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Dealing With Earthquake Disaster on Java 2006: A Comparison of Affected and Non-affected People

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The study investigated affected and non-affected people in Indonesia after the earthquake and the volcanic eruption in May 2006. We expected belief in a just world (BJW) and coping styles to be important factors when dealing with natural disasters for disaster attribution and psychopathological symptoms. Overall, 80 affected and 66 non-affected people were asked in the survey about their BJW, coping style, earthquake attribution, and psychopathological symptoms. ANOVAs and path models were used to analyze the data. Results show that people with a strong BJW attribute the disaster as a consequence of human failure. Avoidance coping was correlated with both emotional disturbance and psychological affectedness whereas approach coping was not related to the assessed psychopathological symptoms. Differences in the structural relations for the affected group emerged when compared to the non-affected group.

Keywords: psychological well-being, natural disaster, coping style, psychopathological symptoms, Islamic belief

Studi ini meneliti masyarakat di Indonesia yang terdampak dan yang tak-terdampak setelah gempa bumi dan letusan gunung berapi pada Mei 2006. Kami mengharapkan keyakinan terhadap dunia yang adil (DYA) dan gaya koping (*coping styles*) merupakan factor-faktor penting ketika berhadapan dengan bencana alam terkait atribusi kebencanaan dan gejala psikopatologis. Sejumlah 80 masyarakat terdampak dan 66 tak-terdampak diwawancarai dalam survei tentang DYA, gaya koping, atribusi gempa bumi, dan gejala psikopatologisnya. Untuk menganalisis data digunakan model ANOVA dan jalur. Hasil menunjukkan bahwa masyarakat dengan DYA kuat mengatribusikan bencana sebagai konsekuensi kegagalan manusia. Koping penghindaran berkorelasi dengan gangguan emosional dan akibat psikologis sedangkan koping pendekatan tidak berkorelasi dengan gejala psikopatologis yang dinilai. Perbedaan dalam hubungan struktural pada kelompok terdampak muncul bila dibandingkan terhadap kelompok yang tak-terdampak.

Kata kunci: kenyamanan psikologis, bencana alam, gaya koping, gejala psikopatologis, keyakinan Islam

Indonesia belongs to those countries most affected by natural disasters, particularly earthquakes, volcanic eruptions, and floods. It is positioned on the equator where several tectonic plates converge (the Indian-Australian, Euro-Asian, Pacific, and Philippine plates). Indonesia is thus regarded as a high-risk country with respect to natural disasters and consequently disaster management, disaster preparedness and resilience are the most important requirements for developing solid infrastructures, social services, architecture, the economy as well as first aid medicine and first aid and disaster psychology.

Over the past few years, Indonesia has been affected by various severe natural disasters. More than 100,000 people died from the seaquake which resulted in a tsunami, destroying vast areas of the South Asian coastline in 2004 (former disaster experience). This seaquake caused severe damage and loss among the Indonesian population of Aceh. Two years later in

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2006, Indonesia suffered from new natural disasters. The volcanic Merapi erupted and a strong earthquake (Magnitude 6.7) occurred in the District of Bantul (Yogyakarta) and South-Southwest Java (current disaster experience). Whereas fewer people lost their lives (approx. 5,700), more houses were destroyed (approx. 300,000) compared to the tsunami in 2004 (Leitmann, 2007).

There is evidence that many of the affected people felt at a disadvantage in terms of the distribution of aid. They perceived that some people became rich at the expense of others, leading to an escalation of conflicts within villages (Zaumseil, Hadiyono, & Sullivan, 2009). Justice is a principal concern for people (Walster, Berscheid, & Walster, 1973). Over and above this, the way that people cope with their fate might be relevant for their evaluation of the disaster (disaster attribution) and for their psychological well-being. Against this background, we investigated the meaning of belief in a just world (BJW), coping styles for earthquake attribution, and the occurrence of psychopathological symptoms. We considered a group of citizens directly affected by the earthquake as well as a comparable non-affected control group in order to evaluate whether our expected relations were specific to the affected people or could be generalized to other people.

The Meaning of BJW for Disaster Attribution and Psychological Well-being

According to Lerner's (1965) just world hypothesis, people are motivated to believe that the world is basically a just and meaningful place in which good things happen to good people and bad things happen to bad people. As BJW serves important adaptive purposes, individuals are motivated to defend this belief when faced with a threat (Lerner, & Miller, 1978).

Previous research on BJW focused on individuals' attribution processes aimed at seeking an explanation for and rationalizing an injustice either when they suffer unfairness themselves (Bulman, & Wortman, 1977; Comer, & Laird, 1975) or when they observe unfairness experienced by others (Furnham, & Procter, 1989; Lerner, & Miller, 1978).

Obviously, people are more strongly affected when they are treated unjustly themselves, in other words, when they are victims as opposed to when they observe other people being treated unjustly (Lind, Kray, & Thompson, 1998). For example, when people are affected by a natural disaster such as an earthquake, they tend to search for explanations to cope with their fate and to justify why such an unjust critical life event has happened to them. Disaster victims might try to rationalize their own fate by attributing the event internally to their own actions and regarding it as a form of punishment for a bad practice of their religion. On the other hand, they might also look for societal reasons evaluating that disasters in any case happen more often to their "in-group" because they are poor, or live in regions with already difficult political conditions. Whether it is attributed to one's own failures or to those of society, in both cases the disaster can be classified as being caused by human and not natural reasons. In sum, we argue that the more disaster victims believe in a just world, the more they tend to trace back their own fate to human failure.

Similarly, non-affected people may judge the earthquake survivors as if they were responsible for the situations in which they found themselves. On a global level, when observing to the injustice inflicted upon others, individuals may devalue victims in order to defend their BJW by assuming that the affected people deserved such a fate. Accordingly, research so far has indicated that BJW is associated with discrimination behavior (Bizer, Hart, & Jekogian, 2012). As observers, non-affected people are in a position where they are able to blame the "out-group", in other words, the victims of the earthquake for their bad actions or their bad personality which might be reflected in social, political or religious difficulties to maintain their BJW. It would therefore seem logical to postulate that the link between BJW and disaster attribution to human reasons is stronger for the non-affected compared to the affected group.

