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Examining Posttraumatic Growth After a Natural Disaster: An Appreciative Inquiry Approach

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Abstract

With the frequency and intensity of natural disasters expected to increase as climate change persists, it is crucial for agricultural educators and extension agents around the world to develop the capacity to assist individuals in the wake of traumatic natural disasters. Data were collected in January 2019 and surveyed Georgia residents who they themselves, or someone they cared about, were affected by Hurricane Michael which occurred in October 2018. Data were measured using a modified version of Tedeschi and Calhoun's (1996) 21-item posttraumatic growth inventory. Highest mean posttraumatic growth score was associated with the Relate to Others scale, while the lowest mean score was associated with the Appreciation of Life scale. Approximately 48% of respondents reported a large or very large change in their compassion for others and their appreciation of each day as a result of their traumatic experience. Female respondents scored higher than male respondents on all the posttraumatic growth factors. Significant differences at the .05 level between male and female mean posttraumatic growth scores were identified for five scale factors; personal strength; spiritual change; appreciation of life; and overall posttraumatic growth. These findings suggest females may be more adaptive to traumatic events and more likely to be receptive to the potential to perceive positive benefits resulting from traumatic experiences. An associated recommendation would be for agricultural educators and extension personnel to utilize the appreciative inquiry approach when assisting individuals recovering from natural disasters and other traumatic events.

Keywords: posttraumatic growth; Hurricane Michael; natural disasters; appreciative inquiry

Introduction

From October 7-11, 2018, Hurricane Michael devastated the Florida panhandle as well as parts of southwestern and central Georgia. This category five storm made first made landfall near Mexico Beach and Tyndall Air Force Base in Florida before moving inland to Georgia, passing west of Albany and southeast of Macon (Beven et al., 2019). Initially, Hurricane Michael hit parts of southwestern Georgia with winds up to 115 miles per hour (Brasch et al., 2018). While the storm was downgraded to a category three hurricane by the time it reached Macon (Beven et al., 2019), the aftermath of this natural disaster was no less severe.

Approximately $4.7 billion worth of damages were incurred by Hurricane Michael, with high winds causing damage to structures as well as agricultural and forestry operations throughout southwestern and central Georgia (Beven et al., 2019). According to University of Georgia researchers, over $2 billion in damages were related directly to crops and commodities including pecans, soybeans, cotton, peanuts, timber, beef, and poultry (Evans, 2020). Across Coffee, Houston, Mitchell, Wilcox and Decatur counties in south Georgia, an estimated 53 poultry houses were decimated. Additionally, Hurricane Michael precipitated widespread power outages, hundreds of downed trees, storm surges, heavy rains, freshwater flooding, three tornadoes, and one death within Georgia (Beven et al., 2019; Brasch et al., 2018).

The long-term effects of climate change have impacted the severity and frequency of natural disasters around the globe (USGS, n.d.). Climatic changes affecting Earth's surface temperatures, precipitated by increasing greenhouse gas emissions, has led to increased ocean temperatures as well as a decrease in the temperature range between the North and South poles (NASA, 2005). These changes may facilitate the rise of more intense and far-reaching tropical storms, which may evolve into hurricanes (NASA, 2005). Other long-term effects of climate change include increased intensity, duration, and frequency of heat waves across North America, as well as increased risk of inland flash floods, more frequent coastal flooding, increased storm erosion, and rising sea levels across Europe (USGS, n.d.). For Asia, climate change will contribute to increased flooding among coastal regions, as well as an increased death rate due to diseases related to floods and droughts (USGS, n.d.). Similar changes and challenges are also expected throughout Africa, Oceania, and the Caribbean (USGS, n.d.), underscoring the global nature of the changes and anticipated impacts.

As the frequency and intensity of these natural disasters rise, it is imperative that agricultural educators and extension personnel, particularly those working with countries and cultures around the globe, are aware of how these traumatic events affect individuals that represent the clientele and beneficiaries of such efforts. This knowledge will be instrumental in informing how agricultural educators and extension personnel aid the communities they work with in the aftermath of a natural disaster and may increase the effectiveness of programming and outreach efforts.

