

Posttraumatic Stress and Meaning Making in Mexico City: An Exploratory Study

Jennifer Doran, Ani Kalayjian, Loren Toussaint, Diana Mendez

Doran, J., Kalayjian, A., & Toussaint, L., Gil, E. (2014). Posttraumatic stress and meaning making in Mexico City. *Psychology and Developing Societies*, 26, 91-114.

Abstract

Mexico City, established in 1524, is Mexico's most important educational, financial, and cultural centre. As is typical of large metropolitan cities, Mexico City has its share of crime, violence, and poverty. It also has a history of natural disasters, particularly large-scale earthquakes. There is a lack of research on the impacts and correlates of chronic exposure to trauma in developing societies such as Mexico City. Particularly, a dearth of research exists that examines the relationship between exposure to trauma and posttraumatic growth in these populations. Recently, the Association of Trauma Outreach and Prevention (ATOP) organised a humanitarian mission to Mexico City to assess posttraumatic symptomatology and identify factors that contributed to meaning making and posttraumatic growth, including socio-demographic variables. The results demonstrated that age and marital status were associated with traumatic stress symptomatology and the ability to find meaning in trauma and purpose in one's life. Inconsistent with previous research, there were no differential associations in symptomatology or posttraumatic growth on the basis of gender. Of note, the results suggested that individuals who had offered support to others during a traumatic event were currently experiencing lower levels of posttraumatic stress and an increased ability to find meaning in the trauma.

Keywords: *posttraumatic stress, posttraumatic growth, Mexico City, earthquake*

Exposure to trauma is a known risk factor for psychopathology (Baker, Norris, Jones, & Murphy, 2009; Kendall-Tackett, 2009; Perry, 2008), and the association between traumatic stress and poor health outcomes has been well established in the literature (Deschenie, 2006; Park & Ali, 2006; Verschuur, Maric, & Spinhoven, 2010; Wu, Schairer, Dellor, & Grella, 2010).

Traumatic events have been shown to negatively impact an individual's sense of connection and meaning, undermining ordinary systems that help establish and maintain a sense of control and autonomy (Carver, 1999; Frankl, 1962; Park & Ali, 2006, van der Kolk, 1987). This may result in a crisis of faith that can exacerbate trauma-related symptoms (Herman, 1997). Traumatic events take various forms, including natural disasters, accidental human-made trauma, and intentional human-made trauma.

Acute Stress Disorder (ASD) and Posttraumatic Stress Disorder (PTSD) are the most prevalent psychiatric diagnoses following a traumatic event (Kalayjian, 2010; Lantz & Buchalter, 2005), with PTSD the more severe and long-term outcome. According to the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV-TR; American Psychiatric Association, 2000), diagnostic criteria for PTSD include a history of exposure to a traumatic event, in which at least two symptoms from each of three symptom clusters are present: intrusive recollections, avoidant/numbing behaviour, and physiological hyperarousal lasting more than one month and causing distress or impairment. Primary symptom clusters include re-experiencing the traumatic event through flashbacks or nightmares, avoidance of stimuli associated with the traumatic event, and increased physiological arousal (American Psychiatric Association, 2000). When left untreated, PTSD symptoms can become chronic and can interfere with the ability to function adaptively in society (Yehuda, 2002). While ASD and PTSD are conditions that can be diagnosed if an individual exhibits a certain number of criteria, individuals can also suffer from

posttraumatic stress in the absence of a diagnosable condition. Posttraumatic stress is predominantly a phenomenological experience and may vary in its manifestations across individuals.

Risk Factors for PTSD

Given the prevalence and severity of PTSD, it is important to understand factors that predispose individuals to the disorder and have the potential to aid in recovery. Several factors have been associated with increased risk for PTSD, including age, proximity to the event, cognitive appraisal of the event, emotional and coping responses, support from significant others, and the surrounding social and ecological context (Nightingale & Williams, 2000). Research has also examined risk and protective factors by considering the impact of *pre-*, *peri-*, and *post-traumatic* variables (e.g., Doran, Kalayjian, Toussaint, & DeMucci, 2011).

Pre-traumatic variables consist of socio-demographic characteristics, which have been shown to predict PTSD symptoms and recovery (Bonanno & Mancini, 2008; Freedy, Saladin, Kilpatrick, Resnick, & Saunders, 1994; Park & Ali, 2006). A review evaluating twenty-five years of research on sex-specific risk found that while males are more likely to experience traumatic events than females, they are less likely to meet diagnostic criteria for PTSD (Tonlin & Foa, 2006). The increased susceptibility of women to PTSD is well-documented in the literature (Breslau, 2009; Brewin, Andrews, & Valentine, 2000; Doran et al., 2011; Furr, Comer, Edmunds, & Kendall, 2010). One explanation that has been given for this gender discrepancy is that males may be more socialised to respond to psychological distress with aggression or substance use, while females are more susceptible to depression and more likely to come to clinical attention (Holdcraft, Iacono, & McGue, 1998). Age has been identified as a risk factor for PTSD (Doherty, 1999; Perry, 2008), with the most profound effects of trauma occurring in childhood

(Brown, 2008; van der Kolk, McFarlane, & Weisaeth, 2006; Vogel & Vernberg, 1993), though PTSD can occur at any age (McNally, 2001). Cultural research has found differential relationships between age and PTSD as a function of social and cultural context. For example, a negative linear association emerged in a Mexican sample following a hurricane in Mexico, with younger participants experiencing the most distress (Norris, Kaniasty, Conrad, Inman, & Murphy, 2002).

Peri-traumatic variables refer to correlates of the traumatic event, including level of exposure and severity of trauma, higher levels of which increase the likelihood of developing PTSD (Tucker, Pfefferbaum, Nixon, & Dickson, 2000). The availability of social support has been identified as a key factor in coping with trauma, as it assists individuals in returning to baseline emotional levels and re-establishes a foundation and a sense of community (Park & Ali, 2006). Social support may facilitate healing (Herman, 1997) and has been shown to directly impact the relationship between trauma exposure and traumatic stress symptomatology (Piper, 2007). The surrounding socio-political context in which trauma occurs can also play a role. For example, research has found that rates of PTSD are significantly higher in Mexico than in North America, despite equivalent rates of exposure to trauma, which may be due to harsher living conditions and less access to resources (Norris, Murphy, Baker, Perilla, Rodriguez, & Rodriguez, 2003).

