Psychiatry Research 271 (2019) 136–143

Contents lists available at ScienceDirect

Psychiatry Research

journal homepage: www.elsevier.com/locate/psychres

The impact of past trauma on psychological distress among Chinese students: The roles of cognitive distortion and alexithymia

Siqi Fang*, Man Cheung Chung

Department of Educational Psychology, Faculty of Education, The Chinese University of Hong Kong, Shatin, N.T., Hong Kong, People's Repulic of China

ARTICLE INFO

Keywords:
Past trauma
Posttraumatic stress disorder (PTSD)
Cognitive distortion
Alexithymia
Psychological distress
Structural equation modeling

ABSTRACT

Past traumatic events are distressing experiences which can result in the emergence of posttraumatic stress disorders (PTSD) and other psychological symptoms among university students. However, little is known as to whether or not cognitive distortion and alexithymia would influence the severity of these distress outcomes. This study examined a cognitive-emotional framework depicting potential roles that cognitive distortion and alexithymia could play in influencing the relationship between past trauma and psychiatric co-morbidities among university students in China. One thousand one hundred and eleven participants completed the PTSD Checklist for DSM-5, Cognitive Distortion Scale (CDS), Toronto Alexithymia Scale (TAS-20), and General Health Questionnaire (GHQ-28). Results indicated that PTSD following past trauma was significantly associated with increased psychiatric co-morbidities after controlling for covariates. Both alexithymia and distorted cognition mediated the association between PTSD and psychiatric co-morbidities. To conclude, university students can develop PTSD from past trauma and other mental health problems. The severity of psychological distress can be influenced by their distorted perceptions of themselves, the world, and the future, as well as their ability to identify, describe, and express distressing emotions.

1. Introduction

A growing ascendancy in mental health problems has been demonstrated among university students worldwide (Blanco et al., 2008). Exposure to a traumatic event is a statistically normative experience for them, possibly resulting in prolonged traumatization (Marx and Sloan, 2002; Read et al., 2011; Scarpa et al., 2002) and other psychological problems such as insomnia (Hardison et al., 2005), anxiety (Heim and Nemeroff, 2001), depression (Hill, 2003), and somatization (Briere et al., 2010). At least one traumatic event among 56–85% of university students was found in multiple studies of whom 12–24% of American students (Boyraz et al., 2015, 2016), 3% (Chung et al., 2012), 50% (Hoelterhoff and Chung, 2017) and 72% (Chung et al., 2002) of European students could go on to develop posttraumatic stress disorder (PTSD). This wide range might have resulted from differences in measurement tools and diagnostic criteria used, namely, the Impact of Event scale, the DSM-IV versions of PTSD Checklist–Civilian and posttraumatic stress diagnostic scale. Trauma types including abuse in childhood, an accident, other types of violence or assault, and potential life-threatening illness (e.g., Boyraz et al., 2015; Elhai et al., 2012; Frazier et al., 2009; Read et al., 2011; Smyth et al., 2008), trauma history (Orcutt et al., 2003), as well as number of traumas experienced (Edwards et al., 2003) might have also contributed to the wide range in prevalence rates.

One study targeting at Asian university students (e.g., Japan, Singapore, South Korea and Taiwan) reported the prevalence rates of PTSD from 9% to 37% (Kamimura et al., 2016). More specifically, Japanese, Singapore, and South Korean university students reported lower levels of PTSD than those of Taiwanese students ($F = 22.77$, $p < 0.01$). This study, however, was restricted to students who experienced intimate partner violence (Kamimura et al., 2016). Studies on PTSD among Chinese university students has largely been ignored (Guo et al., 2013). Limited evidence suggests that prevalence rates of PTSD can range from 12 to 14% following exposure to natural disaster (e.g., Fu et al., 2013; Zhou et al., 2015). Study also shows that 30% of Chinese university students reported an experience of intimate partner violence, although the rate of PTSD was not provided (Kamimura et al., 2016).

PTSD and psychiatric co-morbidity can vary between individuals (Bonanno and Mancini, 2012). Whilst some may experience slight disruptions in functioning but gradually return to normal, others maintain clinically significant psychological problems which require prolonged intervention (Kessler et al., 2005). Individual differences mean that the impact of trauma on distress outcomes is not direct (Verhaeghe and

* Corresponding author.
E-mail addresses: joyfang@link.cuhk.edu.hk (S. Fang), man.chung@cuhk.edu.hk (M.C. Chung).

https://doi.org/10.1016/j.psychres.2018.11.032
Received 2 April 2018; Received in revised form 15 November 2018; Accepted 15 November 2018
Available online 16 November 2018
0165-1781/ © 2018 Elsevier B.V. All rights reserved.

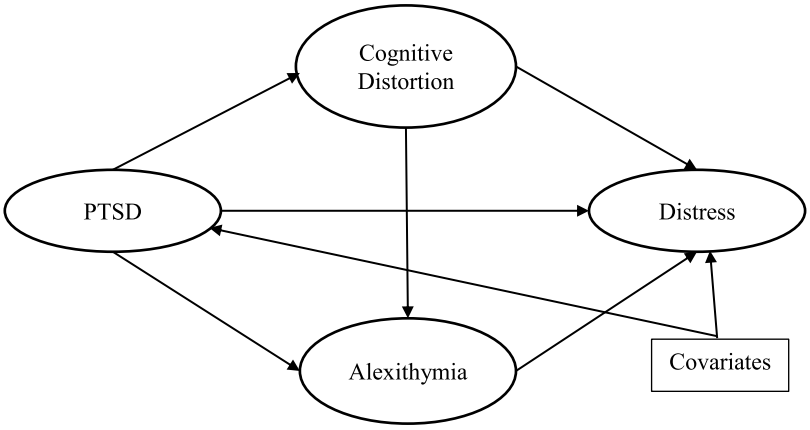

Fig. 1. Theoretical model
Note: Covariates: traumatic life event types and number of traumas.