Conceptual Framework

Posttraumatic Growth

In the aftermath of a traumatic event, posttraumatic growth may occur and is defined as the "significant positive change[s] in an individual's life as a consequence of exposure to [this] event" (Bernstein & Pfefferbaum, 2018, p.1). Although trauma is defined by the *Diagnostic and Statistical Manual of Mental Disorders* (American Psychiatric

Association, 2013) as an event involving actual or threatened death which is violent and accidental, the context of trauma within this study is broader, encompassing any event which is highly stressful, challenging, and life-altering (Tedeschi et al., 2018). Central to the theory of posttraumatic growth is the constructivist ideology where individuals personalize basic cognitive categories to understand experience and inform core beliefs after their self, future, and world (Tedeschi et al., 2018).

Tedeschi and Calhoun (1996) conceptualized a five-factor model of posttraumatic growth, including personal strength, relating to others, new possibilities, spiritual life, and appreciation of life. Personal strength refers to a change in self-concept where experience of trauma can cause individuals to perceive selves as "more vulnerable, yet stronger" (Calhoun et al., 2010, p. 127). Relating to others is defined as the change in relationships with others following a traumatic event (Calhoun et al., 2010). These changes can include an increased sense of closeness with others, or greater compassion towards others; however, negative changes are also possible (Calhoun et al., 2010). New possibilities refers to the new responsibilities or relational connections that can open up after a traumatic event (Calhoun et al., 2010). It also refers to opportunities for life experiences or life paths that may not have previously been available or feasible (Calhoun et al., 2010). Spiritual life is perceived as changes in existential or spiritual/religious conceptualizations of life (Calhoun et al., 2010). Survivors of traumatic events may change the way they understand their existence as humans or connection to a higher power (Calhoun et al., 2010). Lastly, appreciation of life refers to a realization that life is not guaranteed and a commitment to live more intentionally (Calhoun et al., 2010).

The stages of posttraumatic growth include:

(1) the individual prior to the traumatic event,
(2) occurrence of the traumatic event,
(3) challenges, e.g. management of emotional distress,
(4) initial rumination,
(5) self-disclosure,
(6) reduction of emotional distress management,
(7) social support,
(8) deliberate rumination,
(9) enduring distress,
(10) posttraumatic growth, and
(11) wisdom (Tedeschi & Calhoun, 2004).

Posttraumatic growth is not a linear process or a singular outcome (Tedeschi & Calhoun, 2004). Different temporal patterns may exist depending on the aspects of posttraumatic growth being experienced and individual variation (Frazier et al., 2001). Ultimately, posttraumatic growth is described by Calhoun and Tedeschi (1999) as the process of developing the ability to "balance reflection and action, weigh the known and unknowns of life, be better able to accept some of the paradoxes of life, and to more openly and satisfactorily address the fundamental questions of human existence" (p. 21).

Tedeschi and Calhoun (2016) outlined a five-step model for facilitating posttraumatic growth among survivors of a traumatic experience. The first step is to aid survivors in deconstructing their core beliefs and educate them on the common physiological reactions to trauma (Tedeschi & Calhoun, 2016). The second step is to equip the survivor with mechanisms to reduce psychological distress and enable them to engage in more deliberate rumination (Tedeschi & Calhoun, 2016). The third step is to encourage survivors to

disclose details about their experiences and work with them to understand what happened and identify potential meaning from the experience (Tedeschi & Calhoun, 2016). The fourth step is to reconfigure core beliefs and life narrative (Tedeschi & Calhoun, 2016). This step is more of a personal experience and may not need to be facilitated by a professional (Tedeschi & Calhoun, 2016). The last step is to encourage individuals to acknowledge and appreciate themselves as a survivor, which may enhance appreciation of life and sense of purpose (Tedeschi & Calhoun, 2016).