Outcomes and Posttraumatic Growth

Post-traumatic variables refer to what happens after the traumatic event in terms of treatment, particularly what facilitates or hinders recovery. A central aspect of healing from trauma is the ability to find meaning in the traumatic event and cultivate a sense of meaning and purpose in one's life (Frankl, 1962). Meaning making has been defined as the mental

representation of relationships between things and events – what connects representations to each other (Baumeister, 1991). According to van der Kolk (1987), human beings have difficulty comprehending meaninglessness and lack of control, as “much of human endeavour, in religion, art, and science, is centrally concerned with exactly these grand questions of meaning and control over one's destiny” (pp. 31). Meaning making has demonstrated a positive linear association with adjustment following stressful life events (Collie & Long, 2005; Skaggs & Baron, 2006). It has also been found to predict severity of PTSD (Kalayjian, Shigemoto, & Patel, 2010). One study of the 9/11 terrorist attacks found that the inability to find meaning in the event predicted greater posttraumatic stress up to two years later (Updegraff, Silver, & Holman, 2008).

In the last two decades, researchers have become interested in how experiencing traumatic events can lead to personal growth (Tedeschi, Park, & Calhoun, 1998). The positive impact of trauma has been labelled *posttraumatic growth*. While various definitions of the construct exist, posttraumatic growth (PTG) is most commonly defined as positive outcomes and improvement in functioning following exposure to a traumatic stressor (Park, 2010). One specific definition describes PTG as positive outcomes that emerge in the course of the struggle to reintegrate into society following trauma exposure, which often results in shattered assumptions about fairness and security in the world (Schaefer, Blazer & Koenig, 2008). Crisis theory posits that the way people process trauma through appraisal of meaning is what determines individual outcomes, and takes the position that if a survivor can positively frame the trauma, posttraumatic growth is possible (Park & Ali, 2006). Empirical evidence for PTG is growing, with its prevalence rates following trauma estimated to be between 29.0 and 97.6% (Linley and Joseph, 2004).

There are several definitions of meaning making in the literature, with research most

commonly examining the role of meaning making in response to stressful life events (Calhoun & Tedeschi, 2006). In this context, the literature has both differentiated and likened to concept to posttraumatic growth (Park, 2010). A relationship has been postulated between the two constructs, with meaning making seen as a necessary precursor for PTG to be possible (Helgeson, Reynolds, & Tomich, 2006; Joseph & Linley, 2005; Park, 2010). Other outcomes of meaning making include increased personal resources and coping skills, seeking emotional and support from others, improved relationships, and greater appreciation for life overall (Armeli, Gunthert, & Cohen, 2001; Sears, Stanton, & Danoff-Burg, 2003; Frazier, Tashiro, Berman, Steger, & Long, 2004; Park & Helgeson, 2006).

Disaster in Mexico City

Exposure to traumatic experiences in Mexico City is relatively common (Medina-Mora, Borges, Lara, Ramos-Lira, Zambrano, & Fleiz, 2005; Orozco-Zavala, Borges, Benjet, Medina-Mora, & Lopez-Carrilo, 2008).¹ Exacerbating the prevalence of trauma in this region, Mexico City is one of the highest risk areas in the world for earthquakes and is considered one of the most seismologically active regions on the planet (U.S. Library of Congress, 2010). Earthquakes and the potential threat of earthquakes are likely an on-going source of traumatic stress for the city's population. Perhaps the most notable example of this occurred on September 19th, 1985 a large-scale earthquake struck Mexico City, achieving a rating of 8.1 on the Richter scale. There were four earthquake events spanning from May to April of the following year, with the main event in September producing twelve separate aftershocks. As a result, approximately 9,500 people were killed, 30,000 were injured, and 100,000 lost their homes (Anderson, Bodin, Brune, Prince, Singh, Quaas & Onate, 1986), though additional reports put the death and injury toll at higher numbers. Murillo & Manuel (2005) report that over 10,000 people were killed and around

50,000 suffered some form of injury, and Haber (1995) reports that approximately 250,000 people lost their homes. Discrepancy in these statistics is a result of the delayed response of the Mexican government and a news blackout following the event. The statistics reported by the government have been disputed by the public and other agencies, making exact numbers unknown. Death toll estimates span 5,000 to 45,000 people (Campus, 2005). According to the United States Geographical Survey (2010), the quake severely affected an area of approximately 825,000 square kilometres, caused between three and four billion U.S. dollars in damage, and was felt by almost twenty million people. This monumental event and continued earthquakes in surrounding areas over the past three decades (US Geological Survey, 2012) have added an additional trauma burden on Mexico City residents. For this reason, earthquake-related trauma is an interesting area for study in this population.

While much research has been conducted on trauma and PTSD to date, less is known about the impact of chronic traumatic stress in developing countries like Mexico. The majority of studies on PTSD, meaning making, and healing from trauma have been conducted on North American samples, and there is a notable lack of literature on the relationship between trauma and meaning making in developing countries (Kalayjian et al., 2010; Pipinelli & Kalayjian, 2010; Powell, Rosner, Butollo, Tedeschi, & Calhoun, 2003). In light of this gap in the literature, the current study was designed to investigate the levels of posttraumatic stress and the potential for posttraumatic growth in a sample of Mexico City residents. We set out to evaluate the role that pre-, peri-, and post- traumatic variables had in the development of chronic or residual PTSD symptoms and the potential for posttraumatic growth. Given past research, we hypothesized that 1) women and younger participants would have higher rates of chronic PTSD, and 2) the presence of social support during and after a trauma would result in lower levels PTSD

symptoms. Following a two-day intervention focused on meaning making, we also assessed if participants were able to find meaning in the event, indicating a potential for posttraumatic growth, and identify the factors associated with this positive outcome.

