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Coping style and posttraumatic growth among adult survivors 8 years after the 2008 Wenchuan earthquake in China

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ABSTRACT

The objectives of the present study were to identify the relationship between coping style and PTG among survivors 8 years after the Wenchuan earthquake, using data from a cross-sectional survey. 1369 participants were recruited from two different sites in the areas that were severely affected by the earthquake. Bivariate correlation analysis and multivariate linear regression analysis were used to assess PTG and identify associated factors. The results indicated that both positive and negative coping style can develop to PTG among adult survivors 8 years later after Wenchuan earthquake. Positive coping style had a higher correlation with "new possibilities" ($\beta = 0.19$, $p < 0.001$), "personal strength" ($\beta = 0.30$, $p < 0.001$) "appreciation of life" ($\beta = 0.11$, $p < 0.001$) than negative coping style, while negative coping style had a higher correlation with "relating to others" ($\beta = 0.25$, $p < 0.001$) than positive coping style. In addition, the study found PTSD and PTG co-exist after the earthquake, while depression was a barrier factor during the process of developing PTG.

1. Introduction

Over 50% of people experience a traumatic event during their lifetimes (Del Ben, Scotti, Chen, & Fortson, 2006), which may have no effect,negative effects such as depression and posttraumatic stress disorder (PTSD), or a positive effect known as posttraumatic growth (PTG) on individuals. Although trauma studies have been traditionally concentrated on the pathogenic effect of experiencing trauma (Galea, Nandi, & Vlahov, 2005), particularly on the relationship between suffering trauma and developing PTSD (Breslau, Chilcoat, Kessler, & Davis, 1999; Hiley-Young, Blake, & Abueg, 1995), as well as the effects it brings to the individual (Foa, Hembree, & Rothbaum, 2007; Herman, 1992), things becomes to change last decade. Researchers in the field of trauma began to shift their focus on the positive adaptation-related outcomes after a diversity (Jin, Xu, & Liu, 2014; Levine, Laufer, Stein, Hamamaraz, & Solomon, 2009), and PTG had been observed and tested in a various of trauma-exposed population, including survivors of serious medical illness, disasters and the bereaved (Brooks, Lowe, Graham-Kevan, & Robinson, 2016; Linley & Joseph, 2004; Zwahlen, Hagenbuch, Carley, Jenewein, & Buchi, 2010).

Adequate studies had pointed out that PTG referred to positive change following trauma and focus on the five aspects below: improved relationships with others, increased personal strength, identification of new possibilities, positive spiritual change, and increased appreciation of life (Jin et al., 2014; Villamor & Adana, 2015). The main model of PTG is that of Schaefer and Moos (Schaefer & Moos, 1998). They suggest that a set of factors combine to influence the development of PTG within a person following a traumatic event. These factors include: 1) event-related factors 2) environmental factors 3) personal factors and 4) cognitive and coping responses. Each factor is seen to make a unique contribution to PTG. They also point to the importance of positive coping style over negative coping style; only positive coping style is assumed to contribute to positive outcomes. In contrast, mixed results about the relationship between negative coping style and PTG existed in the previous studies. Some studies found that negative coping style was associated with less PTG (Frazier, Tashiro, Berman, Steger, & Long, 2004), whereas others have found the opposite or no association (Su & Chen, 2014). Therefore, it is necessary to further examine the relationship of coping style and PTG.

On May, 12, 2008, an earthquake measuring 8.0 on the Richter scale hit Wenchuan, in Sichuan province, China. According to Ministry of Civil Affairs, 69,197 people were confirmed dead, including 68,636 in Sichuan province, and 374,176 people were injured, with a further 18,236 people listed as missing, and about 6.5 million people left homeless (Jin et al., 2014). Abundant studies showed that PTSD and depression were the most prevalent mental disorder among survivors of the Wenchuan earthquake (Hong & Efferth, 2015). However, few studies observed the PTG among earthquake survivors, especially from a long-term PTG perspective. Jin & Xu revealed that 51.1% of the survivors reported PTG one year following the earthquake and suggested that female was more affected than male (Jin et al., 2014). Wenchuan

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earthquake has passed eight years, little is known about the level of PTG among those survivors. As Xiao & Wen pointed, the number of article concerning health consequence after earthquake tend to drop dramatically 2 years after an earthquake (Xiao, Jin, Hong, Tan, & Xiao, 2011), reflecting the lack of research attention to the long term impact of trauma on affected individuals.

The objective of this study is to (a) examine the level of PTG, (b) investigate the relationship between coping style and PTG among adult survivors at 8 years after the Wenchuan earthquake. The findings could add knowledge of long-term disaster resilience and have implications for further mental health promotion following earthquakes.

2. Methods

2.1. Study design and participants

This study is based on a community-based, cross-sectional survey conducted among survivors of the 2008 Wenchuan earthquake in February 2016, eight years later. Participants were recruited from two different sites in the area that were severely affected by the earthquake. The first survey site was the township of Yongan (115.7 km from the epicenter) in Beichuan County, which is located in a mountainous area. Over 90% of the buildings in Yongan were damaged in the earthquake. The earthquake killed 15,645 people and left 26,916 people injured, and 1023 missing in Beichuan County. The second site was the township of Guangji (58.3 km from the epicenter) in Mianzhu County, which is located on a plain. Over 96% of the buildings in Guangji were damaged in the earthquake. It has been confirmed that 11,098 people were killed, 36,468 people were injured, and 298 people missing in Mianzhu County. These two townships were selected because both are close to the epicenter but at somewhat different distances, both suffered severe destruction in the earthquake, and both had similar socioeconomic and demographic characteristics before the earthquake.