Vanheule, 2005) but indirect through a variety of factors including distorted cognitions and emotion dysregulation as suggested by Briere's self-trauma model (1996).

The model argues that past trauma (e.g., childhood abuse) can distort victims' cognitions (Briere, 1996), changing the schema with which they perceive themselves and interpret external reality, leading to self-blame, self-criticism, feelings of helplessness or hopelessness, and hypervigilance of danger in the world (Briere and Spinazzola, 2005). These dysfunctional thinking patterns may greatly influence subjective internal states and psychological distress later in life (Briere, 1996, 2002). Cross-sectional and longitudinal studies have indicated that distorted cognitions from past trauma are critical risk factors for such psychological distress as anxiety and depression (e.g., Beck et al., 2005). In other words, the relationship between PTSD symptoms and distress outcomes can be mediated by distorted cognitions, which has been documented by previous literature focusing on university students with childhood trauma experiences (Browne and Winkelman, 2007; Zeng et al., 2015).

Drastic schematic changes can create overwhelming emotions, triggering avoidance strategies for self-protection. Alexithymia is one of these strategies, aiming to keep intensive and negative emotions at bay by manifesting (i) difficulty identifying and distinguishing emotions from bodily sensations and differentiating between cognition and emotions; (ii) difficulty verbalizing feelings to others, and (iii) a cognitive style that is literal, utilitarian, and externally oriented (Nemiah and Sifneos, 1970; Taylor et al., 1997). In other words, alexithymia can be conceptualized as an emotional regulation strategy characterized by impairment in recognizing or processing emotions (Fink et al., 2010) or avoidance coping (Coriale et al., 2012; Parker et al., 1998).

However, avoidance reactions aiming to protect oneself are not always effective and may prove maladaptive because the negative emotions of the trauma have not been processed. Unresolved feelings accumulated in the body can cause later disturbance in the physiological and neurological system, giving rise to health and/or psychological co-morbidities (Pennebaker, 1995). This might be why alexithymia is often negatively correlated with well-being (Mattila et al., 2009), but positively with somatization (Sayar et al., 2003), anxiety (Karukivi et al., 2010), and depression (Honkalampi et al., 2000). The relationship between alexithymia and mental health problems among Chinese university students has been established (He et al., 2013; Niu et al., 2011). Thus, alongside cognitive distortions, alexithymia may act as another potential mediator for the link between past trauma and distress symptoms. This mediating effect has been demonstrated among Western university samples (Helmes et al., 2008).

The foregoing amounts to an integrative model outlining the interrelationships between PTSD from past trauma, cognitive distortion, alexithymia, and psychological distress. To the best of our knowledge, this model has not been investigated among Chinese university students. It has been examined in part in that PTSD from past trauma was associated with alexithymia among Chinese adolescents (Chen and Chung, 2016), and following a flood disaster, adolescents and young adults in Pakistan reported significantly fewer PTSD, psychiatric co-morbidity and distorted cognition symptoms than people who were older. Distorted cognitions related to distress differently depending on age (Chung et al., 2017). Preoccupation with danger and hopelessness was associated with distress for adolescents, middle-aged, and older people. For young adults, helplessness was associated with PTSD while hopelessness and preoccupation with danger was associated with psychiatric co-morbidities.

In investigating the model, confounding factors need to be considered as mentioned earlier. For instance, exposure to multiple events might influence PTSD development (Breslau et al., 1998, 2004a, 2004b; Kessler et al., 1995). A linear relationship has been reported between the number of traumatic events and symptom severity (Edwards et al., 2003). In addition, assault deliberately inflicted by people is far harder to bear and would cause substantially more posttraumatic disturbance than natural disasters or unintended acts (Briere, 2004). In short, the effects of trauma type and the number of traumas experienced on distress cannot be ignored (e.g., Briere, 2004).

In summary, the current study aimed to examine a cognitive-emotional framework depicting the potential mechanisms of cognitive distortion and alexithymia in mediating the path between past trauma and psychological distress among a group of Chinese university students with trauma type and the number of traumas being co-variates (see Fig. 1). Our hypotheses were:

(1) Controlling for trauma types and the number of traumas, PTSD following past trauma would be associated with psychological co-morbidities.
(2) PTSD would be positively associated with cognitive distortions which would also be positively associated with alexithymia. In turn, cognitive distortion and alexithymia would be positively associated with psychological co-morbidities.
(3) Alexithymia and distorted cognition would mediate the path between PTSD from past trauma and distress outcomes.