Method

Procedure

Data for the study were collected as part of a humanitarian rehabilitation trip sponsored by the organization the Association of Trauma Outreach and Prevention (ATOP). The organization has provided global healing seminars since 1989, training paraprofessional counsellors and disseminating outreach teams to various sites around the world. Counsellors undergo a series of trainings in a biopsychosocial, multiphasic holistic healing method, grounded in experiential and empirical work, and designed to ameliorate the effects of acute and chronic traumatic stress. The program begins with progression through a seven-step process model focused on the integration of mind-body healing and incorporating meaning making, forgiveness, spirituality, mindfulness, and cultural rituals and idiosyncrasies (for a detailed review, see Kalayjian, 2002). The organization works closely with universities and other organizations to reach out to the community and offer counselling services and support, and anyone who wishes to share their story or participate in the program is permitted to do so. Research studies are often conducted in conjunction with these humanitarian missions, though participating in data collection in no way impacts eligibility to receive clinical services. The trip to Mexico City took place in September of 2008. ATOP collaborated with several local universities, hospitals, local and international non-governmental organizations, and churches to recruit participants for the two-day holistic therapeutic workshop. Participants were given the opportunity to share their experiences and unresolved feelings surrounding traumas they had experienced (e.g.

earthquakes, violence, etc.), receiving trauma-informed counselling and psychological support.

Participants were recruited through collaboration with the Mexico City campus of Ibero-American University, a local mental health NGO, and the organization Doctors without Borders. In the two months leading up to the trip, flyers were distributed to these organizations and posted in several locations (classrooms and common areas, waiting rooms, etc). The second author interfaced with faculty and providers at these sites, explaining the rationale for the trip, the services offered, and encouraging them to share this information with individuals who they believed could benefit from the intervention. The workshop was open to all adults interested in participating and willing to share their experiences in a group-setting. There was no formal registration process; individuals were provided with the dates and times of the workshop and encouraged to come and participate if there were interested and able. The workshop was framed as an opportunity to discuss exposure to earthquake trauma and receive intervention and support in a group-setting.

As part of the workshop, participants were asked to fill out the measures utilised in this study. Socio-demographic information and PTSD symptomatology was collected prior to participation. Following the workshop, participants were administered a measure to assess their ability to find meaning in the traumatic event and a sense of purpose in life. Since the purpose of the workshop was to offer therapeutic support and a space to process unresolved trauma, PTSD symptoms were assessed prior to the clinical intervention. We wanted symptoms to reflect the individuals level of distress at present, in the absence of therapeutic support designed to reduce trauma symptoms. Similarly, we assessed the ability to find meaning after participation in the intervention. We believed that assessing meaning making prior to the intervention would have been problematic, given that the intervention was designed in part to help participants find

meaning in their traumatic experiences and lives. Assessing meaning making pre-intervention would have potentially been irrelevant until participants had been made aware of the role of meaning making in trauma, and afforded an opportunity to process their experiences. Earlier assessment could have also masked the *potential* of individuals to find and make meaning in the context of adequate support. The purpose of the assessment was for participant ratings to reflect their ability to find meaning in the trauma when they were provided the therapeutic support to do so.

Participants

Approximately forty individuals attended the workshop, which occurred during daytime hours and spanned two days. Thirty-three adult residents of Mexico City also elected to participate in the research component (the present study). The majority of the sample ($N = 22$, 66.7%) were women. The age range of the sample spanned 20-65 years old, with 6 participants in the 20-29 age group (18.2%), 10 in the 30-39 age group (30.3%), 7 in the 40-49 age group (21.2%), 7 in the 50-59 age group (21.2%), and 1 participant over 60 (3%). Based on an open-ended self-report of nationality and religious affiliation, the majority of the sample identified as Mexican ($N = 31$, 93.8%) and Catholic ($N = 23$, 69.7%). Those that identified as Mexican also reported identifying as Christian ($N = 1$, 3%), a “Believer” ($N = 1$, 3%), or as an Atheist ($N = 2$, 6%). One participant identified as Mexican but opted not to list a religious affiliation (3%) and one participant identified as Guatemalan and Christian (3%). The sample was fairly well-educated, with 48.5% of the sample graduated from a university ($N = 16$) and 45.5% of the sample undertaking some post-graduate work ($N = 15$). Most participants held either full-time ($N = 19$, 57.6%) or part-time jobs ($N = 10$, 30.3%). Four participants reported not being currently employed (12.1%). Slightly more than half of the sample was currently married ($N =$

17, 51.5%). Six participants reported being divorced (18.2%), 3 reported being separated (9.1%), and 6 reported being single (18.2%).

Measures

Prior to beginning the research component of the workshop, participants were instructed to choose a significant earthquake event in their lives, and to use this earthquake as the framework for all measures in the study. There were no restrictions on which earthquake the participant could report on; rather, they were given the autonomy to discuss the event that felt the most impactful and meaningful to them.

Socio-demographic Questionnaire. A brief socio-demographic questionnaire was administered. Participants reported their gender, age, education level, current employment status, and marital status. Open-ended questions assessed nationality and religious affiliation. Because Mexico City is one of the most seismologically active areas in the world, the following items were also included to assess trauma specifically resulting from earthquakes: 1) Level of damage to one's home or workplace, 2) the nature and quantity of any support they received in the aftermath of earthquakes, and 3) how much support and assistance they provided to others in the aftermath of earthquake trauma. Items were rated both on likert-scales (ranging from 0 to 3) and included space for open-ended responses. Space was also provided for participants to qualitatively detail their memories and experiences of the traumatic events that were most salient to them.

Posttraumatic Symptomatology. The Posttraumatic Stress Disorder Reaction Index (PTSD-RI; Pynoos, Frederick, Nader, & Arroyo, 1987) was administered to assess the degree to which participants were experiencing posttraumatic symptomatology. The PTSD-RI is a 20-item self-report measure commonly used as a screening tool for PTSD. Each item is rated for

frequency on a 5-point Likert scale, with positively framed items requiring reverse coding. Total scores are calculated and categorised by level of severity – no PTSD symptoms (<12), mild symptomatology (12-14), moderate symptomatology (25-39), and severe symptomatology (>40). The PTSD-RI has demonstrated reliability and validity (Alderfer et al., 2003; Allwood et al., 2002; Pynoos et al., 1993; Pynoos & Nader, 1989). In the current study, internal consistency was $\alpha = .90$.