When individuals experience a traumatic event, their basic assumptions about life and the meaning it holds may be altered, affecting their inherent self-reliance and eroding their sense of control on the world around them (Tedeschi et al., 2018; Jacobs et al., 2016). Humans are inherently characterized by a desire to find meaning in their existence (e.g. Triplett et al., 2012). Disruptions to this search are often replaced with the desire to seek out purpose in an individual's life (Frankl, 1959). This desire to seek out purpose is intrinsically related to posttraumatic growth, since it is a cognitive and emotional effort to process and create meaning from traumatic events (Dursun et al., 2016). Within the literature, there is strong evidence linking posttraumatic growth to demographic variables such as sex and age (e.g. Tedeschi & Calhoun, 1996; Lowe et al., 2013), psychological variables including perceived stress and coping styles (e.g. Bernstein & Pfefferbaum, 2018; Wlodarczyk et al., 2016), and social variables such as social support and spirituality (e.g. Wlodarczyk et al., 2017; Chan & Rhodes, 2013).

The posttraumatic growth phenomenon is not without controversy. McMillen (2004) proposes that Tedeschi and Calhoun's (1996) five-factor model cannot completely capture the full range of potential posttraumatic growth. McMillen (2004) argued the model needs further refinement to capture the nuances of the negative effects of traumatic events and how these can contribute or detract from posttraumatic growth. There are two schools of thought concerning posttraumatic growth: (1) that posttraumatic growth is real and (2) that posttraumatic growth is illusory (Sumalla et al., 2009). Models describing posttraumatic growth as real define growth as the unintentional results of questioning previous beliefs and is thought to facilitate positive changes in an individual's identity (Sumalla et al., 2009). Models describing posttraumatic growth as illusory define growth as how an individual assimilates the traumatic experience and emphasizes an identity that resists change (Sumalla et al., 2009). Wortman (2004) posited that the growth referenced by Tedeschi and Calhoun (2001) – i.e. significant life change viewed as highly positive – might not even be growth at all. Wortman (2004) stipulated that an individual's perception of growth may not accurately reflect discrete measures of growth. Additionally, Wortman (2004) supported McMillen's (2004) belief that not enough consideration is given to the negative effects of traumatic events which may impact posttraumatic growth.

Posttraumatic Growth and Natural Disasters

Natural disasters are a unique instance of traumatic events because these phenomena compromise the ability to "meet basic survival needs, create profound economic problems, and damage community infrastructure on a massive scale" (Sattler & Smith, 2020, para.2). They affect not only an individual's microsystem (i.e. their interactions with their immediate environment), but also their macrosystem (i.e. laws, cultural practices) and exosystem

(i.e. institution, services, policies) (Bernstein & Pfefferbaum, 2018).

Cultural traditions have been shown to impact an individual's coping behaviors, recovery, and posttraumatic growth in the wake of natural disasters. Collectivist cultures are centered on group loyalty and view others as part of one's self (Wlodarczyk et al., 2016). These cultures, such as those in African, Asian, and Latin-American countries, emphasize communal coping strategies including social sharing, and requesting or receiving help from friends, family members, or governmental institutions (Wlodarczyk et al., 2016). In contrast, individualistic cultures, such as those in North America and Europe, are defined by individuality and voluntary relationships with others (Taylor et al., 2007). These cultures are more likely to utilize direct coping strategies, such as assertive self-disclosure, confronting others, and asking for emotional support even if it upsets others (Lucas, 2002; Kuo, 2011). Wlodarczyk et al. (2016) found that overall trauma intensity was associated with communal coping strategies. Additionally, in the three countries examined, posttraumatic growth was higher in Chile and Colombia who have more collectivist cultures, than in Spain which has a more individualistic culture (Wlodarczyk et al., 2016).

Posttraumatic growth in the aftermath of natural disasters was also found to be related to demographic factors, most notably sex. Tedeschi and Calhoun (1996) found that posttraumatic growth scores for severely traumatized women were twice as high as those of traumatized men. A meta-analysis of 70 studies on posttraumatic growth revealed that moderate yet reliable differences among genders exist for posttraumatic growth, with women reporting greater posttraumatic growth than men (Vishnevsky et al., 2010). Furthermore, Jin et al. (2014) found that female respondents consistently reported higher posttraumatic growth scores than male respondents, particularly in the areas of relationships with others and personal strength. Zwaheln et al. (2010) found that total posttraumatic growth scores were greater for female respondents than males; however, there was no significant effect of gender on posttraumatic growth in the new possibilities or spiritual change factors.