Over and above BJW's impact on attribution processes, research has shown that individuals with a strong BJW are more satisfied with their lives, have a more positive outlook on life, show higher levels of self-esteem, and are less likely to suffer from depression, anxiety, or emotional burn-out compared to individuals with a low BJW (Lipkus, Dalbert, & Siegler, 1996; Otto, Glaser, & Dalbert, 2009; Otto, & Schmidt, 2007; Ritter, Benson, & Snyder, 1990). Several studies however have indicated that BJW is particularly effective at shielding the mental health of victimized people (e.g., Dalbert, 1997; Lupfer, Doan, & Houston, 1998). In a study on flood victims, Otto, Boos, Dalbert, Schöps, and Hoyer (2006) reported that BJW was negatively associated with severe psychopathological symptoms. Accordingly, we argue that BJW should also buffer the mental health of those affected by an unjust critical life event.

Contrary to BJW, however, under some circumstances, people may perceive the world as unjust because

such a belief may imply an "ego-defensive" component for an individual (Dolinski, 1996). The belief in an unjust world, describes the conviction that the world is basically an unjust place, where decisions made are often unfair, and a compensation for injustice is rather the exception than the rule. Cubela-Adoric (2003, cited from Cubela-Adoric, 2004) found that the more students endorsed an unjust world, the less confident they were to complete their current academic year successfully. Moreover, the belief in an unjust world was negatively correlated with psychopathological symptoms in a study on flood victims (Otto et al., 2006).

Gender and Psychopathological Symptoms

Several studies stress the fact that women report more psychological symptoms than men (Irmansyah, Dharmono, Maramis, & Minas, 2010; Kirk & Dollar, 2001; Sunidharan, 2006). In general, women are more often affected by depression or anxiety disorders and by posttraumatic stress disorders (PTSD) which are characterized by four symptoms related to the traumatic event: (a) re-experiencing, (b) avoidance, (c) persistent negative cognitive or mood swings, and (d) hyper-arousal (APA, 2013) after natural disasters (Kirk & Dollar, 2001). Especially, women with a lower education showed higher PTSD levels following the tsunami and earthquake in Aceh and Nias (Indonesia) and a higher co-morbidity regarding anxiety and dysphoric stress (higher SRQ-20 scores) compared to men (Irmansyah et al., 2010). Kirk and Dollar (2001) also found a longer lasting higher level of PTSD after natural disasters in women compared to men. Sunidharan (2006) conducted an investigation on the survivors of the tsunami in India and was able to show significant gender differences for both anxiety and depression. This difference could be attributed to gender roles in the society of Kerala (India) where gender roles are rigid and closely aligned to traditional gender stereotypes. This gender difference could result from men and women expressing psychological distress in different ways. On the other hand, females and the elderly also showed higher levels of psychological symptoms after an explosion in the Netherlands (Yzermans et al., 2005) where gender roles are not as rigid.

Other studies have come up with different results. Bravo, Rubio-Stipec, Canino, Woodbury, and Ribera (1990) conducted an investigation on flood victims in Puerto Rico from various socio-demographic groups and found no effects for gender, age, or education. Furthermore, Witruk, Reschke, and Stueck (2009) did not find any gender differences in PTSD-levels in the tsunami-affected regions of Sri Lanka and Indonesia 11 months after the tsunami. Similarly, no gender differences were found regarding PTSD, depression, and grief disorders among Norwegian tourists who survived the 2004 tsunami (Kristensen, Weisæth, & Heir, 2009), and recovery processes for PTSD symptoms after Hurricane Katrina also showed no gender differences (Kessler, Galea, Gruber, Sampson, Ursano, & Wessely, 2008). These contradictory findings show the importance of including gender as a control variable in our research.

Former Disaster Experience

Psychological morbidity. Research so far has revealed that former disaster experience might be important for psychopathological symptoms and decrease well-being and life quality. It is known that exposure to stressful and traumatic events can have severe and chronic psychological consequences (Foa, Keane, & Friedman, 2000; Van der Kolk, McFarlane, & Weisaeth, 1996). More specifically, it can be assumed that repeated negative life events in general or natural disasters in particular can strongly impact on psychopathological symptoms in the sense of morbidity.

Risk of re-traumatisation. The former disaster experience can be reactivated by similar external situation characteristics or thoughts that stimulate PTSD symptoms (e.g., intrusions, hyper-arousal, panic attacks, avoidance). The triggers can be smells, sounds or images from mass media that can trigger off a subsequent traumatic experience occurring in a normal every-day situation. People with former disaster experience are extremely vulnerable to PTSD symptoms and are at risk of high morbidity (Yule, Bolton, Udwin, & Boyle, 2000). The earthquake and the volcanic eruption in May 2006 in the District of Bantul (Java) involved the risk of re-traumatisation of those who had been directly or indirectly affected by the tsunami in 2004 (Witruk et al., 2009; Witruk, Senarath, & von Lieres, 2010).

Resilience. Disaster resilience is defined as the ability to maintain or regain pre-disaster levels of functioning, to manifest successful adaptation, and/or foster post-traumatic growth. The study conducted by Jang and Wang (2009) on survivors of an earthquake living in a Hakka community in Tung Shih (Taiwan) shows that disaster resilience depends on acceptance, preparedness, self-reliance, and spirituality. Hakka spirit, resource availability, social support networks, and serving others were all shown to have positive impacts.

Traumatic growth and wisdom. There is also some evidence of positive psychological changes resulting from stressful and traumatic experiences. The

study of positive changes following stressful and traumatic events is part of the wider concept of positive psychology that has been developed by psychologists over recent years (Joseph, Linley, Andrews, Harris, Howle, Woodward, & Shevlin, 2005; Linley & Joseph, 2005). This new positive perspective of trauma and stress greatly contrasts with the more traditional emphasis of psychologists on psychopathology following a trauma. When a person struggles with adversity, changes may arise that propel him or her to a higher level of psychological functioning compared to the state before the event. The evidence showed that people who reported and maintained adversarial growth over time were subsequently less distressed, whereas people who were more depressed or anxious were less likely to report adversarial growth (Linley & Joseph, 2004).

The Role of Coping Style for Psychological Well-Being and Disaster Attribution

Coping and coping style. Coping can be described as behavior that is targeted at protecting people from being psychologically harmed by stressful events (Folkman & Moskowitz, 2004). It plays a mediating role between stress and psychological, physical, and social well-being. Coping as cognitive and behavioral efforts to manage specific external and/or internal demands is appraised as taxing or exceeding the resources of the person (Lazarus & Folkman, 1984, p.141). It is very likely that the relationships between coping and traumatic stress symptoms are reciprocal and dynamic. Coping efforts are made in response to stress appraisals. And the altered person-environment relationship leads to new appraisals or reappraisals (Folkman & Moskowitz, 2004).