Posttraumatic Growth. A 3-item Meaning in Life Scale (Kalayjian, 2010) was administered. Participants responded to questions on a 7-point Likert scale on how able they are to deal with daily tasks (*Not at all able – Very able*), if they discovered meaning in the traumatic event (*No meaning – Significant meaning*), and how able they are to find meaning and purpose in their lives (*Not at all able – Very able*). This measure was constructed to be in line with the operationalization of posttraumatic growth as the ability to find meaning in stressful experiences and in life (Gangstad, Norman, & Barton, 2009; Park, 2010; Phelps, Williams, Raichle, Turner, & Ehde, 2008; Taylor, 1983). In the current study internal consistency of the measure was good, $\alpha = .89$.

Data Analysis

Analyses for this study included descriptive statistics, bivariate correlations, t-tests, and multiple regression. This study is largely exploratory in nature and the sample size is small. As a result our statistical tests will be conducted at an alpha of $p < .10$. Using $p < .10$ allows exploratory investigators a better opportunity to adequately balance both type I *and* type II errors and identify moderate-large effects that would otherwise be overlooked. Given that the nature of the work was part of an outreach mission, with the primary focus on providing clinical intervention and support, there was limited time available for extensive recruitment and

assessment. As a result, we feel that a more liberal alpha level is appropriately used in this instance, and this follows with what Cohen (1988) has recommended for these types of situations.

Results

Posttraumatic Stress Symptomatology. The majority of participants (26; 78.8%) in the current study showed PTSD symptomatology according to scores on the PTSD-RI. A total of 19 (57.6%) participants screened positive for mild PTSD, 7 (21.2%) screened positive for moderate PTSD, and 7 (21.2%) did not meet criteria. Significant differences on a number of outcomes emerged between participants who currently screened positive (mild and moderate combined) for PTSD compared to participants below the threshold. Participants with PTSD symptoms reported receiving more assistance from a health professional during an earthquake, $t(24) = 2.14, p < .05$, and reported feeling less able to deal with daily tasks presently, $t(30) = -2.96, p < .01$. Participants in the moderate category reported more dreams about earthquakes, $t(24) = -2.89, p < .01$, increased fear of disaster reoccurring, $t(24) = -2.56, p < .05$, displayed more avoidance behaviour, $t(24) = -3.83, p < .01$, and felt more guilt about their lack of response during an earthquake, $t(30) = -2.98, p < .01$, when compared to the mild group.

Pre-traumatic variables. In support of hypothesis 1, there was a negative linear association between age and current PTSD symptomatology, $r = -.33, p < .10$. Negative relationships also emerged between age and the ability to deal with daily tasks, $r = -.694, p < .10$; the discovery of meaning in a traumatic event, $r = -.826, p < .05$; and the ability to find meaning in life, $r = -.670, p < .10$. This suggests that older age may result in less PTSD symptomatology but also less potential for posttraumatic growth. In contrast to our hypothesis, t -tests revealed no significant differences between males and females on PTSD symptomatology, $t(31) = -1.448, p >$

.10, or ability to deal with daily tasks, $t(30) = -.928, p > .10$; discovery of meaning in a traumatic event, $t(29) = -1.210, p > .10$; or the ability to find meaning in life, $t(30) = -.909, p > .10$.

Peri-traumatic variables. In support of hypothesis two, perceived social support from others during an earthquake was associated with increased levels of PTSD, $r = .31, p < .10$. Of note, participants who reported providing support to others in the aftermath of an earthquake had lower levels of current PTSD symptomatology presently, $r = -.34, p < .10$. Combining age, support received, and support provided to others explained 48% of the variance in PTSD symptomatology, $F(3,36) = 2.54, p < .10, R^2 = .48$.

Post-traumatic variables. Several factors were correlated with the ability to find meaning in life. Participants reported finding more meaning in the trauma when the level of damage to their home or workplace was more severe, $r = .40, p = .03$; when they had a family member directly affected by an earthquake, $r = .37, p = .04$; or when they received support from others following an earthquake, $r = .32, p = .07$. Finally, the correlation between how much participants helped others in the aftermath of an earthquake and the ability to currently find meaning in one's own life was statistically significant, $r = .41, p < .05$. Participants reported feeling able to find meaning in that earthquake event ($M = 6.03, SD = 1.14$) and indicated feeling a sense of purpose in their lives ($M = 5.84, SD = 1.11$).

Marital status appeared to play some role in the ability to find meaning, with currently married participants reporting increased levels of meaning when compared to single, $t(21) = 1.74, p < .10$, and separated, $t(18) = 2.68, p < .10$, participants. No other findings emerged between the remaining socio-demographic variables (e.g. employment status, education) and trauma.

Clinical Impressions

Based on the authors' previous work with ATOP, some of which has focused on the long-term impact and intergenerational transmission of trauma, it was expected that there would be symptoms surrounding earthquake trauma in this sample. However, we did not expect to find earthquake trauma to be so present in the participants' lives and memories. The observed reactions to the processing group were surprising; many participants cried and became distressed as soon as the topic of earthquake trauma was addressed. They also displayed increased arousal and hypervigilance as the trauma was remembered and re-experienced. Participants were able to provide vivid memories of earthquake events, including a strong sense of cultural suppression related to the impact and aftermath of such traumas. Several participants spoke of the 1985 earthquake specifically, and shared their experiences of being children and having no one ask them how they felt about the earthquake. They stated that the subject was never addressed at home or in school, and there seemed to be a general culture of silence surrounding the event. One participant stated that "It was an event that shocked the whole country;" with another stating, "It was a big tragedy that damaged all kinds of people. There was economic help... but there was no psychological help." A third stated, "It was terrible to see so much destruction and general suffering. It is impossible to forget the horrific scenes of the earthquake." Years later, as adults finally beginning to process and cope with their experiences, many participants realized that they had been suppressing their emotional experience for years. Unresolved trauma and traumatic stress symptomatology appeared to be present for the majority of the sample.