2. Method

2.1. Participants and procedure

Approval for the research was granted by the ethics committee at the Chinese University of Hong Kong. A total of 1111 students from five universities in different regions of China participated in this study. Participants were recruited via advertisements with a hyperlink of the

questionnaires in student residence halls and through the university mass mailing system. People who completed the online questionnaires were encouraged to pass the hyperlink onto their friends via email or social networking media (e.g., WeChat and Weibo). The inclusion criteria were university students over 18 years of age. A briefing page stated that (1) the study aimed to examine the association among cognition, emotion, and mental health; (2) it was entirely voluntary and anonymous; (3) data would be kept confidential; (4) they were entitled to exit from the study at any point. Participants completed an online consent form before starting the survey and were not financially compensated for taking part.

2.2. Measures

Demographic Information was collected including basic information on age, gender, marital status, and study modes.

Toronto Alexithymia Scales (TAS-20, Bagby et al., 1994) is a 20-term self-report questionnaire on a 5-point Likert scale from "1 = Never" to "5 = Very often". It measures the degree of alexithymia with 3 dimensions: (1) difficulty in identifying feelings (DIF); (2) difficulty in describing feelings (DDF); and (3) externally oriented thinking (EOT). The reliability of the scales was found to be satisfactory in previous research ranging from 0.61–0.86, and the 3-week test-retest reliability was 0.77 (Chung and Wall, 2013). In the current study, the sub-scales and total score of Cronbach's alphas were 0.84 (DIF), 0.75 (DDF), 0.60 (EOT), and 0.73 (Total) demonstrating acceptable internal consistency.

Cognitive Distortion Scales (CDS, Briere, 2000) is a 40-item self-report questionnaire (1 = Never to 5 = Very often) assessing 5 types of distorted cognitions: self-criticism, self-blame, helplessness, hopelessness and preoccupation with danger. The Cronbach's α for subscales reported from previous studies ranged from 0.90 to 0.97 (Rohany et al., 2011). The Cronbach's α for the subscales in this study were 0.92, 0.91, 0.92, 0.95 and 0.88, respectively.

General Health Questionnaire-28 (GHQ-28, Goldberg and Hillier, 1979) is a 28-item scale on a 4-point Likert scale (0 = better than usual, to 3 = worse than usual) measuring 4 types of health conditions (somatic symptoms, anxiety and insomnia, psychosocial dysfunction, and depression). GHQ-28 has been widely used in various cultures as a self-administered tool for screening the risk of developing psychiatric disorders (Goldberg and Williams, 1988) in the general population, clinical (e.g., primary care) and non-clinical settings (e.g., university). GHQ has been recommended as an effective tool to estimate general dysfunction and co-morbid symptoms for trauma and PTSD research (Raphael et al., 1989). Extant studies have shown the reliability to be excellent, ranging from 0.79 to 0.95 (Sterling, 2011; Vallejo et al., 2007). In this study, Cronbach's alphas were reported as 0.82, 0.90, 0.81 and 0.93 for each dimension.

PTSD Checklist for DSM-5 (PCL-5, Weathers et al., 2013) is a 20-item self-report measure designed to measure PTSD in two parts. Part I lists 17 categories of traumatic events, such as natural disaster, motor vehicle accident, assault, and sudden death of a loved one. Participants indicated whether they had experienced or witnessed the events on the list. In Part II, focusing on the event which bothered them the most, participants rated the severity of PTSD symptoms (Intrusion, Avoidance, Negative Mood and Cognition, and Hyperarousal) using a rating scale indicating the severity of disturbance (0 = not at all to 4 = extremely). Previous studies showed that PCL-5 scores exhibited strong internal consistency (α = 0.94), test-retest reliability (r = 0.82), and convergent (rs = 0.74–0.85) and discriminant (rs = 0.31–0.60) validity (Blevins et al., 2015; Bovin et al., 2016). For the current study, Cronbach's alphas for the subscales were 0.93, 0.90, 0.93 and 0.93, respectively.

2.3. Data analysis

Expectation Maximization algorithm was used to replace missing data, which were less than 5% of total responses (Enders, 2001). Firstly, descriptive statistics were used to describe the demographic variables and subscales of each construct. Due to non-normality, the subscales of cognitive distortion and distress outcomes were transformed to ensure normal distribution. Secondly, correlational analyses were performed among all observed variables. Thirdly, structure equational model (SEM) was applied to examine our theoretical framework using Amos 21.0 programs in SPSS 23.0 (Arbuckle, 2012). We performed two steps of analysis: (a) confirming the measurement model (i.e., mapping how indicators loaded onto latent variables, e.g., how DIF. DDF, EOT loaded onto TAS); and (b) estimating the structural model (i.e., delineating the relationships among latent variables and evaluating the fit of the model to the data). Maximum likelihood estimation (ML) was applied. Criteria for good model fit were chi-square/degree of freedom (χ^2/df), comparative fit index (CFI), normed fit index (NFI), Tucker-Lewis-Index (TLI) above 0.95; root-mean-square error of approximation (RMSEA). The cutoff for model fit were suggested to be 0.95 or above as excellent for CFI, NFI, and TLI, less than 3 for χ^2/df, and less than 0.08 for RMSEA (Hu and Bentler, 1999).

Furthermore, PROCESS (Hayes, 2016) was applied to verify the mediational effects of the hypothesized model. Bias-corrected bootstrapping was used to generate confidence intervals which addressed the problem of power resulting from the asymmetric and non-normal sampling distributions of an indirect effect (MacKinnon et al., 2004). Cognitive distortion and alexithymia were entered as independent mediators in between PTSD from past trauma and psychological distress using model 6 in PROCESS. Point estimates and 95% confidence intervals were estimated for the indirect effects. When zero was not contained in the confidence interval, point estimates of indirect effects were considered to be significant.