Pearlin and Schooler (1978) demonstrated that the protective functions of coping can operate by modifying the outer circumstances causing the problems, by changing the meaning of the experiences from problematic to neutral, and by regulating one's emotional reactions to the problem. The classification of coping strategies can be based on the focus approach (problem-focused versus emotion-focused), on the method (cognitive versus behavioral), or on the orientation (approach versus avoidance). Folkman and Lazarus (1980) analyzed two functions (problem-focused and emotion-focused coping) for coping with the stressful events of daily life. Problem-focused coping is adopted to manage the person-environment relationship as the source of the stress, while emotion-focused coping is adopted to regulate stressful emotions.

The cultural dependency of coping styles. Culture as a highly complex system of meanings that is learned, shared, transmitted, and altered from one generation to the next is a fundamental context that shapes both the individual and the environment (Hofstede, 2001). According to Hofstede (n.d.), Indonesia is a collectivistic society, compared to Western countries such as Germany. In more collectivist societies, individuals belong to one or more closed "in-groups" from which they cannot detach themselves. The in-group protects the interests of its members, expecting their permanent loyalty in return. The core task of a collectivistic society such as the one that prevails in Indonesia is to maintain harmony with others. The members of this kind of society define themselves in the context of relationships within the society, particularly that of the family (Hofstede, 1980). In contrast, individualistic societies place greater priority on personal goals rather than the goals of the collective. Here, individuals primarily look after their own interests and the interests of their immediate family (Triandis, 1989).

Coping styles are influenced strongly by cultural and religious backgrounds. Coping strategies that confront and modify external stressors or approach-focused coping strategies are expected to be more effective in individualistic cultures, whereas coping strategies that modify internal psychological states by cognitive or avoidance-focused coping strategies are expected to be more effective in collectivistic cultures such as Indonesia. In addition, many other factors can alter the impact of culture and religion on the coping style (e.g., the environment of the affected region, the profession or the personality of the affected people, gender, age etc.) (Von Lieres, 2010; 2013).

In studies conducted in Western, industrialized countries, empirical findings suggest that approach coping is constructive and adaptive, whereas avoidance coping is passive and maladaptive, with people who adopted more approach-focused coping rather than avoidance-focused coping showing lower levels of PTSD symptoms (Krause, Kaltman, Goodman, & Dutton, 2008; Glass, Flory, Hankin, Kloos, & Turecki, 2009).

In contrast to studies in Western, industrialized settings, von Lieres (2010) found that avoidance coping was more effective among victims of the tsunami in Kerala (South-India) for decreasing levels of traumatic stress than approach coping in this non-industrialized, collectivistic cultural setting with a Hindu background.

Coping style and disaster attribution. Mikulincer (1989) showed problem-focused coping to be associated with a less stable/global attribution for failure and with a higher expectancy of control. Emotion-focused coping and distancing coping were associated with more internal/global/stable attributions for failure.

Mikulincer and Solomon (1989) investigated combat-related PTSD, coping strategies and causal attributions among Israeli soldiers in the 1982 Lebanon War. The results showed that attributing the negative event to stable and uncontrollable causes was associated with a more frequent use of emotion-focused coping and a less frequent use of problem-focused coping.

With these points in mind, it is important for our study to consider the different findings regarding pre-conditions, patterns, effort, efficiency, and the consequences of individual coping styles. Overall, there are complex relations of conditions before, during, and after the disaster. Different demographic characteristics are related to coping strategies. For example, differences were found with respect to gender, age, education, profession, sense of coherence, focus of control, BJW, resilience, disaster preparedness as well as the pre-morbidity of personalities due to neuroticism, anxiety, and vulnerability (Ikeda, 1995; Qurotul, 2013; von Lieres, 2010, 2013).

Hypotheses

Hypothesis 1: The affectedness by the current disaster will have a global impact on attitudes, beliefs, disaster attribution, coping and psychological well-being. The currently affected people will have a stronger belief in an unjust world associated with a stronger attribution of the disaster to human reasons, higher coping scores and a lower psychological well-being compared to the non-affected group.

Hypothesis 2: Gender will influence the disaster attribution, the coping style and the psychological well-being. For the female group, a higher avoidance coping and a lower psychological well-being are expected compared to the male group. The male group will also have a higher disaster attribution to natural reasons compared to the female group.

Hypothesis 3a: People with a strong BJW are more likely to attribute the disaster to human reasons compared to those with a weak BJW.

Hypothesis 3b: The relationship between BJW and attribution of the disaster to human reasons will be stronger for the non-affected group than for the group affected by the earthquake.

Hypothesis 4a: BJW will be negatively correlated with psychopathological symptoms.

Hypothesis 4b: Unjust world belief will be positively associated with psychopathological symptoms.

Hypothesis 4c: The relationship between BJW and psychological symptoms will be mediated by attribution of the disaster to human reasons.

Hypothesis 5a: Avoidance coping will be associated with an attribution of the disaster to human reasons for the affected group.

Hypothesis 5b: Approach coping will be associated with an attribution of the disaster to natural reasons for the non-affected group.

Hypothesis 6: Avoidance coping will be related to higher psychopathological symptoms for both groups.

Hypothesis 7: The relationship between gender and the attribution of the disaster to natural reasons will be mediated by approach coping for the affected group.

Hypothesis 8: The relationship between former disaster experience and psychological symptoms will be mediated by attribution of the disaster to human reasons for the affected group.

Method

Procedure

Citizens in the District of Bantul close to Yogyakarta in South Java were invited to participate in a survey about their psychosocial affectedness after the earthquake and volcanic eruption in May 2006. The data collection took place in the District of Bantul close to the epicenter of the earthquake. Data was collected about one year after the natural disasters from June 15, 2007 to August 31, 2007.