Discussion

The current study demonstrates that chronic exposure to a major traumatic event has important consequences. It is noteworthy that the majority of the sample screened positive for at least mild posttraumatic stress symptomatology. Qualitative statements made by participants

supported these findings, and further demonstrated the long-term negative impact of unprocessed earthquake trauma in the sample. Our results also demonstrate the important role that socio-demographic variables play in responding to and recovering from trauma. Age was negatively associated with both posttraumatic stress symptomatology and the ability to find meaning in the event or in life. Participants who were currently married reported a greater ability to find meaning in an experience of trauma. The amount of received and offered support during a traumatic event was related to symptom level and the ability to find meaning in the trauma. This suggests that demographic variables and other situational factors should be taken under consideration when working with survivors of trauma.

Consistent with previous research (Barsakova & Oesterrich, 2009; Breslau, Kessler, & Chilcoat, 1998; Miller, Worthington, & McDaniel, 2008; Toussaint, Williams, Musick, & Everson, 2001), socio-demographic and psychosocial factors impacted participants' current level of distress and potential for posttraumatic growth. These results suggested that older participants may be less susceptible to long-term PTSD symptomatology but also less likely to experience posttraumatic growth. This may be explainable by the developmental literature that suggests the potential for change decreases over time and that personality characteristics become more stable with increased age (Beauchaine & Hinshaw, 2008). The failure to find differences on the basis of gender is unusual and inconsistent with previous research, and may be explained by the fact that there were a larger proportion of women in the sample. Only eleven men participated in the study, which may have attenuated potential gender differences in the sample. The overrepresentation of women may be explained by the fact that the study utilised a self-selecting service-seeking sample, and women have been shown to be more likely to disclose psychological distress and seek out treatment or support (Kessler, Brown, & Broman, 1981). Research has also

shown that women are more at risk for developing PTSD than men after experiencing a traumatic event (Breslau, Kessler, & Chilcoat, 1998), and this finding has been shown to generalise to a large Mexican sample (Baker, Norris, Diaz, Perilla, Murphy, & Hill, 2005). Given that age and gender are well-established correlates of posttraumatic outcome and that this finding has previously been demonstrated in a similar post-disaster Mexican sample (Norris, Kaniasty, Conrad, Inman, & Murphy, 2002), failure to find similar results in the current study is likely an artefact of the relatively small sample size and the composition of the present sample – individuals who self-selected themselves to participate in a clinical workshop.

The present data revealed findings on the impact of received and offered support, suggesting that social support appears to be a promising factor in the ability to heal from trauma in a Mexico City population. Combining the effects of age and received and offered support explained a significant portion of the variance in PTSD symptomatology, suggesting that perhaps these variables have cumulative effects and are more important together than in isolation. The most interesting findings emerge in the context of posttraumatic variables. Consistent with past research, severity of trauma exposure was associated with the ability to find meaning in a traumatic event. The fact that participants reported feeling able to find meaning in trauma and a sense of purpose in their lives suggests that the opportunity to process a traumatic event and work through it may be helpful in facilitating posttraumatic growth. Other studies have shown important posttraumatic growth experiences in victims following trauma, even far removed from traumatic event (Holgerson, Boe, & Holen, 2010; Maercker & Herrle, 2003; Updegraff, Silver, & Holman, 2008), and our work lends support to that possibility.

There are several limitations of the current study that should be mentioned. First, it would have been preferable to have a larger overall sample with more equal socio-demographic

distribution. With a larger sample and more variability in socio-demographics, statistical power would have been increased and more sophisticated analytic procedures could have been used to assess main effects and interactions among variables. Regrettably, our ability to recruit participants was limited by a very modest project budget. Nonetheless, this study offers a recent glimpse of both PTSD and meaning making in a developing country, an area that has received limited attention in the literature to date. Second, as with any retrospective study, there are sources of error inherent in the fallibility of memory recall (Schacter, 1999). For future studies it would be preferable to have longitudinal data on participants. This would allow for prospective relationships to be examined. However, obtaining these types of data in Mexico, or any developing area for that matter, can be especially difficult given challenges with logistics, funding, and security.

It is also important to consider the impact of measuring meaning making following a clinical intervention designed to increase meaning in the participants' lives. The ability to find meaning reported in the present study therefore at least partially reflects a response to therapeutic support, and is not necessarily indicative of an individuals' ability to find meaning spontaneously and in the absence of external supports. Since the clinical intervention was specifically focused on processing and finding meaning in traumatic events, it is also possible that completing the measure following the intervention resulted in an estimated sense of meaning that reflects an upper-bound measurement. Examining the stability of meaning making, and potential regression to the mean, would require on-going assessment which was not possible in the current study. Finally, the present sample consisted of individuals who were help-seeking and elected to participate in a trauma-focused clinical intervention. The nature of the sample likely resulted in excluding individuals who were high-functioning and did not perceive themselves as needing

support, and individuals with barriers to care (e.g. perceived stigma towards seeking psychological help). Taken together, these limitations highlight the limited generalizability of the present study, and emphasize the exploratory nature of the work and the importance of this study being replicated and extended in order to generalise to a broader population.

Despite its limitations, the current study offers some insight into the relationship between trauma and growth in a sample of Mexico City residents. The fact that PTSD symptoms were found in the majority of participants attending the healing seminar suggests that mental health services may be important and underutilised in this population. Our findings also suggest that socio-demographic and contextual factors have at least some influence over response to traumatic stress and one's potential for posttraumatic growth. Future studies should look more closely at the interaction effects of salient variables. Additionally, resilience factors should be explored and more information should be gathered on residents who have more positive long-term outcomes.

Perhaps the most inspiring finding of the current study is the fact that helping others in the aftermath of an earthquake was associated with less current distress and increased meaning in life. The prevalence of trauma is well established; what is less known is how helping *others* cope and reconstruct their lives can impact one's *own* well-being – a powerful altruistic implication worthy of further exploration. While it may be the case that lower distress and higher functioning increase engagement in helping behaviours, it is also possible that the very act of helping others serves to decrease the felt experience of posttraumatic distress. This suggests that, in our darkest moments, we may be able to heal ourselves by helping others.