3. Results

3.1. Descriptive and correlation results

Of the 1111 participants, 380 were males (34%) and 731 females (66%). All of them were full-time students, single and between 18 and 25 years of age (M = 20.13, SD = 1.67). Overall, 74% (n = 822) reported having experienced past traumas (M for the event total = 3.29, SD = 4.00) of whom approximately 11.0% (n = 122) experienced only 1 event and 21.5% (n = 239) 5 events or more. Three of the most prevalent traumatic events were accidental or sudden death of a loved one (n = 483, 43.4%), motor vehicle accident (n = 475, 42.8%), and childhood physical or sexual assault (n = 280, 25.2%). Adopted from literature (Briere, 2004), trauma types were classified into 0 = no traumatic events, 1 = natural disaster (e.g., earthquake, floods, tornadoes), 2 = unintended act (e.g., motor vehicle accidents), and 3 = intended interpersonal violence (e.g., rape and physical assault). No-PTSD referred to participants who did not meet any of the diagnostic criteria for the four clusters of PTSD symptoms. Partial-PTSD referred to those who had met the diagnostic criteria for one or two of the symptom clusters (Chung and Wall, 2013). Using this classification, 29% (n = 321), 40% (n = 445), and 31% (n = 345) met the criteria for full, partial PTSD, and No-PTSD, respectively. None of the demographic variables significantly correlated with distress outcomes (age: r_{pb} = 0.02, $p > 0.05$; gender: r_{pb} = 0.06, $p > 0.05$; major: r_{pb} = −0.04, $p > 0.05$). Table 1 shows the means, standard deviations (SD) and Pearson correlations of all observed indicators. Significant correlations existed between all subscales measuring PTSD, cognitive distortion, alexithymia, and psychological distress.

3.2. Measurement model (MM)

Analysis of MM resulted in good indices of fit (Table 2). The psychological constructs were significantly ($p < 0.01$) represented by all indicators with factor loadings ranging from 0.54 to 0.94, except

Table 1
Means, standard deviations, and bivariate correlations of indicators.

Indicator	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Intrusion	–															
2. Avoidance	0.71	–														
3. Neg Mo & Co	0.76	0.68	–													
4. Hyperarousal	0.76	0.61	0.85	–												
5. Self-criticism	0.36	0.28	0.42	0.41	–											
6. Self-blame	0.37	0.30	0.43	0.41	0.86	–										
7. Helplessness	0.36	0.28	0.44	0.45	0.80	0.79	–									
8. Hopelessness	0.36	0.23	0.44	0.43	0.75	0.71	0.86	–								
9. Danger	0.39	0.28	0.43	0.44	0.73	0.75	0.73	0.76	–							
10. DIF	0.23	0.17	0.28	0.29	0.40	0.43	0.45	0.42	0.38	–						
11. DDF	0.15	0.15	0.20	0.20	0.33	0.32	0.36	0.34	0.28	0.62	—					
12. EOT	0.15	0.12	0.17	0.19	0.13	0.15	0.20	0.25	0.21	0.30	0.31	—				
13. Somatic	0.30	0.23	0.30	0.37	0.35	0.35	0.40	0.42	0.41	0.31	0.19	0.17	—			
14. Anxiety	0.41	0.29	0.40	0.46	0.48	0.48	0.51	0.50	0.47	0.39	0.26	0.17	0.67	—		
15. Social Dys	0.19	0.15	0.21	0.19	0.23	0.24	0.23	0.26	0.24	0.15	0.13	0.08	0.37	0.39	—	
16. Depression	0.38	0.26	0.46	0.46	0.55	0.52	0.57	0.65	0.56	0.35	0.25	0.22	0.55	0.60	0.35	—
M	3.27	1.64	4.38	3.53	16.83	17.23	17.18	13.95	14.54	17.91	13.97	20.43	13.02	13.16	14.46	10.65
SD	4.05	2.13	5.57	4.83	5.84	5.53	6.54	6.29	5.18	5.42	3.74	3.78	3.70	4.31	3.20	3.96
Range	0–20	0–8	0–28	0–24	8–40	8–40	8–40	8–40	8–40	7–35	5–25	8–40	7–28	7–28	7–28	7–28

Note: Neg Mo & Co = Negative Mood and Cognition, Danger = Preoccupied with Danger, DIF = Difficulty in Identifying Feelings, DDF = Difficulty in Describing Feelings, EOT = External Oriented Thinking, Somatic = Somatic Symptoms, Anxiety = Anxiety & Insomnia, Social Dys = Psychosocial Dysfunction, Depression = Severe Depression.

external oriented thinking (EOT, 0.32) (Fig. 2). Consequently, we dropped EOT subscale from the measurement model based on a similar suggestion from literature (Hund and Espelage, 2006; Mazzeo et al., 2008).

3.3. Structural models 1 and 2 (SM1 and SM2)

The SM1 and SM2 were based on the same proposed theoretical model but the latter included covariates. Results of both models indicated good fit of the data with fit indices presented in Table 2. All standardized coefficients achieved significant level ($p < 0.05$); less than 10% of the standardized residuals were greater than an absolute value of 3.0. Comparing the results of the two models, SM2 shows a better model fit ($\Delta\chi^2 = 52.75$, $\Delta\ df = 28$, $p < 0.01$). Thus, SM2 was selected as the final structural model.