This cross-sectional study used a combined multistage systematic sampling and convenience sampling design to select participants. In the first stage, 12 of the total 29 villages were randomly selected from the two survey townships. In the second stage, households, rather than individuals, were systematically selected, using village registration information, as the basic unit for the entire survey. But in a small number of villages, many former residents were no longer residing in their homes, making such systematic sampling unfeasible; in these villages, non-random sampling methods were therefore also used. Adults over age 16 in each household were selected for participation. The actual samples achieved amounted to a total of 1369 adults. A higher than 90% response rate was achieved. These samples were representative of two townships that were severely affected by the Wenchuan earthquake.

Face-to-face interviews were conducted, in Mandarin Chinese and in the local dialects and languages, by 22 college students from Mainyang Normal University. All of the interviewers were thoroughly trained before the survey. The training involved the following five sessions: introduction, sampling design and procedures, review of the questionnaire, methods and techniques of interviewing, and potential difficulties in conducting the survey. The interviewers were required to show their identification and explain the aims of the study prior to requesting permission to enter the participants' houses. They read each question out to the respondents, and then wrote down their answers on the questionnaire. The average interview time was 1 h.

The study protocol was approved by the Institutional Review Board. All participants gave consent after being informed about the aim of the survey and their right to refuse to participate.

2.2. Measures

PTG was assessed using the post traumatic growth inventory (PTGI) (Tedeschi & Calhoun, 2004). The original English version of the inventory consists of 21 items within five major domains: relating to others (seven items), new possibilities (five items), personal strength (four items), and spiritual change (two items), and appreciation of life (three items). Participants responded on a 6-point scale ranging from 0 (no change) to 5 (complete change), with higher scores representing higher levels of PTG to Wenchuan earthquake. Two items were excluded in this study ("A better understanding of spiritual matters" and "I have a stronger religious faith"), as these two items were deemed not applicable to the local culture. The total PTGI scores were summed with a final range of 0–95. This inventory has shown good internal and test–retest reliability for western (Tedeschi & Calhoun, 2004), and Chinese samples (Jin et al., 2014) with an internal consistency for the total PTGI being 0.90(Tedeschi & Calhoun, 2004). For this study, the internal reliability was 0.92 and the internal reliabilities for the four subscales were 0.85, 0.76, 0.78, and 0.69, respectively.

Coping Style was measured by the simplified Coping Style Questionnaire (SCSQ), which was developed in China (Jie, 1998). In this study, participants were asked to complete the SCSQ on the basis of how they coped with stress after the earthquake. The SCSQ is a self-report scale which comprises 20 items structured on a five-point scale, ranging from 1 (not used) to 5 (used a great deal). The SCSQ consists of two subscales: negative coping (NC) and positive coping (PC). The PC category also includes twelve items that describe positive cognitive and behavioral strategies to manage emotional distress. The NC category includes eight items that describe negative cognition and avoiding behavioral activities to manage the problem. This inventory had shown good internal and test–retest reliability (Jie, 1998). In the present study, Cronbach's a of the total scale was 0.84 and that for NC and PC were 0.68 and 0.83, respectively.

Probable Symptomalogical PTSD: symptomalogical PTSD was assessed by the Impact of Event Scale-Revised (IES-R) (Weiss & Marmar, 1997), a self-report instrument widely used in the field of traumatic stress. It includes 22 items used to measure the three major symptom clusters of PTSD: Intrusion, avoidance, and hyper-arousal. The IES-R's measures have been found to have good and stable psychometric properties (Creamer, Bell, & Failla, 2003). The Chinese version of the IES-R has been found to have satisfactory psychometric properties, comparable to those of the original English version (Chen et al., 2007; Wu & Chan, 2003). In this study, the IES scale was used to investigate only posttraumatic symptoms related to the Wenchuan earthquake. The participants were asked to indicate the frequency of their distress using 4 response options (0 = not at all, 1 = seldom, 3 = sometimes, 5 = often) (Chan et al., 2012; Chan et al., 2011; Qu, Tian, Zhang, Wang, He, Zhang, et al., 2012a; Qu, Wang, Tian, Zhao, Zhang, He, et al., 2012b). Subscale scores were calculated as the means of the responses to all of the items in the specific subscale, and the total score was calculated as the mean response across all items. The internal consistency coefficient (Cronbach's alpha) of the whole scale in the present study was 0.93.

Depression: The Chinese edition of the Center for Epidemiologic Studies Depression Scale (CES-D) (Wang, 1999) was used to assess probable depression. This scale is the most widely used depression-screening scale and has been used in many community-based studies. The Chinese version of the CES-D scale has shown good reliability and validity across all age groups in urban populations (Zhang, Wu, Fang, Li, & Han, 2010). The internal consistency coefficient (Cronbach's alpha) of the whole scale in the present study was 0.88.

Traumatic exposure to the Wenchuan earthquake was assessed using an exposure checklist. Exposure refers to respondents' having been trapped or injured, or seen others thus exposed, during the earthquake. The participants were asked to answer "yes" or "no" regarding each kind of exposure.

Demographic and socioeconomic variables: The following demographic and socioeconomic information was also collected in the survey: Township of residence (Yongan/Guangji); gender (female/male); ethnicity (Han vs. Minority, with the latter including Qiang, Tibetan, Hui, Mongol and other minority groups); age; marital status (married/