References

- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed. Text Revision). Washington, DC: Author.
- Anderson, J.G., Bodin, P., Brune, J.N., Prince, J., Singh, S.K., Quaas, R., & Onate, M. (1986). Strong Ground Motion from the Michoacán, Mexico, Earthquake. *Science*, 233, 1043-1049.
- Armeli, S., Gunthert, K. C., & Cohen, L. H. (2001). Stressor appraisals, coping, and post-event outcomes: The dimensionality and antecedents of stress-related growth. *Journal of Social and Clinical Psychology*, 20, 366–395.
- Baker, C., Norris, F., Jones, E., & Murphy, A. (2009). Childhood trauma and adulthood physical health in Mexico. *Journal of Behavioral Medicine*, 32, 255-269.
- Baker, C. K., Norris, F. H., Diaz, D. M., Perilla, J. L., Murphy, A. D., & Hill, E. G. (2005). Violence and PTSD in Mexico: Gender and regional differences. *Social Psychiatry and Psychiatric Epidemiology*, 40, 519-528.
- Barsakova, T., & Oesterreich, R. (2009). Post-traumatic growth in people living with a serious medical condition and its relations to physical and mental health: a systematic review. *Disability and Rehabilitation*, 31, 1709-1733.
- Baumeister, R. F. (1991). *Meanings in life*. New York: Guilford.
- Beauchaine, T. P. & Hinshaw, S. P. (Eds.). (2008). *Child and Adolescent Psychopathology*. Hoboken, New Jersey: John Wiley & Sons.
- Bonnano, G. A., & Mancini, A. D. (2008). The human capacity to thrive in the face of potential trauma. *Pediatrics*, 121(2), 369-375.

- Breslau, N. (2009). The epidemiology of trauma, PTSD, and other posttrauma disorders. *Trauma, Violence, and Abuse, 10*(3), 198-210.
- Breslau, N., Kessler, R., & Chilcoat, H. (1998). Trauma and posttraumatic stress disorder in the community. The 1996 Detroit Area Survey of Trauma. *Archives of General Psychiatry, 55*, 627-632.
- Brewin, C. R., Andrews, B., & Valentine, J. D. (2000). Meta-analysis of risk factors for posttraumatic stress disorder in trauma-exposed adults. *Journal of Consulting and Clinical Psychology, 68*(5), 748-766.
- Brown, Laura S. (2008). *Cultural competence in trauma therapy: Beyond the flashback*. Washington, D.C.: American Psychological Association.
- Calhoun, L. G., & Tedeschi, R. G. (Eds.). (2006). *Handbook of posttraumatic growth: Research and practice*. Mahwah, NJ: Erlbaum.
- Campus, Y. (2005). A 20 años del terremoto del 85. Mexico City: Televisa. Retrieved from: <http://www.esmas.com/noticierostelevisa/terremoto/475688.html>
- Carver, C. S. (1999). Resilience and thriving: Issues and models and linkages. *Journal of Social Issues, 54*, pp. 245-266.
- Cohen, 1988.(1988). *Statistical power analysis for the behavioral sciences*, second edition. Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.
- Collie, K., & Long, B. C. (2005). Considering “meaning” in the context of breast cancer. *Journal of Health Psychology, 10*, 843-853.
- Conrad, K. A., Amstadter, A. B., McCauley, J. L., Richardson, L., Kilpatrick, D. G., Tran, T.L., Trung, L.T., Tam, N.T., Tuan, T., Buoi, L.T., Ha, T.T., Thach, T.D., & Acierno, R.

- (2010). Examination of general health following Typhoon Xangsane: A pre-post analysis. *Psychological Trauma: Theory, Research, Practice, and Policy*, 2, 109-115.
- Deschenie, T. (2006). Historical trauma. *Tribal College Journal*, 17(3), pp. 8-11.
- Doherty, G. W. (1999). Cross cultural counseling in disaster settings. *The Australian Journal of Disaster and Trauma Studies*, 2, 1-15.
- Doran, J. M., Kalayjian, A., Toussaint, L., & DeMucci, J. (2011). The relationship between trauma and forgiveness in post-conflict Sierra Leone. *Psychological Trauma: Theory, Research, Practice, and Policy*. Advance online publication. doi: 10.1037/a0025470
- Dubrow, N., & Peddle, N. (1997). *Trauma healing and peace education training manual*, 2nd Edition. Chicago, IL: Taylor Institute.
- Frankl, V. E. (1978). *The Unheard Cry for Meaning. Psychotherapy and Humanism*. New York, NY: Touchstone.
- Frankl, V. E. (1962). *Man's search for meaning: An introduction to logotherapy*. Boston: Beacon Press (Original work published in 1946).
- Frazier, P., Tashiro, T., Berman, M., Steger, M., & Long, J. (2004). Correlates of levels and patterns of positive life changes following sexual assault. *Journal of Consulting and Clinical Psychology*, 72, 19-30.
- Freedly, J. R., Saladin, M. E., Kilpatrick, D. G., Resnick, H. S., & Saunders, B. E. (1994). Understanding acute psychological distress following natural disaster. *Journal of Traumatic Stress*, 7(2), 257-273.
- Friedman, M. J., & Schnurr, P. P. (1995). The relationship between trauma, posttraumatic stress disorder, and physical health. In M. J. Friedman, D. S. Charney, & A. Y. Deutch (Eds.),

- Neurobiological and clinical consequences of stress: From normal adaptation to post-traumatic stress disorder*, 507-524. Philadelphia, PA: Raven Press.
- Furr, J. M., Comer, J. S., Edmunds, J. M., Kendall, P. C. (2010). Disasters and youth: A meta-analytic examination of posttraumatic stress. *Journal of Consulting and Clinical Psychology*, 78(6), 765-780.
- Gangstad, B., Norman, P., & Barton, J. (2009). Cognitive processing and posttraumatic growth after stroke. *Rehabilitation Psychology*, 54, 69-75.
- Grant, D.M., Beck, J.G., Marques, L., Palyo, S.A., & Clapp, J.D. (2008). The Structure of Distress Following Trauma: Posttraumatic Stress Disorder, Major Depressive Disorder, and Generalized Anxiety Disorder. *Journal of Abnormal Psychology*, 117, 662-672.
- Green, B.L., Goodman, L.A., Krupnick, J.L., Corcoran, C.B., Petty, R.M., Stockton, P., & Stern, N.M. (2000). Outcomes of single versus multiple trauma exposure in a screening sample. *Journal of Traumatic Stress*, 13, 271-296.
- Haber, Paul Lawrence (1995). "Earthquake of 1985". *Concise Encyclopedia of Mexico*. Taylor & Francis Ltd.. pp. 179–184.
- Hedva, B. (2001). *Betrayal, trust, and forgiveness*. Berkeley, CA: Ten Speed Press.
- Helgeson, V. S., Reynolds, K. A., & Tomich, P. L. (2006). A meta-analytic review of benefit finding and growth. *Journal of Consulting and Clinical Psychology*, 74, 797–816.
- Herman, J. L. (1997). *Trauma and recovery: The aftermath of violence - from domestic abuse to political terror*. New York: Basic Books.
- Holdcraft, L. C., Iacono, W. G., & McGue, M. K. (1998). Antisocial personality disorder and depression in relation to alcoholism: A community. *Journal of Studies on Alcohol*, 59, 222-226.