PTSD from past trauma was significantly related to psychological distress ($\beta = 0.25, p < 0.001$) after controlling for covariates. PTSD was significantly correlated with cognitive distortion ($\beta = 0.50$, $p < 0.001$) which was also positively associated with alexithymia ($\beta = 0.51$, $p < 0.001$). Both alexithymia and cognitive distortion were positively associated with psychological co-morbidities (Fig. 3).

3.4. Direct and indirect effects of alexithymia and cognitive distortion

We further examined the direct and indirect effects of alexithymia and distorted cognitions on distress outcomes by computing the multiple mediation bootstrap analysis using PROCESS. Although the indirect effects of PTSD on distress through cognitive distortions and alexithymia were significant with confidence intervals being statistically different from zero based on a 95% bootstrap, the direct effect of PTSD from past trauma on distress outcomes remained significant ($\beta = 0.18$, $SE = 0.02$, $t = 7.95$, $p < 0.001$). In other words, alexithymia and distorted cognitions partially mediated the path between PTSD from past trauma and distress outcomes (Table 3).

4. Discussion

This study explored the interrelationships between PTSD from past trauma, cognitive distortion, alexithymia, and psychological distress after controlling for trauma type and number of traumas among Chinese university students. All our hypotheses were supported. Firstly, PTSD from past trauma was significantly associated with psychological distress after controlling for covariates. Secondly, PTSD was positively related to cognitive distortion which was also associated with alexithymia positively. Further, distorted cognition and alexithymia were positively correlated with distress. Thirdly, both alexithymia and distorted cognition partially mediated the path between PTSD and distress outcomes.

Consistent with literature (Bernat et al., 1998), university students still displayed PTSD symptoms despite the fact that on average, the trauma had happened one year ago; approximately 29% of the sample still had regular images about the trauma intruding into their consciousness and felt emotionally upset. Further analysis revealed that all PTSD subscales were strongly and positively correlated with the four subscales of psychological co-morbidities ($p < 0.001$). This is not surprising given that PTSD was expressed through other psychological symptoms (Miller et al., 2004). Even after controlling for trauma type and number of traumas, the impact of PTSD on distress remained significant indicating the robust relationship between PTSD and distress. It is important to note that although PTSD symptoms were developed after the traumatic event, some of the psychiatric co-morbid symptoms could have been present before the event but exacerbated by the traumas. This is likely since pre-existing psychiatric symptoms or previous psychiatric disorders have often been associated with PTSD (Kessler et al., 2018). Unfortunately, information was not collected in the current study to verify this.

Table 2
Fit indices for measurement and structural models.

Models	χ^2	df	CMIN/df	CFI	TLI	NFI	RMSEA	90% CI for RMSEA
MM	293.33	80	3.67	0.98	0.98	0.98	0.05	0.04, 0.06
Structural Model 1	247.15	78	3.17	0.99	0.98	0.98	0.04	0.04, 0.05
Structural Model 2 (with covariates)	299.90	106	2.77	0.99	0.98	0.98	0.04	0.04, 0.05