Participants

Muslims predominated the group of participants in the survey accounting for 95.12%, compared to 1.49% Protestants, 3.20% Catholics, .07% Buddhists, and .12% Hindus (BPS, 2008) among the Bantul citizens. In the regions affected by the earthquake, nearly all citizens were Muslims. We aimed to compare affected and non-affected people and to include only Muslims in each group. In order to distinguish between the groups, participants were asked individually whether they had been directly affected by the earthquake or volcanic eruption in May 2006 (current disaster experience), and whether they had experienced a loss of family members or friends, a loss of their home, damage to their home, the loss of their job and whether they had been psychologically affected by the feeling of a loss of safety or any other kinds of affectedness. Participants were selected and recruited based on their distance from the epicenter. Affected people lived 2-3 miles from the epicenter, whereas non-affected people lived further than eight miles from the epicenter. The affected

Table 1
Sample Characteristics for Affected and Non-affected Groups

	Affected group (n = 80)	Non-affected group (n = 66)
Gender		
Female	38 (47.5%)	32 (48.5%)
Male	42 (52.5%)	34 (51.5%)
Age	Range: 14-63 M = 33.99 (SD = 14.24)	Range: 15-64 M = 32.29 (SD = 12.52)
Education level		
Elementary	8 (10.0%)	4 (6.1%)
Junior high	15 (18.8%)	11 (16.7%)
High school	46 (57.5%)	34 (51.5%)
Diploma/teacher academy	4 (5.0%)	2 (3.0%)
Bachelor/college	7 (8.8%)	15 (22.7%)
Profession		
Farmers	8 (10.0%)	7 (10.6%)
Laborers & craftsmen	18 (22.5%)	8 (12.1%)
Police & army members	16 (20.0%)	12 (18.2%)
Village officers & traders	15 (18.8%)	21 (31.8%)
Students & college students	15 (18.8%)	13 (19.7%)
Teachers & civil servants	8 (10.0%)	5 (7.6%)
Former disaster experience		
Not affected by Tsunami in 2004	34 (42.5%)	26 (39.4%)
Affected by Tsunami in 2004	46 (57.5%)	40 (60.6%)

Note. To distinguish between the affected and non-affected groups, the participants were asked if they had been affected by the earthquake or volcanic eruption in the form of personal losses (loss of family members) or damages (damage to their homes) or felt directly psychologically affected (loss of the feeling of safety). All participants were asked to write down their level of education and their profession. These statements were later classified.

and non-affected people were comparable in terms of their jobs, education, gender, and age.

Overall, an investigation was conducted on 80 affected and 66 non-affected people. Affected and non-affected groups differed significantly in terms of their self-rated affectedness by the earthquake or volcanic eruption in 2006, $\chi^2(1) = 20.69$, $p < .001$. As shown in Table 1, two samples were comparable in terms of their gender distribution, $\chi^2(1) = 0.01$, $p = .91$, age, $t(144) = 0.76$, $p = .45$, education level, $\chi^2(4) = 6.04$, $p = .20$, and profession, $\chi^2(5) = 5.02$, $p = .41$. Moreover, there was no difference between the two groups regarding their affectedness by the tsunami in 2004, $\chi^2(1) = .14$, $p = .70$.

Research Instruments

All instruments were translated from either German or English into Indonesian by using an independent back-translation procedure with bilingual speakers (Brislin, Lonner, & Thorndike, 1973). Scale scores were calculated by averaging across items. Most measures showed Cronbach's alphas of .70 and above and yielded satisfactory internal consistencies (Nunnally, & Bernstein, 1994). However, because alpha is dependent on the length of a scale and the breadth of the measure, it is also important to consider inter-item correlations, particularly for short scales (Streiner, 2003). Clark and Watson (1995) suggested that mean inter-item correlations between .40 and .50 should be achieved for scales measuring very narrow characteristics and between .15 and .20 for scales measuring broad characteristics. Hence, we also report the mean inter-item correlations for scales showing Cronbach's alphas lower than .70.

Justice beliefs. We assessed two distinct and well-established justice beliefs, namely BJW using Dalbert's (1999) 7-item Personal Belief in a Just World Scale and the belief in an unjust world using Dalbert, Lipkus, Sallay, & Goch's (2001) 4-item General Belief in an Unjust World Scale. Responses to the items were provided on 6-point Likert-type scales from 1 (strongly disagree) to 6 (strongly agree). Due to a low item-total correlation, one item on the personal BJW scale had to be deleted. Cronbach's alphas of .68 (mean r = .26) shows a satisfactory internal consistency of the shortened 6-item scale (e.g., "I believe that I usually get what I deserve."). Two items had to be excluded from the unjust world belief scale due to low reliability, and we used the remaining two items as an indicator reflecting an unjust world belief (e.g., "I feel that even important decisions are often unfair"). In spite of the scale's shortness, with a Cronbach's α of .64 (mean r = .47) it can be considered acceptable.

The confirmatory factor analysis supported the hypothesized two-factor model for our study which distinguishes personal belief in a just world and unjust world belief ($\chi^2 = 25.06$, $df = 19$, $p = .159$; $\chi^2/df = 1.32$, $CFI = .96$, $RMSEA = .05$). It provided a significantly better fit ($\chi^2 = 31.12$, $df = 1$, $p < .001$) than the one-factor model ($\chi^2 = 56.18$, $df = 20$, $p < .001$, $\chi^2/df = 2.81$, $CFI = .75$, $RMSEA = .11$) whereby all items were incorporated into a global world belief factor.

Disaster attributions. Two scales were developed to assess the attribution of natural disasters. Responses varied from 1 (strongly disagree) to 6 (strongly agree). The first scale consisted of 5 items and was labeled attribution to human reasons (e.g., "Natural disasters are a sign that religious requirements have not been fulfilled") (*Cronbach's* $\alpha = .67$, mean $r = .29$). The second measure was labeled attribution to natural reasons and was represented by a single item (e.g., "Only natural reasons lead to natural disasters").

Coping styles. To measure how participants coped with their experiences of the volcanic eruption and the earthquake in 2006, we applied Brief COPE, a 28-item inventory of general coping strategies (Carver, Scheier, & Weintraub, 1989). The 28 items measure 14 coping strategies (e.g., active coping, denial) with 2 items each. Items were rated on 4-point Likert-type scales ranging from 1 ("I haven't been doing this at all") to 4 ("I've been doing this a lot").

The results of the confirmatory factor analysis supported the our hypothesized two-factor model of approach and avoidance coping ($\chi^2 = 81.16$, $df = 72$, $p = .215$; $\chi^2/df = 1.13$ *CFI* = .98, *RMSEA* = .03), which provided a significantly better fit ($\chi^2 = 109.93$, $df = 1$, $p < .001$) than the one-factor model ($\chi^2 = 191.09$, $df = 73$, $p < .001$, $\chi^2/df = 2.62$, *CFI* = .69, *RMSEA* = .11) in which all items were loaded into a global coping factor.