- Holgersen, K. H., Boe, H. J., & Holen, A. (2010). Long-term perspectives on posttraumatic growth in disaster survivors. *Journal of Traumatic Stress, 23*(3), 413-416.
- Joseph, S., & Linley, P. A. (2005). Positive adjustment to threatening events: An organismic valuing theory of growth through adversity. *Review of General Psychology, 9*, 262–280.
- Kalayjian, A. (2010). Forgiveness in spite of denial, revisionism, and injustice. In *Forgiveness and reconciliation: Psychological pathways to conflict transformation and peace building*, A. S. Kalayjian & F. R. Paloutzian, (Eds.), 237-250. New York: Springer.
- Kalayjian, A., Donovan, E., & Shigemoto, Y. (2010). Coping with Hurricane Andrew: Preparedness, resilience, and meaning-making. In *Mass trauma and emotional healing around the world: Rituals and practices for resilience and meaning-making*, volume 1, 73-91. Santa Barbara: CA: ABC-CLIO, LLC.
- Kalayjian, A., & Sofletea, G. (2012). Victim, perpetrator, or both? A child soldier's journey into healing wounds of war in Sierra Leone. In S. Poyrazli & C. E. Thompson (Eds.), *International case studies in mental health* (pp. 33-52). Washington, D.C.: Sage.
- Kalayjian, A., Shigemoto, Y., Patel, B. (2010). Earthquake in Soviet Armenia: Coping, integration, and meaning-making. In *Mass trauma and emotional healing around the world: Rituals and practices for resilience and meaning-making*, volume 1, 1-21. Santa Barbara: CA: ABC-CLIO, LLC.
- Kalayjian, A. (2002). Biopsychosocial and spiritual treatment of trauma. In *Comprehensive handbook of psychotherapy*, R. Massey & S. Massey (Eds.), 615-637. New York: Wiley.
- Kendall-Tackett, K. (2009). Psychological trauma and physical health: A psychoneuroimmunology approach to etiology of negative health effects and possible interventions. *Psychological Trauma: Theory, Research, Practice, and Policy, 1*, 35-48.

Kessler, R. C., R. L. Brown, and C. L. Broman. 1981. "Sex Differences in Psychiatric Help-Seeking: Evidence from Four Large-Scale Surveys." *Journal of Health and Social Behavior*, 22(1), 49-64.

Lantz, M. S., & Buchalter, E. N. (2005). Post-Traumatic Stress Disorder: When current events cause relapse. *Clinical Geriatrics*, 13(2), 20-23.

Linley, P.A., & Joseph, S. (2004). Positive change following trauma and adversity: A review. *Journal of Traumatic Stress*, 17, 11–21.

Maercker, A., & Herrle, J. (2003). Long-term effects of the Dresden bombing: Relationships to control beliefs, religious belief, and personal growth. *Journal of Traumatic Stress*, 16(6), 579-587.

McLelland, G. H. (2000). Increasing statistical power without increasing sample size. *American Psychologist*, 55(8), 963-964. doi: 10.1037/10003-066X.55.8.963

McNally, R. J. (2001). Vulnerability to anxiety disorders in adulthood. In R. E. Ingram & J. M. Price (Eds.), *Vulnerability to psychopathology: Risk across the lifespan*, pp. 304-321. New York: Guilford Press.

Medina-Mora, M. E., Borges, G., Lara, C., Ramos-Lira, L., Zambrano, J., & Fleiz, C. (2005). Prevalencia de sucesos violentos y trastorno post-traumático en la población mexicana. *Salud Pública de México*, 47, 8-22.

Miller, A. J., Worthington Jr., E. L., & McDaniel, M. A. (2008). Gender and forgiveness: A meta-analytic review and research agenda. *Journal of Social & Clinical Psychology*, 27(8), 843-876.

Moreno, M., Manuel, K. (1995). The 1985 Mexico Earthquake. *Geofisica Columbia* (3), 5-19.

- Nightingale, J., Williams, R. M. (2000). Attitudes to emotional expression and personality in predicting post-traumatic stress disorder. *British Journal of Clinical Psychology*, 39, 243-254.
- Norris, F. H., Kaniasty, K., Conrad, L. M., Inman, G. L., & Murphy, A. D. (2002). Placing age differences in cultural context: A comparison of the effects of age on PTSD after disasters in the United States, Mexico, and Poland. *Journal of Clinical Geropsychology*, 8(3), 153-173.
- Norris, F. H., Murphy, A. D., Baker, C. K., Perilla, J. L., Rodríguez, F. G., & Rodríguez, J. G. (2003). Epidemiology of trauma and posttraumatic stress disorder in Mexico. *Journal of Abnormal Psychology*, 112(4), 646-656.
- Olf, M., Langeland, W., Draijer, N., & Gersons, B.P.R., (2007). Gender Differences in Posttraumatic Stress Disorder. *Psychological Bulletin*, 133, 183-204.
- Orozco-Zavala, R., Borges, G., Benjet, C., Medina-Mora, M. E., & Lopez-Carrillo, L. (2008). Traumatic life events and posttraumatic stress disorder among Mexican adolescents: Results from a survey. *Salud Publica de Mexico*, 50(1), 29-37.
- Park, C. L. (2010). Making sense of the meaning literature: An integrative review of meaning making and its effects on adjustment to stressful life events. *Psychological Bulletin*, 136(2), 257-301.
- Park, C. L., & Ali, A. L. (2006). Meaning making and growth: New directions for research on survivors of trauma. *Journal of Loss and Trauma*, 11, 389-407.
- Park, C. L., & Helgeson, V. S. (2006). Growth following highly stressful life events: Current status and future directions. *Journal of Consulting and Clinical Psychology*, 74, 791-796.