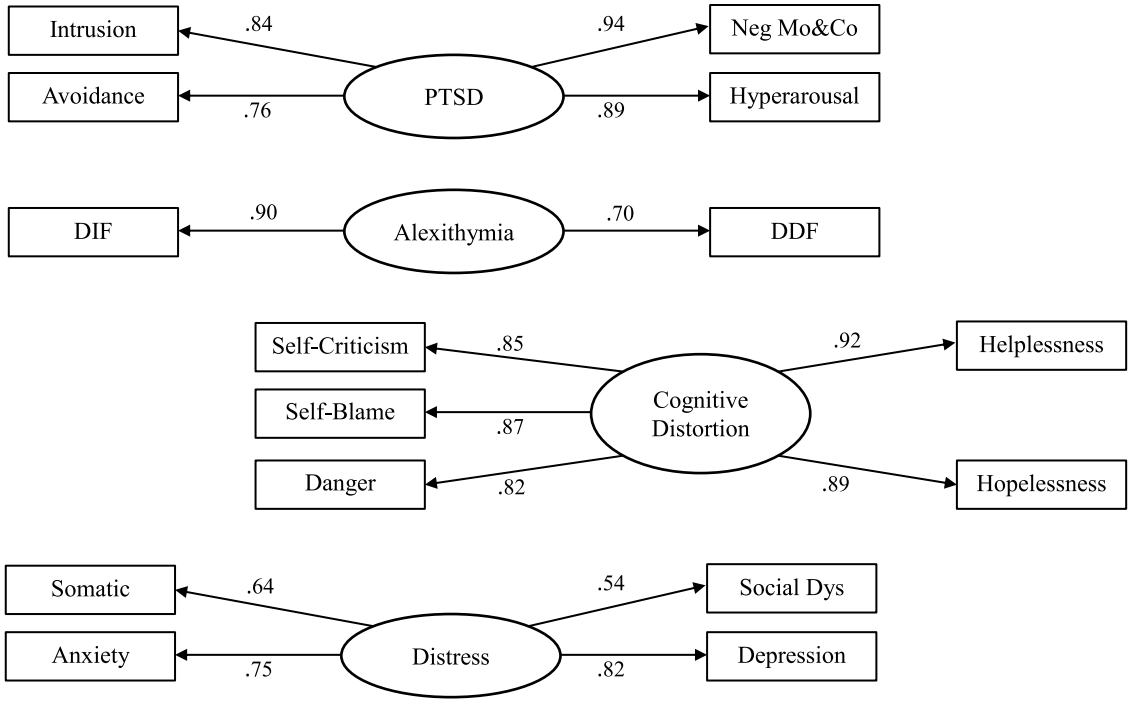

Fig. 2. Measurement model
Note: Neg Mo & Co = Negative Mood and Cognition, DIF = Difficulty in Identifying Feelings, DDF = Difficulty in Describing Feelings, Danger = Preoccupied with Danger, Somatic = Somatic Symptoms, Anxiety = Anxiety & Insomnia, Social Dys = Psychosocial Dysfunction, Depression = Severe Depression.

The prevalence rate of full PTSD (29%) identified in this study was higher than that reported in some published studies (6–17%) (e.g., Smyth et al., 2008). As was mentioned in the introduction, this might have resulted from different tools used to assess PTSD. Variations in expression of symptoms could also impact the incidence of PTSD (Macdonald et al., 2013). Although intrusive symptoms have been shown to be universal, avoidance may be culturally specific (Norris et al., 2001). The Chinese students in the current study would have adopted a collectivist cultural orientation. They would have been bound, mutually obligated and interdependent individuals who maintained well-being by emphasizing connectedness with others, carrying out social obligations and restricting individual emotional expression for group harmony (Jayawickreme et al., 2013; Markus and Kitayama, 1991; Oyserman and Lee, 2008). This collectivist orientation could have influenced PTSD symptom presentation (Kleinman, 1982; Lopez

Table 3
Total, Direct and Indirect effects of PTSD tot (X) on Distress (Y) via mediators.

$R = 0.65$, $R^2 = 0.42$, $F = 159.45$, $p < 0.001$

Total Effect of X on Y				
Effect	SE	*t*	LLCI	ULCI
0.38	0.02	16.56	0.33	0.42
Direct Effect of X on Y				
Effect	SE	*t*	LLCI	ULCI
0.18	0.02	7.95	0.13	0.22
Indirect effect(s) of X on Y via mediators (total score)				
Variable	Effect	SE	Lower	Upper
Total	0.20	0.02	0.17	0.23
Cognitive Distortion (CD)	0.13	0.02	0.10	0.16
CD - Alexithymia	0.04	0.01	0.03	0.05
Alexithymia	0.03	0.01	0.02	0.05

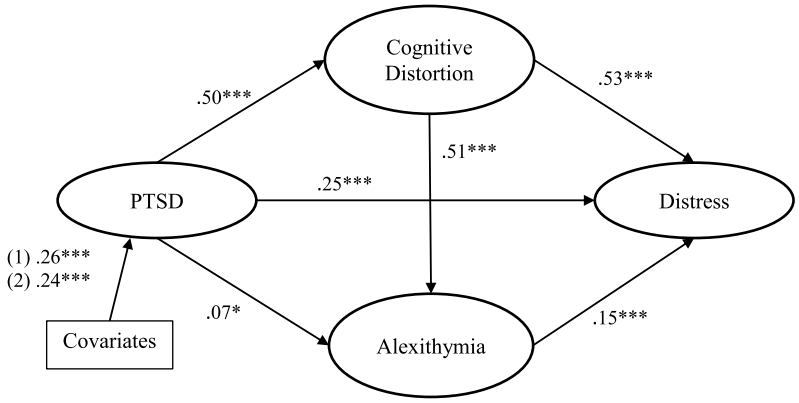

Fig. 3. Structural model and SEM coefficients.
Note. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$
Covariates: Traumatic Life Event[1] types and number of traumas[2].

and Guarnaccia, 2000) in that students might have "internalized" symptoms by directing them inwardly through avoidance and numbness (Miller et al., 2004). In fact, it has been argued that Chinese university students tend to adopt a higher degree of avoidance and numbness than Western samples (Foa et al., 1989). It is different from individuals with the Western cultural orientation whereby emphasis is placed on feeling good about oneself, personal success, and open emotional expression as a key to achieve a high level of well-being (Jayawickreme et al., 2013). They might therefore "externalize" PTSD symptoms outwardly through, for example, anger or aggression towards others (Miller et al., 2004).

Distorted cognition acted as a mediator in the link between PTSD and distress. Further analysis showed that hopelessness ($\beta = 0.30$, $t = 6.06$, $p < 0.001$) and helplessness ($\beta = 0.09$, $t = 2.34$, $p < 0.05$) were significantly and positively associated with distress outcomes. These findings aligned with previous studies (e.g., Beck et al., 2005) suggesting that psychological distress is related not only to the external reality of traumas, but also to people's maladaptive interpretations of it. Given that traumas are uncontrollable and unpredictable, most victims feel unable to avoid danger or protect themselves; the chronic perceptions of helplessness, fear, and hopelessness thereby gradually increase (Kim and Cicchetti, 2003) and lead to a pervasive sense of a lack of options and capability in a wide variety of circumstances. As such, our findings echoed that cognitive distortions are commonly reported as significant risk factors for distress among university students from the West (Briere, 2002; Owens and Chard, 2006).