After excluding the two items from the "substance use" subscale (because of a zero non-variance of the answers), two higher order dimensions could be differentiated from one another. Approach coping corresponded to both of Lazarus and Folkman's (1984) central coping strategies "problem-focused coping" and "emotion-focused coping" (combining items from the subscales of active coping, emotional support, humor, self-distraction, instrumental support, planning, acceptance, and positive reframing), whereas avoidance coping involved withdrawal cognitions and behavior such as denial, behavioral disengagement, or self-blame. Overall, approach coping consisted of 16 items (e.g., "I've been trying to come up with a strategy about what to do") and with a Cronbach's α of .77 it indicated satisfactory internal consistency. Avoidance coping was measured using 10 items (e.g., "I've been giving up trying to deal with it") and with a Cronbach's α of .69, this measure can be considered to be reliable.

Psychopathological symptoms. In order to investigate respondents' psychopathological symptoms, emotional disturbances and psychological affectedness were assessed. Emotional disturbances were recorded using three items (e.g., "My concentration ability is disturbed now", *Cronbach's α* = .80) which were comparable to items on the Impact of Event Scale (IES-R; Weiss & Marmar, 1996). The answering mode varied from 1 (strongly disagree) to 6 (strongly agree). Psychological affectedness by natural disasters was measured by four items summarizing anxiety, panic attacks, shock experiences, and nightmares (e.g., "I was shocked by the earthquake in May 2006", *Cronbach's α* = .67).

Control variables. Based on findings relating to gender and former disaster experience, these were included as relevant control variables. Former disaster experience was measured by the following item "Were you affected by the tsunami in 2004?". This item was asked more specifically as follows: (a) Loss of family members or friends, (b) Loss of your home, (c) Damage to your home, (d) Loss of your job, (e) Psychologically affected, and (f) Other kinds of affectedness.

Data Analysis Strategy

Statistical analyses included ANOVAs using SPSS version 21.0, and path models using AMOS version 21.0 (Arbuckle, 2010). Error terms were allowed to correlate on the basis of our measurement domains and hypothesized dimensions. To estimate the quality of the hypothesized models, the following fit indices were applied: (a) the comparative fit index (CFI; Satorra & Bentler, 1994) and (b) the root-mean-square error of approximation (RMSEA; Browne & Cudeck, 1993).

RMSEA was chosen as one of the most frequently applied absolute fit indices. A value between .08 and .10 provides a mediocre fit whereas values below .08 represent a good fit (MacCallum, Browne, & Sugawara, 1996). As one of the most popularly reported incremental fit indices, CFI is one of the measures least affected by sample size even performs well when the sample size as it is rather small (Fan, Thompson, & Wang, 1999). A value of > .95 is recognized as being indicative of a good fit (Hu & Bentler, 1999). Our results of the fit indices (RMSEA and CFI) were reported in the section of research instruments.

Results

The Impact of Affectedness by the Current Disaster and the Gender Variable on the Measured Psychological Constructs (ANOVAs)

The results were classified according to hypotheses. Overall, we found several significant main effects of the affectedness by the current disaster and gender on the studied psychological constructs but there were no significant interactions between them. The inter-correlations of the assessed constructs for the affected and non-affected groups are provided separately in Table 2.

Compared to the non-affected group, the affected group scored higher with respect to unjust world belief ($F(1, 142) = 3.92$, $p = .05$), emotional disturbances ($F(1, 142) = 16.46$, $p < .001$), and approach coping ($F(1, 142) = 30.55$, $p < .001$). By contrast, for disaster attribution to human reasons, $F(1, 142) = 12.89$, $p < .001$, and personal BJW, $F(1, 142) = 3.69$, $p = .06$, the non-affected

Table 2
Statistics and Inter-correlations of All Assessed Constructs Separately for Affected and Non-affected Groups

	M	*SD*	1	2	3	4	5	6	7	8	9	10	11	12
Demographic characteristics														
Age	33.22	13.47	–	.04	-.01	.16	-.18	-.20	.03	-.35**	-.06	.04	.04	.01
Gender	–	–	.35**	–	-.00	-.21	.17	.10	.24*	.10	-.21	.10	-.09	-.08
Education level	2.00	1.08	-.04	-.07	–	.12	-.06	-.07	.13	-.28**	-.20*	-.22**	.13	-.23*
Former disaster experience	–	–	.13	-.10	.14	–	-.18	.00	.14	-.15	.28*	.17	-.19	-.10
Justice beliefs														
Personal BJW	4.52	0.66	.30*	.08	.13	-.08	–	-.01	.06	.26*	-.07	-.05	-.01	.06
Unjust world belief	3.53	1.29	-.25*	-.10	.14	.06	-.35**	–	.03	.21	.04	.05	-.01	.03
Disaster attribution														
Attribution to natural reasons	4.13	1.55	-.03	.13	-.16	-.10	-.14	.19	–	-.15	.23*	-.00	-.11	.14
Attribution to human reasons	3.17	0.98	.18	.00	-.03	-.01	.26*	.11	-.08	–	.13	-.01	.09	.32**
Psychopathological symptoms														
Psychological affectedness	4.30	1.03	-.20	-.14	-.01	.27*	.06	-.04	.08	.15	–	.34**	-.07	.33**
Emotional disturbances	3.10	1.29	-.06	.12	-.21	.08	-.04	-.01	.15	.04	.26*	–	-.14	.25*
Coping styles														
Approach coping	3.19	0.41	-.17	-.17	.03	.21	-.03	.09	.22	-.17	.21	.09	–	.19
Avoidance coping	2.04	0.51	-.20	-.24*	-.03	.06	.05	.04	.08	-.09	.28*	.27*	.53**	–

Note. For gender, 0 = *female*, 1 = *male*. For former experience, 0 = *not affected by Tsunami in 2004*, 1 = *affected by Tsunami 2004*. Education level ranged from 0 = *elementary* to 4 = *bachelor*, and profession from 0 = *farmer* to 5 = *teacher/civil servant*; for details, see Table 1. The answering mode of the coping scales ranged from 1 to 4 and on other scales from 1 to 6, with higher values indicating a strong endorsement of the construct. For inter-correlations, the upper diagonal reflects the affected group, and the lower diagonal the non-affected group. Pearson parametric correlations were used except for education level (Kendall's Tau-b). *$p < .05$.** $p < .01$.

group had significantly higher values. Therefore, *hypothesis 1* was confirmed.