Appreciative Inquiry Approach

This study proposes examining posttraumatic growth inventories through the lens of appreciative inquiry. The concept of appreciative inquiry is rooted in searching for the best in people and their organizations (Cooperrider & Whitney, 2005; Lamm & Lamm, 2018). This approach can be defined as the "systematic discovery of what gives 'life' to a living system when it is most alive, most effective, and most constructively capable" (p.3) and is characterized by asking questions which strengthen an organization's capacity to conceptualize positive potential (Cooperrider & Whitney, 2005). As opposed to a gap analysis approach which tends to focus on deficiencies, appreciative inquiry focuses on successes and strengths (Lamm & Lamm, 2018). For example, questions such as "Which circumstances maximize program effectiveness?", "What possibilities have we not yet considered?" and "When has the team come together and been successful?" are indicative of an appreciative approach.

In the context of posttraumatic growth, appreciative inquiry can be related to psychoeducation, which informs survivors of traumatic events about expected psychological responses and normalizes individual expectations and reactions (Sattler & Smith, 2020). Following natural disasters, mental health services are often

overwhelmed (Sattler et al., 2014); therefore, agricultural educators and extension agents, particularly within international contexts where these personnel may represent the primary point of contact for rural or remote communities, have the unique opportunity to leverage their influence within a community and assist in survivors' recovery. An appreciative inquiry approach may be beneficial in these circumstances to prompt extension personnel to ask which strategies are working in helping survivors cope. By focusing on what is successful, rather than what isn't working, extension personnel can be more effective in their response to survivors of natural disasters and encourage positive coping strategies which appeal to the individual.

Purpose & Objectives

The purpose of this study was to examine measures of posttraumatic growth within Georgia residents who were either directly or indirectly affected by Hurricane Michael. This purpose was achieved through the following research objectives:

1. Describe individual levels of posttraumatic growth for each of the five posttraumatic growth factors, as well as the overall scale.
2. Examine the relationship between sex of respondent and posttraumatic growth scores for each of the five posttraumatic growth factors, as well as the overall scale.

Methods

Prior to data collection, approval was obtained from the University of Georgia IRB. Data collection protocol, instrumentation, and analysis were all conducted in accordance with the resulting IRB approved protocol. An online survey company was contracted to develop a sampling frame using a non-probability opt-in sampling approach, which established criteria corresponding to U.S. Census data for each of the counties included in the study. Attention filters were embedded within the survey instrument following recommendations in the literature (Lamm & Lamm, 2019). Data were collected in January of 2019. A total of 3,347 respondents representing 152 of the 159 counties within Georgia participated in the online survey. The data were collected as part of a larger research study. Within the questionnaire, respondents were asked, "Were you, or someone you care about, effected by Hurricane Michael?" Using branching logic, individuals that indicated "Yes" were presented the post traumatic growth inventory (Tedeschi & Calhoun, 1996). There were 747 respondents which indicated that they, or someone they cared about, were affected by Hurricane Michael or 22.1% of all respondents. Among the 747 respondents 61.3% (n = 458) self-reported as female and 38.7% (n = 289), self-reported as male. Due to the non-probability nature of the sampling procedure, non-response bias was mitigated as the results cannot be generalized (Lamm & Lamm, 2019).

The data were collected using Tedeschi and Calhoun's (1996) posttraumatic growth inventory scale. This 21-item scale assesses five factors: 1) new possibilities, 2) relating to others, 3) personal strength, 4) spiritual life, and 5) appreciation of life. Additionally, an overall scale score was calculated based on all 21 items. Statements were asked to gauge change in respondent related to these five factors as a result of the crisis (e.g. I've discovered that I'm stronger than I thought I was; "I learned a great deal about how wonderful people are". Responses were rated on a five-point Likert-type scale with responses including: "1-No change", "2-small change", "3-moderate change", and "4-large change" and "5-Very large change".