It is worth noting that although the association between helplessness and distress has been found, it is a weak relationship. For some researchers, this is not a surprising finding since the usefulness of helplessness as a key to understanding trauma reactions has been questioned. For example, it was one of the constituents of the Criterion A2 of DSM-IV but was abandoned in DSM-5 due to the weak precision of PTSD diagnosis that it could offer (Adler et al., 2008; Breslau and Kessler, 2001; Schnurr et al., 2002). Some trauma victims have in fact experienced intense peritrauma emotional responses other than helplessness, fear or horror (O'Donnell et al., 2010).

In line with literature, alexithymia mediated the relation between PTSD from trauma and psychological co-morbidities (Chen and Chung, 2016; Helmes et al., 2008). In comparison to Western university samples, Chinese students were similar to a large extent (Chung and Hunt, 2014; Chung et al., 2012). The indirect effect of alexithymia as one of the trauma responses in carrying the effect of PTSD onto distress seemed to be universal across different cultures. This echoes the claim that alexithymia might be a trait which transcends cultural differences (Taylor et al., 2003). Specifically, difficulty identifying feelings ($\beta = 0.13$, $t = 4.27$, $p < 0.001$) showed the strongest link with distress outcomes giving further support to previous findings (O'Brien et al., 2008). It might be the case that regardless of cultural differences, following a trauma, individuals tend to inhibit one's traumatic emotions (Nemiah, 1996) through alexithymia which does not necessarily, however, decrease the emotion itself (Gross, 1998). Instead, trauma victims may experience the effects from unresolved, unprocessed, and accumulated traumatic emotions which disturb the physiological and neurological system consequently giving rise to distress (e.g., Amstadter and Vernon, 2008). Thus, as was mentioned earlier, whilst there might be cultural differences in expressing trauma symptoms, to defend against or regulate traumatic emotion after a trauma might be universal. Caution needs to be taken with this interpretation, however, since this study had no cross-cultural comparison data.

Findings also indicated that distorted cognitions were associated with alexithymia which aimed to avoid overwhelming internal trauma-related distress. Further analysis also showed that hopelessness ($\beta = 0.17$, $t = 2.81$, $p < 0.001$) and helplessness ($\beta = 0.22$, $t = 3.80$, $p < 0.001$) were significantly related to alexithymia, in line with existing literature (Sifneos et al., 1977). When participants felt hopeless and helpless, they tended to cope with these distressing feelings by avoiding confronting, accessing, or expressing of internal feelings or emotions. However, alexithymia maintains unresolved emotions leading to distress outcomes. Findings were consistent with previous research (Chung et al., 2016; Helmes et al., 2008).

Several limitations of the study deserve to be mentioned. Firstly, the sample could have been biased due to the online recruitment strategy (Wise et al., 2016). Notwithstanding this, the strengths of a web-based method in trauma research cannot be ruled out completely as long as the mechanisms through which data are collected are rigorous (Schlenger and Silver, 2006). Secondly, although mediational relationships were explored in this cross-sectional study, causality inference between psychological constructs should not be assumed. The purpose for exploring direct and indirect effects between psychological constructs was simply to gain a better understanding of the structural relationships. Nevertheless, our results provided a solid foundation for a future longitudinal study. Thirdly, this study was retrospective, and thus participants' reports of trauma exposure may have been influenced by the passage of time. Last but not least, the model in current study has not taken account of the impact that attachment might have on alexithymia (Mikulincer et al., 2003). Attachment styles have been shown to cultivate ability to confront, identify, express and regulate distressing feelings as an important step toward restoring emotional balance. In other words, these styles could have influenced the levels of alexithymia. Individuals might have learned constructive emotion-regulation strategies when caregivers, for example, were emotionally accessible and responsive and provided a secure basis for such learning. The level of alexithymia would have been reduced. On the contrary, as a result of fearful or insecure attachment experiences, individuals might have heightened levels of alexithymic characteristics as maladaptive and avoidance coping strategies (Mikulincer and Shaver, 2007; Mikulincer et al., 2003).

The current findings have promising implications for clinical practice. First, screening for PTSD symptoms, maladaptive cognitive schemata, and alexithymic symptoms followed by appropriate counselling services is paramount for university students. Secondly, treatments targeting cognitive distortions should be encouraged. In fact, there is evidence suggesting that trauma-focused cognitive behavioral therapies (TF-CBT) such as Cognitive Processing Therapy (Resick and Schnicke, 1993) and Cognitive Therapy (Ehlers et al., 2005) are effective to decrease both negative posttraumatic cognitions and psychological symptoms (Cusack et al., 2016; Diehle et al., 2014; Haagen et al., 2015). Last but not least, therapy targeting facilitation of getting in touch with inner feelings would be useful to empower individuals to get in touch with their internal self (Briere, 1996).

To conclude, following exposure to trauma, university students can develop PTSD affecting mental health. The severity of psychological distress was influenced by the degree of distorted perception of themselves and the world, as well as their ability to identify, describe, and process distressing emotions.

Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.psychres.2018.11.032.

References

Adler, A.B., Wright, K.M., Bliese, P.D., Eckford, R., Hoge, C.W., 2008. A2 diagnostic criterion for combat-related posttraumatic stress disorder. J. Trauma. Stress 21 (3), 301–308.