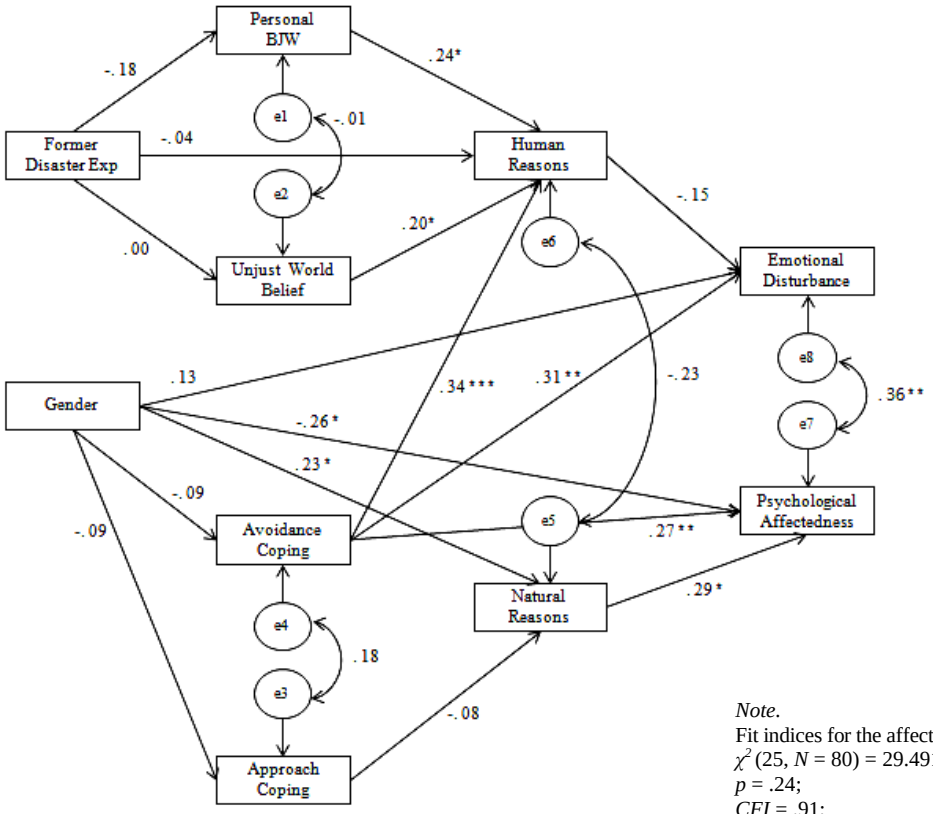
Hypothesis 2 was supported because higher values in the female group were found regarding psychological affectedness ($F(1, 142) = 4.45$, $p < .05$), and avoidance coping ($F(1, 142) = 4.52$, $p < .05$). Male participants reported significantly higher levels of disaster attribution to natural reasons ($F(1, 142) = 4.89$, $p < .05$).

Path Models for the Affected and Non-affected People

Separate models were presented for the affected and non-affected groups (see Figures 1 and 2). The accuracy of both models was tested and found to be a good fit to the data. The affected group fit indices: $\chi^2(25, N = 80) = 29.491$; $p = .24$; *CFI* = .91; *RMSEA* = .04, and non-affected group fit indices: $\chi^2(25, N = 66) = 22.584$; $p = .60$, *CFI* = 1.000, *RMSEA* = .000. The individual paths of the model were tested and summarized in Table 3.

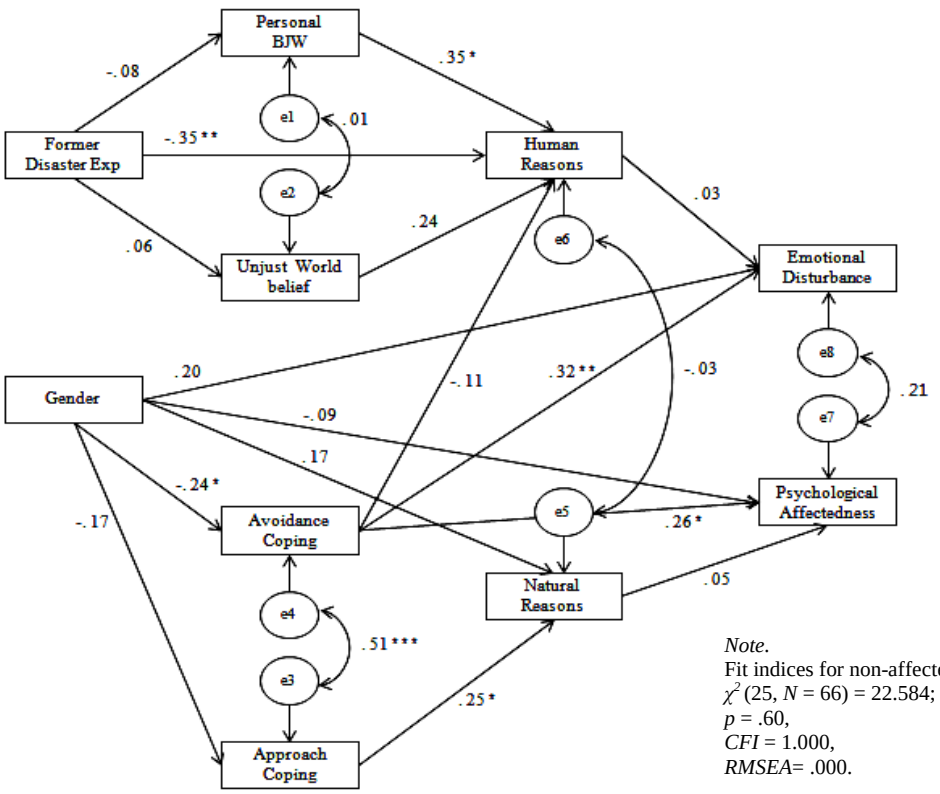
In line with the *hypotheses 3a and 3b*, we found that BJW was positively associated with disaster attribution to human reasons for both groups (strong BJW believers in the affected group, $p = .01$, in the non-affected group, $p = .005$; weak BJW believers in the affected group, $p = .04$, in the non-affected group, $p = .05$). For both groups, BJW believers were more ready to regard the disaster as a kind of punishment (e.g., devaluating the victim) for being a poor or bad Muslin compared to those with a weak BJW. The results demonstrated that there was a positive relationship between unjust world belief and an attribution to human reasons for the affected group only $p = .04$, which we can confirm by our hypothesis 3a. In addition, the relationship between BJW and disaster attribution to human reasons was stronger for the non-affected group ($p = .005$) than for the affected group ($p = .01$) which confirmed our hypothesis 3b.