- Perry, B. D. (2008). Child maltreatment: A neurodevelopmental perspective on the role of trauma and neglect in psychopathology. In T. P. Beauchaine & S. P. Hinshaw (Eds.). *Child and Adolescent Psychopathology*. Hoboken, NJ: John Wiley & Sons.
- Phelps, L. F., Williams, R. M., Raichle, K. A., Turner, A. P., & Ehde, D. M. (2008). The importance of cognitive processing to adjustment in the first year following amputation. *Rehabilitation Psychology, 53*, 28-38.
- Pipinelli, A., & Kalayjian, A. (2010). Gender and Genocide: Armenian and Greek Women Finding Positive Meaning in the Horror. In *Mass trauma and emotional healing around the world: Rituals and practices for resilience and meaning-making*, volume 2, 307-326. Santa Barbara: CA: ABC-CLIO, LLC.
- Powell, S., Rosner, R., Butollo, W., Tedeschi, R. G., & Calhoun, L. G. (2003). Posttraumatic growth after war: A study with former refugees and displaced people in Sarajevo. *Journal of Clinical Psychology, 59*, 71-83.
- Schacter, D. L. (1999). The seven sins of memory: Insights from psychology and cognitive neuroscience. *American Psychologist, 54*, 182-203.
- Schaefer, F.C., Blazer, D.G., & Koenig, H.G. (2008). Religious and spiritual factors and the consequences of trauma: A review and model of the interrelationship. *International Journal of Psychiatry in Medicine, 38*, 507-524.
- Schnurr, P., & Green, B. (2004). Understanding relationships among trauma, posttraumatic stress disorder, and health outcomes. In P. Schnurr & B. Green (Eds.), *Trauma and health: Physical health consequences of exposure to extreme stress*, 247-275. Washington DC: American Psychological Association.

- Sears, S. R., Stanton, A. L., & Danoff-Burg, S. (2003). The Yellow Brick Road and the Emerald City: Benefit finding, positive reappraisal coping and posttraumatic growth in women with early-stage breast cancer. *Health Psychology, 22*, 487–497.
- Skaggs, B. G., & Barron, C. R. (2006). Searching for meaning in negative events: Concept analysis. *Journal of Advanced Nursing, 53*, 559-570.
- Staub, E., & Pearlman, L.A. (2001). Healing, reconciliation, and forgiving after genocide and other collective violence. In R.G. Helmick & R.L. Petersen (Eds.), *Forgiveness and reconciliation: Religion, public policy, and conflict transformation*, pp. 195–217. Radnor, PA: Templeton Foundation Press.
- Stevens, S., & Slone, L. (June 2005). Tsunami and mental health: What can we expect? Retrieved from http://www.ncptsd.va.gov/facts/disasters/fs_earlyint_disaster.html.
- Taylor, S. E. (1983). Adjustment to threatening events: A theory of cognitive adaptation. *American Psychologist, 38*, 18-28.
- Tedeschi, R.G., Park, C.L., & Calhoun, L.G. (Eds.). (1998a). *Posttraumatic growth: Positive changes in the aftermath of crisis*. Mahwah, NJ: Lawrence Erlbaum.
- Tonlin, D. F., & Foa, E.B. (2006). Sex Differences in Trauma and Posttraumatic Stress Disorder: A Quantitative Review of 25 Years of Research. *Psychological Bulletin, 132*, 959-992.
- Toussaint, L. L., Williams, D. R., Musick, M. A., & Everson, S. A. (2001). Forgiveness and health: Age differences in a U.S. probability sample. *Journal of Adult Development, 8*(4), 249-257.
- Tucker, P., Pfefferbaum, M., Nixon, S. J., & Dickson, W. (2000). Predictors of post-traumatic stress symptoms in Oklahoma City: Exposure, social support, pre-traumatic responses. *Journal of Behavioral Health Services and Research, 27*, 406-416.

United States Geographical Survey. Mexico Earthquake Information. Retrieved from

<http://earthquake.usgs.gov/earthquakes/world/index.php?regionID=3>

Updegraff, J. A., Silver, R.C., & Holman, E.A. (2008). Searching for and finding meaning in collective trauma: Results from a national longitudinal study of the 9/11 terrorist attacks. *Journal of Personality and Social Psychology*, 95, 709-722.

U.S. Geological Survey (2012). *Mexico earthquake information*. Retrieved from:

<http://earthquake.usgs.gov/earthquakes/world/index.php?region=Mexico>.

U.S. Library of Congress. Earthquakes. Retrieved from <http://countrystudies.us/mexico/49.htm>

van der Kolk, B. A., McFarlane, A. C., & Weisaeth, L. (Eds.). (2006). *Traumatic stress: The effects of overwhelming experience on mind, body, and society*. New York: The Guilford Press.

van der Kolk, B. A. (1987). *Psychological trauma*. Washington, DC: American Psychiatric Press.

Verschuur, M., Maric, M., & Spinhoven, P. (2010). Differences in changes in health-related anxiety between Western and non-Western participants in a trauma-focused study. *Journal of Traumatic Stress*, 23, 300-303.

Vogel, J. & Vernberg, E. M. (1993). Children's psychological responses to disaster. *Journal of Clinical Child Psychology*, 22, 464-484.

Wu, N., Schairer, L., Dellor, E., & Grella, C. (2010). Childhood trauma and health outcomes in adults with comorbid substance abuse and mental health disorders. *Addictive Behaviors*, 35, 68-71.

Yehuda, R. (2002). Post-Traumatic Stress Disorder. *The New England Journal of Medicine*, 346, 108-114.

¹ The authors recognize the ubiquity of trauma throughout various regions of the world, particularly in urban centers and developing societies. For the purposes of the current study, we restricted our discussion to Mexico City's specific exposure and risk.