Data were analyzed using SPSS v26. Absolute rating frequency counts were analyzed for each of the 21 statements in the posttraumatic growth inventory. Descriptive statistics and Cronbach's alpha coefficient were computed for each individual index factor as well as an overall index factor. Alpha coefficients greater than 0.70 were deemed acceptable according to recommendations in the literature (Lamm et al., 2020; Cortina, 1993; Schmitt, 1996). A Pearson correlations analysis was also conducted to examine the correlations between each of the five factors and the overall factor. Six one-way ANOVA tests were completed to examine the presence of significant differences between sex of respondent and the posttraumatic growth indices. A significance level of .05 was determined *a priori*.

Results

Absolute rating frequencies for each of the 21 items in the posttraumatic growth inventory were computed. The results are displayed in Table 1 ordered based on frequency counts in the Very Large Change category. Almost half of respondents experienced a large or very large change as a result of their crisis in the areas of having compassion for others (47.5%) and appreciating each day (48.3%). Almost 62% of respondents (n = 463) experienced no change or small change as a result of their crisis related to the perspective that new opportunities are available to them in the aftermath of the crisis that wouldn't have been available before.

Table 1

Absolute Rating Frequency of Perceived Changes in Posttraumatic Growth

Statements	*n*	*1- No change f*	*2- Small change f*	*3- Moderate change f*	*4- Large change f*	*5- Very large change f*
Appreciating each day[e]	747	160	100	132	124	231
An appreciation for the value of my own life[e]	747	192	87	154	138	176
Having compassion for others[a]	747	145	73	168	192	169
My priorities about what is important in life[e]	747	196	115	130	155	151
I discovered that I'm stronger than I thought I was[c]	747	217	103	139	145	143
I learned a great deal about how wonderful people are[a]	747	164	102	176	166	139
I have a stronger religious faith[d]	747	280	83	133	113	138
A better understanding of spiritual matters[d]	747	260	82	141	128	136
Putting effort into my relationships[a]	747	176	97	195	148	131
I accept needing others[a]	747	204	116	163	138	126

Knowing I can handle difficulties[c]	747	168	126	179	149	125
Being able to accept the way things work out[c]	747	185	128	173	139	122
A feeling of self-reliance[c]	747	235	127	153	118	114
I'm more likely to try to change things which need changing[b]	747	221	145	154	121	106
A sense of closeness with others[a]	747	179	132	186	158	92
A willingness to express my emotions[a]	747	252	109	184	110	92
I'm able to do better things with my life[b]	747	289	118	124	125	91
I developed new interests[b]	747	281	127	142	107	90
I established a new path for my life[b]	747	331	109	130	88	89
Knowing that I can count on people in times of trouble[a]	747	190	120	215	136	86
New opportunities are available which wouldn't have been otherwise[b]	747	340	123	111	92	81

Note: [a] – Relating to Others factor, [b] – New Possibilities Factor, [c] – Personal Strength Factor, [d] – Spiritual Change Factor, [e] – Appreciation of Life Factor

Table 2 outlines the descriptive statistics and internal consistency measure for each index. The highest mean score was associated with the relating to others factor ($M = 2.875$, $SD = 1.186$). The lowest mean score was associated with the appreciation of life factor ($M = 2.060$, $SD = 0.932$). Each of the scales had a Cronbach's alpha coefficient greater than the minimum threshold value of 0.70.

Table 2

Posttraumatic Growth Indices Descriptive Statistics

Index	*n*	*M*	*SD*	*α*
Relate to Others	747	2.875	1.186	0.938
Personal Strength	747	2.821	1.312	0.935
Spiritual Change	747	2.694	1.460	0.894
New Possibilities	747	2.438	1.286	0.943
Appreciation of Life	747	2.060	1.416	0.932
PTGI Overall	747	2.770	1.174	0.975

Table 3 presents the descriptive statistics for each posttraumatic growth index according to sex of respondent. For all five factors, and the overall scale index, female respondents reported a higher average posttraumatic growth score than male respondents. The largest difference in the means was observed within the posttraumatic growth index related to appreciation for life ($M_{fem} = 3.220$, $M_{male} = 2.806$).