With regard to *hypotheses 4a and 4b*, we neither found a significant relationship between BJW and psychopathological symptoms nor between unjust world belief and psychopathological symptoms (see Table 2) leading us to reject both hypotheses. Fisher tests were calculated in order to compare the correlation coefficients of affected and non-affected groups. The correlations of BJW to both psychopathological symptoms (psychological affectedness, $p = .44$; emotional disturbance, $p = .95$) (*hypothesis 4a*) and the correlations of the unjust world belief to both psychopathological symptoms (psychological affectedness, $p = .64$; and emotional disturbance, $p = .72$) (*hypothesis 4b*) were not significantly different between the affected and non-affected group.



Note.
Fit indices for the affected group:
χ^2 (25, N = 80) = 29.491;
p = .24;
CFI = .91;

Figure 1. AMOS path model for the group of affected people



Note.
Fit indices for non-affected group:
χ^2 (25, N = 66) = 22.584;
p = .60,
CFI = 1.000,
RMSEA= .000.

Figure 2. AMOS path model for the group of non-affected people

For disaster attribution however the opposite was true: whereas for the non-affected group, no association between the variables could be found for the earthquake both kinds of disaster attribution correlated negatively. Finally, for the non-affected group both of the assessed coping styles were more closely linked than for the affected group indicating that the affected group seem to differentiate more strongly between avoidance and approach coping than the non-affected group. Hypothesis 4c was not confirmed because BJW directly affected disaster attribution to human reasons, but it did not significantly affect emotional disturbance.

Hypothesis 5a was confirmed because avoidance coping was significantly associated with the attribution of disaster to human reasons for the affected group (p = .000) whereas there was no significant relationship for the non-affected group (p = .32). With regard to approach coping, it was associated with the attribution of disaster to natural reasons for the non-affected group (p = .03) whereas there was no significant relationship for the affected group (p = .42). Therefore, hypothesis 5b was also confirmed.

With regard to *hypothesis 6*, psychopathological symptoms (both emotional disturbance and psychological affectedness) were related to avoidance coping. The relationship between avoidance coping and emotional disturbance was both significant for the affected group (p = .007) as well as for the non-affected group (p = .008). In addition, the relationship between avoidance coping and psychological affectedness was significant for the affected group (p = .009) as well as for the non-affected group p = .03).

Table 3

Results of the Individual Paths for Affected and Non-affected Groups

Direct effect	Affected groups				Non-affected groups			
	Estimated	S.E.	C.R.	*P*	Estimated	S.E.	C.R.	*P*
Former disaster experience → Personal BJW	-.217	.132	-1.647	.099	-.118	.180	-.654	.513
Former disaster experience → Unjust world belief	.008	.260	.030	.976	.170	.354	.481	.630
Gender → Avoidance coping	-.076	.099	-.772	.440	-.278	.137	-2.023	.043*
Gender → Approach coping	-.056	.071	-.793	.428	-.149	.106	-1.408	.159
Unjust world belief → Attribution to human reasons	.156	.077	2.022	.043*	.167	.086	1.935	.053
Personal BJW → Attribution to human reasons	.363	.153	2.379	.017*	.474	.170	2.794	.005**
Former disaster experience → Attribution to human reasons	-.069	.182	-.378	.705	.014	.232	.061	.952
Avoidance coping → Attribution to human reasons	.693	.201	3.443	***	-.194	.197	-.981	.326
Gender → Attribution to natural reasons	.654	.304	2.153	.031*	.569	.401	1.421	.155
Approach coping → Attribution to natural reasons	-.383	.481	-.795	.427	.957	.462	2.070	.038*
Gender → Emotional disturbances	.333	.275	1.211	.226	.464	.279	1.667	.095
Attribution to natural reasons → Psychological affectedness	.206	.069	2.968	.003**	.031	.072	.422	.673
Gender → Psychological Affectedness	-.520	.212	-2.453	.014*	-.175	.251	-.698	.485
Avoidance coping → Emotional disturbances	.890	.329	2.707	.007**	.648	.245	2.642	.008**
Avoidance coping → Psychological affectedness	.615	.235	2.619	.009**	.459	.219	2.096	.036*
Attribution to human reasons → Emotional disturbances	-.205	.149	-1.374	.1696	.034	.136	.251	.802

Note. *p < .05. ** p < .01. *** p <.000.

Table 4

Results of Significant Indirect Effect for Affected Group

Indirect effect	Affected group
Gender → Approach coping → Attribution to Natural Reasons	-.013*
Former disaster experience → Attribution to Human Reasons → Emotional disturbance	-.009**

Note. Bias-corrected percentile method (Lower Bounds) was used. *p < .05. ** p < .01. *** p <.000.

Table 5

Results of Significant Indirect Effect for Non-affected Group

Indirect effect	Affected group
Gender → Avoidance coping → Attribution to Human Reasons	-.037*
Former disaster experience → Attribution to Human Reasons → Emotional disturbance	-.036*

Note. Bias-corrected percentile method (Lower Bounds) was used. *p < .05. ** p < .01. *** p <.000.

Two significant mediation effects were also shown for both groups only which are summarized in Table 4 and 5.

Gender was found to significantly affect approach coping, which in turn affected the attribution of disaster to natural reasons for the affected group (p = - .013) supporting *hypothesis 7* (see Table 4). For the non-affected group, gender affected avoidance coping (p = - .037), which in turn affected the attribution of disaster to human reasons (see Table 5).

Former disaster experience was not found to be directly associated with either personal BJW or unjust world belief for the affected groups. However, it showed a significant mediation effect for both groups. Former disaster experience negatively affected the attribution of disaster to human reasons, which in turn, affected emotional disturbance for the affected groups (p = - .009) and non-affected group (p = - .36) (see Table 4 and 5). Therefore, *hypothesis 8* was confirmed.

