into perspective for me."

Additionally, previous research has explored the negative impact on mental health of survivors, but again few on tornado survivors specifically. This study examined the negative impacts on mental health of tornado survivors more than ten years after the event as well as contributing factors to PTG in these survivors. All six participants reported being negatively impacted by the tornado to varying degrees even today, years after the event, thus providing

continued support to the existing research of negative effects on mental health following tornadoes and other natural disasters (Carbone et al., 2017; First et al., 2018; Houston et al., 2015).

Experts continue to report that climate change is related to the intensification of natural disasters with tornadoes becoming more frequent and more severe (insurance information institute, (iii), 2021). The damage from these devastating disasters affects not only thousands of individuals each year in the US, but often whole communities are negatively impacted with costs in the billions. Understanding the negative impact on the mental health of tornado survivors is crucial as offering optimum support to not only each survivor, but also to communities as a whole (Hrabok et al., 2020; Lee et al., 2022; Makwana, 2019; Triplett et al., 2011). For mental health professionals, the data from this study offers continued support for the concept that one can experience severe trauma and yet can also experience PTG. Additionally, when working with survivors the goal would be to understand their individual experience and help them develop healthy coping strategies such as those identified in this study. The data reflected an overall theme of discovering meaning in one's life and having a better appreciation for life with the understanding people are what matter most. For some, experiencing severe trauma is a wake-up call to the fragility of life and can offer new insight into what one values most in the world. The great Ernest Hemingway once said, "The world breaks everyone, and afterward, many are strong at the broken places." (Dickinson, 2021, p 503).

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Appendix B

Online Screening Questionnaire

1. Are you 18 years of age or older?

Yes

No

2. Were you directly impacted by the November 2013 tornado in central Illinois?

Yes

No

Appendix C

Zoom Video/Phone Semi-Structured Interview

Introduction

Thank you for agreeing to participate in this study. I'd like to take a few moments to review the study and answer any questions you might have before we get started with the interview.

[Researcher will provide a summary of the informed consent form that was signed by the participant and answer questions the participant might have.]

We are ready to begin the interview, and as we discussed, I'll be recording this interview. Is it okay if I start recording now?

Interview Questions

1. How has experiencing the tornado led to positive changes in your life?

Relationships

2. What positive changes or growth have you experienced in your relationships with others?
3. What do you think led to positive changes in your relationships with others?

Prompts: Did you experience a change in how you thought about relationships?

If so, how did your thinking change?

What actions did you take that led to positive changes in relationships?

Spirituality

4. What positive changes or growth have you experienced in your spiritual beliefs?
5. What do you think led to these positive changes?

Prompts: Did you experience a change in how you thought about your spiritual beliefs? If so, how did your thinking change?

What actions did you take that led to positive changes in your spiritual beliefs?

Personal Strength

6. In what ways has your sense of your own personal strength changed since the tornado?
7. What do you think led you to a shift in your perspective on your own personal strength?

Prompts: Did you experience a change in how you thought about personal strength? If so, how did your thinking change?

What actions did you take that led to positive changes in your sense of personal strength?

Appreciation of Life

8. In what ways has your appreciation of life changed after the tornado?
9. What do you think led to a change in your appreciation of life?

Prompts: Did you experience a change in how you thought about life? If so, how did your thinking change?

What actions did you take that led to positive changes in your appreciation of life?

New Possibilities

10. What new possibilities or opportunities did you pursue because of the tornado?

Prompts: Did you pursue new interests, a new life path, or make other important changes in your life because of the tornado?

11. What do you think led to your ability to use this experience with the tornado as motivation for pursuing these new possibilities?

Prompts: Did you experience a change in your thinking that you believe led to the pursuit of new possibilities? If so, how did your thinking change?

12. We've discussed many positive changes that occurred within your experience of the tornado, and we've also discussed many factors that led to these positive changes. In thinking about these positive changes as a whole:

- a. Are any additional positive outcomes that occurred that we haven't discussed? If so, what are the additional positive outcomes?
- b. Are there any additional coping skills or strategies that you used that led to these changes? If so, what are the additional coping skills or strategies?

13. Are there any additional thoughts you'd like to share?

Appendix D

Eligibility Criteria

1. You are 18 years of age or older.
2. You were directly impacted (experienced personal loss, for example injury of self, injury or death of a loved one, property loss, financial loss by the November 2013 EF-4 tornado in central Illinois.

Appendix E

Consent Form

National University IRB

9338 Lightwave Ave., San Diego, CA 92123 irb@nu.edu

My name is Teresa Markum, and I am a doctoral student at National University (NU).

I'm conducting a research study and asking you to take part in this research study about the long-term impacts of positive life changes in trauma survivors of the EF-4 November 2013 tornado in central Illinois. The name of this research is "Post-Traumatic Growth in Survivors of the 2013 EF-4 Central Illinois Tornado"

You may participate in this research if you meet all of the following criteria:

1. You are 18 years of age or older.
2. You were directly impacted (as in experienced personal trauma in the form of injury of self, injury or death of a loved one, property damage/loss or emotional trauma) by the November 2013 EF-4 tornado in central Illinois.

I hope to include 3-10 people in this research.

Please read this form carefully and ask any questions you may have before agreeing to take part in the study.

What you will be asked to do: If you agree to be in this study, you will be asked to do the following activities:

1. "Participate in a 1:1 online interview over Zoom or phone for 45-60 minutes"
2. "Review your interview transcript via email for 10-15 minutes for accuracy"

During these activities, you will be asked questions about:

- Positive changes that have occurred since the tornado including improvements in relationships, growth in spiritual beliefs, changes in personal strength, changes in perspective on life, increased appreciation in life, new possibilities or opportunities, new coping skills

Risks: There are foreseeable risks or discomforts associated with this research such as psychological risks/discomfort that may happen when remembering the tornado. You can skip any question you do not wish to answer or stop participation at any time. Referrals to licensed therapists will be available as a resource if needed.

Benefits: If you participate, there are no direct benefits to you. This research may increase the body of knowledge in the subject area of this research.

Recording: I would like to audio/video record your responses and/or actions with Zoom Video during the interview. You can disable the video function of the online meeting platform at any time.

Mandated Reporting: My professional role outside of NU requires me to report suspicion of child or elderly abuse, suspicion of possible harm to self or others, and committed crimes to the appropriate authorities.

Confidentiality: I will keep the records of this study private and take reasonable measures to protect the security of all your personal information. In any report I make public, I will not include any information that will make it possible to identify you. All participants will be given a pseudonym to protect their identity. Data will be securely stored for 3 years and then I will delete electronic data and destroy paper data.

Taking part is voluntary: Participation in this study is completely voluntary. You may quit at any time.

If you have questions: Please ask any questions you have now. If you have questions later, you may contact me at T.Markum2035@o365.ncu.edu or at (309)258-8851. 2

National University IRB 9338 Lightwave Ave., San Diego, CA 92123 irb@nu.edu

If you have any questions or concerns regarding your rights as a subject in this study, you may contact the Institutional Review Board (IRB) via email at irb@nu.edu

Statement of Consent: I have read the above information and have received answers to any questions I asked. I consent to take part in the study.

Your Signature _____ Date _____

Your Name (printed) _____

Appendix F

Psychological Resources

National Mental Health Hotline – 1-866-903-3787 – free, confidential and available 24/7

Illinois Mental Health Hotline – Call or text 988 – free, confidential and available 24/7

Therapist Directory – www.psychologytoday.com

OSF Behavioral & Mental Health 309-624-9522 osfhealthcare.org - SilverCloud