Table 3

Descriptive Statistics for Posttraumatic Growth Indices by Sex

		n	*M*	*SD*
Relate to Others	Male	289	2.718	1.209
	Female	458	2.974	1.162
New Possibilities	Male	289	2.367	1.271
	Female	458	2.482	1.295
Personal Strength	Male	289	2.669	1.332
	Female	458	2.916	1.292
Spiritual Change	Male	289	2.513	1.447
	Female	458	2.809	1.458
Appreciation of Life	Male	289	2.806	1.436
	Female	458	3.220	1.380
PTGI Overall	Male	289	2.618	1.190
	Female	458	2.865	1.155

A Pearson correlations analysis was conducted to examine the correlations between sex and the five posttraumatic growth factors as well as between sex and the overall posttraumatic growth index. Table 4 outlines the results of this analysis. All correlations excepting that between sex and new possibilities, and sex and personal strength were statistically significant at the .01 significance level.

Table 4

Intercorrelations Between Sex and Posttraumatic Growth Indices

	1	2	3	4	5	6	7
1. Sex	-						
2. Relate to Others	.105**	-					
3. New Possibilities	.044	.789**	-				
4. Personal Strength	.092*	.772**	.816**	-			
5. Spiritual Change	.098**	.708**	.748**	.762**	-		
6. Appreciation of Life	.143**	.754**	.756**	.819**	.788**	-	
7. PTGI Overall	.103**	.921**	.920**	.917**	.850**	.891**	-

Note: *$p < .05$; **$p < .01$

Table 5 depicts the results of the one-way ANOVA tests comparing sex to each of the five posttraumatic growth factors and the overall index.

Table 5

One-Way ANOVA between Sex and PTGI Indices

		SS	*df*	*MS*	*F*	*p*
Relate to Others	Between Groups	11.584	1	11.584	8.307	.004*
	Within Groups	1038.858	745	1.394		
	Total	1050.442	746			

New Possibilities	Between Groups	2.346	1	2.346	1.417	.234
	Within Groups	1232.975	745	1.655		
	Total	1235.320	746			
Personal Strength	Between Groups	10.805	1	10.805	6.313	.012*
	Within Groups	1275.060	745	1.711		
	Total	1285.865	746			
Spiritual Change	Between Groups	15.432	1	15.432	7.295	.007*
	Within Groups	1575.978	745	2.115		
	Total	1591.410	746			
Appreciation of Life	Between Groups	30.413	1	30.413	15.455	.000*
	Within Groups	1466.098	745	1.968		
	Total	1496.511	746			
PTGI Overall	Between Groups	10.806	1	10.806	7.911	.005*
	Within Groups	1017.649	745	1.366		
	Total	1028.455	746			

Note: *$p < .05$

A significance level of .05 was determined *a priori*. Significant differences were observed between sex and the following indices: relating to others [$F(1,745) = 8.307$, $p = .004$]; personal strength [$F(1, 745) = 6.313$, $p = .012$]; spiritual change [$F(1, 745) = 7.295$, $p = .007$]; appreciation of life [$F(1, 745) = 15.455$, $p < .01$]; and overall posttraumatic growth [$F(1, 745) = 7.911$, $p = .005$].

Conclusions, Implications, & Recommendations

The results of the research are intended to provide empirical evidence for the potential to use an appreciative inquiry approach through which to consider natural disasters and other traumatic events. As agricultural educators and extension personnel around the globe are likely to continue to experience and be expected to address these challenges (e.g. USGS, n.d.), the present study identifies the use of the posttraumatic growth inventory as a potential tool to assist with these efforts.