Discussion

This study explored the relationships between belief in a just world, coping style, disaster attribution, and psychopathological symptoms among affected and non-affected people following natural disasters in Indonesia. First, the attribution of disaster was divided into attribution to natural reasons and attribution to human reasons. Second, the psychopathological symptoms were measured by emotional disturbance and psychological affectedness. Third, coping styles covered two distinct approaches (approach coping and avoidance coping) to deal with critical life events such as natural disasters.

Our findings indicate that the more people believe in a just world and/or the less they assume the world to be unjust, the more frequently they attribute the disaster to be human-caused (e.g., by moral/religious problems or economic and political issues), which is consistent with previous studies (Lerner & Miller, 1978; Furnham & Procter, 1989).

BJW was expected to be negatively correlated with psychopathological symptoms (Lipkus et al., 1996; Otto et al., 2009; Otto & Schmidt, 2007). However, the results of this study showed that strong BJW believers also experienced greater psychopathological symptoms from attributing the disaster to human reasons which is not in line with the empirical research to date. First, participants in some of other studies may have no former disaster experience and second they were from different cultural backgrounds. For example, studies with flood victims (Otto et al., 2006) indicated a protective function of BJW for mental health. But the participants had no former disaster experience and were from a different cultural background. This leads us to the question of how cultural background and disaster exposure can affect the correlation between BJW and psychological affectedness.

Within collectivist cultures (such as Indonesia: Hofstede, 1980), when people witness the suffering of others (the wrong-doers), they feel partly responsible for letting others do the wrong thing, because "they" are also part of "us", after all. This psychological dynamics could result in psychopathological symptoms, in this case a higher psychological affectedness. In other words "justice" itself could disturb people from a collectivist culture because they value equality more than equity (Fadil, Williams, Limpaphayom, & Smatt, 2005).

The interaction between Islamic beliefs and the disaster experience affects the psychological affectedness. A disaster among the Indonesian majority of Muslims, is perceived to be the Will of God and the Islamic perspective on disaster comprises three parts (purpose, mechanism and final consequences). As mentioned in the Holy Qur'an, Chapter 2-Al Baqarah (The Cow): verse 155, the purpose of disaster is to test faithful Muslims. The complexity of Islamic religious belief may make BJW lose its validity for measuring the belief system of Muslims whether they are affected or non-affected. For Muslims, the justice of world affairs is attributed to Allah (God) which is beyond human prediction and calculation.

In terms of coping styles, approach coping did not show a direct relationship with psychopathological symptoms although approach coping was correlated with the attribution of disaster to natural reasons. Avoidance coping, on the other hand, was associated with emotional disturbance and psychological affectedness. Our findings are opposed to results of von Lieres (2010) in India but in accordance with the majority of studies in the Western world (Carper, Middleton, White, Renk, & Grills-Taquechel, 2010; Chang, 2001; Tiet, Rosen, Cavella, Moos, & Finney et al., 2006). It seems, therefore, that the cultural background "collectivistic versus individualistic" is only one of many conditions related to the effectiveness of coping styles. The diversity of coping styles is based on the complexity of socio demographic characteristics (i.e., gender, age, profession), personality characteristics (i.e., sense of coherence, resilience), the type and the degree of the disaster, the individual pattern of post-traumatic stress disorders, the religious background, the rural/urban environment as well as the social-cultural background (i.e., the caste system in India; Lemercinier, 1983). Kostoula (2011) gives an overview of the cultural-

specificity of PTSD symptoms, coping strategies and consequences for a cultural specific psychological treatment.

Under most of these conditions, we find a strong differentiation between the South-Indian society of fishermen and housewives in the study of von Lieres (2010) and our mixed sample (employees/craftsmen, policemen, members of the army, civil servants, traders, students, teachers and farmers from South Java). The profession of fishermen and the status as housewives, their caste in India, and their Hindu religion strongly depend on the avoidance coping style. The mixed sample from South Java of Islamic religion strongly adopts the active and approach coping style to save their existence. Differences between the sample in India (von Lieres, 2010, 2013) and our sample in Indonesia also exist in the age and in the gender distribution (India: 14-54, M = 42 years, 47% males; Indonesia: 14-64, M = 33 years, 52% males) as well as in the affected region (India: Pacific Ocean coast; Indonesia: South-southwest of Java). The fact that both of them are collectivistic societies (Indonesia more so than India) is of secondary relevance.

The gender differences were in line with most previous studies (Ikeda, 1995; Juran, 2012; Swickert, De Roma, & Saylor, 2004). The female group showed a higher psychological affectedness and stronger avoidance coping while male respondents reported significantly higher values in the attribution of disaster to natural reasons.

The former disaster experience was only an important independent variable for the affected group. According to our results, people who had former disaster experience are more likely to attribute natural disaster to human reasons, and this belief affects their emotional disturbance more than with people who had no former disaster experience.

We would like to point out some of the limitations which urge us to be cautious about over-generalizing our results. The first shortcoming is the cross-sectional nature of our study which prevents us from drawing causal conclusions. Although the order of constructs in our path model was based on former empirical findings and guided by strong theoretical assumptions, we were not able to eliminate other causal relations other than those hypothesized, for example, psychopathological symptoms, attributions to justice beliefs or reciprocity. To obtain more information about the underlying effective direction, the research model should be tested longitudinally in further studies.

Another shortcoming is that we collected our data exclusively from self-reports so that the associations we found may have resulted from carry-over effects. Justice beliefs and psychopathological symptoms are intra-individual states of mind and the judgments of others are, therefore, not adequate to measure them. Moreover, coping styles used by the respondents could be estimated by family or friends. In addition, by also considering assessments made by others, the risk of relying on single source data could be overcome and a more complex picture could be drawn of the ways in which affected compared to non-affected people deal with natural disasters.

With respect to our applied measures (e.g., the BJW measure), the study did not consider the influence of the local belief system (i.e., the Islamic belief system) which may act as an intervening variable. Hence, when conducting further research, we suggest taking the local context into account as different cultural backgrounds might imply different belief systems.

Conclusion

Psychological affectedness in the aftermath of a natural disaster depends on a complex structure of conditions. Whereas a differentiation between affected and non-affected people was possible in our study, in a globalized world of mass media we have to consider that all inhabitants of a region can be psychologically affected by a disaster. For affected people it is very important to find out the best coping strategy and an acceptable, helpful explanation of the disaster. The belief in a just world as well as an active, approach-oriented coping style can represent protective factors for affected people in the aftermath of a natural disaster.

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