Despite the encouraging nature of the study results, a number of limitations must first be acknowledged. The data were collected approximately four months following Hurricane Michael. Although there is not guidance in the literature regarding the appropriate duration between a traumatic event and anticipated perceptions of growth, the timing of the present study may be impacted. Therefore, we would recommend using the results as a baseline for comparison in future research, and not as a set of standards. An associated recommendation would be to replicate the study under different trauma conditions around the globe. The development of a robust set of data collected under various time, event, and cultural conditions would improve the diagnostic capacity of the tool and better inform recommendations for practice. An additional limitation is the nature of the screening question, specifically, whether respondents had been directly impacted themselves, or whether someone they cared about had been impacted by Hurricane Michael. The inclusion of both personal and secondary effects, through cared for individuals, may influence the nature and interpretation of the results. A recommendation would be to interpret the study results through from this perspective. An additional recommendation would be frame future research from more discrete categories, for example, using screening questions that focus on only

individuals directly impacted by events themselves, or on individuals that were not personally affected, but individuals they cared for were. This level of specificity in future research may help to illuminate the nuance between the and growth potential of primary and secondary experiences.

Despite the acknowledged limitations of the study, the results of this study represent significant findings. The first research objective concerned describing the individual measures of posttraumatic growth amongst Georgia residents, who they themselves or someone they cared about were affected by Hurricane Michael, for each of the five posttraumatic growth factors: relate to others; new possibilities; personal strength; spiritual change; appreciation of life; as well as the overall index. The relate to others index had the highest mean score of posttraumatic growth, while the appreciation of life index had the lowest mean score of posttraumatic growth. Absolute rating frequencies were examined for each of the 21 items in the posttraumatic growth inventory. Among respondents, 48.33% reported a large or very large change in having compassion for others, and 47.52% of respondents reported a large or very large change in appreciating each day. These findings are consistent with earlier studies (e.g. Malinak et al., 1979; Joseph et al., 1993) which found that survivors of traumatic events expressed increased appreciation for existence and committed to living each day to the fullest.

While Hurricane Michael did precipitate a large or very large change for respondents in some areas, there were two areas where a substantial portion of respondents reported no change. Specifically, 44.310% of respondents reported no change in establishing a new path for their life. This lack of change may be due to the fact that humans generally desire security and control in the aftermath of traumatic events (Sattler & Smith, 2020; Herman, 1997; Jacobs et al., 2016). Establishing a new path in life may introduce uncertainty and a sense of loss of control, which may dissuade individuals from pursuing a new path shortly after a traumatic event. An associated recommendation for future research would be to conduct a follow up study with Georgia residents five years after Hurricane Michael to determine whether length of time removed from the event had any effect on respondent's willingness to establish a new life path as a result of the event.

Furthermore, 45.515% of respondents reported no change in the perception that new opportunities, which wouldn't have been available otherwise, became available to them in the wake of Hurricane Michael. Disruptions to life and an individual's perception of life meaning often precipitate a desire to search for purpose (Sattler & Smith, 2020; Frankl, 1959). However, it is crucial to reestablish an individual's feelings of stability, safety, and control before they can interpret how their trauma is related to perceptions of meaning and purpose (Sattler & Smith, 2020; Herman, 1997; Jacobs et al., 2016). For this study, data were collected in January 2019, only four months after Hurricane Michael occurred. According to the literature, a possible explanation for this finding may be that respondents were not ready to reframe the traumatic event in a positive manner (e.g. by identifying new opportunities that resulted from Hurricane Michael) since they did not perceive a sense of safety or stability yet (Sattler & Smith, 2020; Herman, 1997; Jacobs et al., 2016).

Our second research objective was to examine the potential relationships between sex of respondent and their associated scores on each of the five posttraumatic growth factors and overall posttraumatic growth. For each of the six indices, female

respondents reported a higher mean posttraumatic growth score than their male counterparts. A Pearson correlation analysis revealed statistically significant relationships between respondent sex and: relating to others; personal strength; spiritual change; appreciation of life; and overall posttraumatic growth. Accordingly, we conducted six one-way ANOVA tests examining the differences between average posttraumatic growth scores for male and female respondents for each of the posttraumatic growth indices.

As expected, there were statistically significant differences observed at the .05 level between mean posttraumatic growth scores of male and female respondents for five indices: relate to others; personal strength; spiritual change; appreciation of life; and overall posttraumatic growth. These results are consistent with previous studies (e.g. Tedeschi & Calhoun, 1996; Vishnesvsky et al., 2010; Jin et al., 2014; Zwahlen et al., 2010) who found that women tended to score higher than men on posttraumatic growth inventories. The results from the present study provide evidence for the idea that men and women may differ in the ways they respond to and perceive trauma (Tedeschi & Calhoun, 1996) with women more likely to perceive positive benefits as a result of trauma (Lowe et al., 2013; Chan & Rhodes, 2013). This finding suggests females may be more capable than males of learning or benefitting from traumatic experiences (Tedeschi & Calhoun, 1996), or that women may be more willing than men to express personal growth experiences (Zwahlen et al., 2010). Tedeschi and Calhoun (2004) indicated that posttraumatic growth stems from an active struggle to process a traumatic experience and engage in emotion-focused coping strategies. Therefore, females may be more likely to report higher posttraumatic growth scores because they are more willing to utilize emotion-focused coping strategies (Jin et al., 2014). No significant difference between mean posttraumatic growth scores of male and female respondents were found for the new possibilities factor, which aligns with Zwahlen et al.'s (2010) findings.

One recommendation we would make for agricultural education and extension professionals, particularly those within international contexts, would be to employ an appreciative inquiry approach when aiding individuals through a traumatic event, such as a natural disaster. The results of the present study indicate this approach may be beneficial to help individuals affected by disasters and traumatic events to consider that there may be some potential for growth as a result. Focusing on what is successful rather than what is unsuccessful allows an individual or organization to recognize their positive potential and provide better resources for their clientele (Lamm & Lamm, 2018). Thus, the appreciative inquiry approach may help in identifying programming strategies which benefit clientele and inform future programming by adopting methods and strategies which have been successful previously.

Additionally, the appreciative inquiry approach may be employed to help individuals impacted by traumatic events to reframe the event and perceive positive or purposeful impacts of the event. Obviously, there are limitations to this approach, as individuals may not be ready to process their trauma in this manner (e.g. Sattler & Smith, 2020; Herman, 1997; Jacobs et al., 2016). We caution agricultural education and extension personnel to allow individuals time to restore a sense of normalcy and initially process the traumatic event before using this approach. However, after an appropriate amount of time, the appreciative inquiry approach may assist affected individuals in facilitating an active search

for meaning (Dursun et al., 2016), increasing an appreciation of existence (Dursun et al., 2016), realizing a greater sense of resiliency and self-worth (Collins et al., 1990; Thomas et al., 1991; Tedeschi & Calhoun, 1996), and stimulating positive coping styles for future obstacles in life (Sattler et al., 2014; Sattler & Smith, 2020).

It is important to emphasize that the recommendation to utilize an appreciative inquiry approach in the wake of traumatic events is not a license for agricultural education and extension professionals to act as untrained therapists. Offering assistance beyond one's level of professional qualifications may be detrimental to an individual's healing and is not recommended. A practical application of this approach may be for agricultural education and extension professionals to engage with step three of Tedeschi and Calhoun's (2016) five step model, i.e. listening to survivors disclose details about their experiences and work with them to understand what happened and identify potential meaning from the experience. Instead of offering psychological advice or forcing affected individuals to disclose details of their experience, agricultural education and extension professionals can offer continued, long-term support and assistance. For example, agricultural education and extension professionals may initially be best suited to provide social support and stability to impacted individuals in the immediate wake of a natural disaster. They can provide compassion, listen to survivors, connect with community members, and build trust. In time, after significant trust has been built and feelings of collective security and safety have been restored, agricultural education and extension professionals may facilitate opportunities for affected individuals to process their experiences and encourage affected individuals to acknowledge and appreciate themselves as survivors. These opportunities may include small group discussions, one-on-one conversations, or opportunities for anonymous reflections. There are numerous places for agricultural education and extension professionals to assist willing, affected individuals in processing their experiences and perceiving positive outcomes without engaging in armchair psychology. The recommendations outlined here should serve as a general guide to inform future extension work in areas affected by natural disasters.

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