Amstadter, A.B., Vernon, L.L., 2008. A preliminary examination of thought suppression,

emotion regulation, and coping in a trauma-exposed sample. J. Aggress. Maltreat. Trauma 17 (3), 279–295.
Arbuckle, J., 2012. IBM SPSS AMOS (Version 21.0). IBM, Chicago.
Bagby, R.M., Parker, J.D.A., Taylor, G.J., 1994. The twenty- item Toronto Alexithymia scale—I. Item selection and cross-validation of the factor structure. J. Psychosom. Res. 38 (1), 23–32.
Beck, A.T., Emery, G., Greenberg, R.L., 2005. Anxiety Disorders and Phobias: A Cognitive Perspective. Basic Books, New York.
Bernat, J.A., Ronfeldt, H.M., Calhoun, K.S., Arias, I., 1998. Prevalence of traumatic events and peritraumatic predictors of posttraumatic stress symptoms in a nonclinical sample of college students. J. Trauma. Stress 11 (4), 645–664.
Blanco, C., Okuda, M., Wright, C., Hasin, D.S., Grant, B.F., Liu, S.M., et al., 2008. Mental health of college students and their non–college-attending peers: results from the national epidemiologic study on alcohol and related conditions. Arch. Gen. Psychiatry 65 (12), 1429–1437.
Blevins, C.A., Weathers, F.W., Davis, M.T., Witte, T.K., Domino, J.L., 2015. The posttraumatic stress disorder checklist for DSM-5 (PCL-5): development and initial psychometric evaluation. J. Trauma. Stress 28 (6), 489–498.
Bonanno, G.A., Mancini, A.D., 2012. Beyond resilience and PTSD: mapping the heterogeneity of responses to potential trauma. Psychol. Trauma 4 (1), 74–83.
Bovin, M.J., Marx, B.P., Weathers, F.W., Gallagher, M.W., Rodriguez, P., Schnurr, P.P., et al., 2016. Psychometric properties of the PTSD checklist for diagnostic and statistical manual of mental disorders–fifth edition (PCL-5) in veterans. Psychol. Assess. 28 (11), 1379.
Boyraz, G., Granda, R., Baker, C.N., Tidwell, L.L., Waits, J.B., 2016. Posttraumatic stress, effort regulation, and academic outcomes among college students: a longitudinal study. J. Couns. Psychol. 63 (4), 475.
Boyraz, G., Horne, S.G., Armstrong, A.P., Owens, A.C., 2015. Posttraumatic stress predicting depression and social support among college students: moderating effects of race and gender. Psychol. Trauma 7 (3), 259.
Breslau, N., Kessler, R.C., 2001. The stressor criterion in DSM-IV posttraumatic stress disorder: an empirical investigation. Biol. Psychiatry 50 (9), 699–704.
Breslau, N., Kessler, R.C., Chilcoat, H.D., Schultz, L.R., Davis, G.C., Andreski, P., 1998. Trauma and posttraumatic stress disorder in the community: the 1996 Detroit area survey of trauma. Arch. Gen. Psychiatry 55 (7), 626–632.
Breslau, N., Peterson, E., Poisson, L., Schultz, L., Lucia, V., 2004a. Estimating post-traumatic stress disorder in the community: lifetime perspective and the impact of typical traumatic events. Psychol. Med. 34 (5), 889–898.
Breslau, N., Wilcox, H.C., Storr, C.L., Lucia, V.C., Anthony, J.C., 2004b. Trauma exposure and posttraumatic stress disorder: a study of youths in urban America. J. Urban Health 81 (4), 530–544.
Briere, J., 1996. A self-trauma model for treating adult survivors of severe child abuse. In: Briere, J., Berliner, L., Bulkley, J.A., Jenny, C., Reid, T. (Eds.), The APSAC Handbook on Child Maltreatment, 2nd ed. Sage Publications, Newbury Park, pp. 140–157.
Briere, J., 2000. Cognitive Distortion Scales. Professional Manual. Psychological Assessment Resources, Florida.
Briere, J., 2002. Treating adult survivors of severe childhood abuse and neglect: Further development of an integrative model. In: Myers, L., Berliner, L., Briere, J., Hendrix, C.T., Reid, T., Jenny, C. (Eds.), The APSAC handbook on child maltreatment, 2nd Edition. Sage Publications, Newbury Park, CA, pp. 175–203.
Briere, J., 2004. Psychological Assessment of Adult Posttraumatic States: Phenomenology, Diagnosis, and Measurement, 2nd ed. American Psychological Association, Washington DC.
Briere, J., Hodges, M., Godbout, N., 2010. Traumatic stress, affect dysregulation, and dysfunctional avoidance: a structural equation model. J. Trauma. Stress 23 (6), 767–774.
Briere, J., Spinazzola, J., 2005. Phenomenology and psychological assessment of complex posttraumatic states. J. Trauma. Stress 18 (5), 401–412.
Browne, C., Winkelman, C., 2007. The effect of childhood trauma on later psychological adjustment. J. Interpers. Violence 22 (6), 684–697.
Chen, Z.S., Chung, M.C., 2016. The relationship between gender, posttraumatic stress disorder from past trauma, alexithymia and psychiatric co-morbidity in Chinese adolescents: a moderated mediational analysis. Psychiatr. Q. 87 (4), 1–13.
Chung, M.C., Di, X., Wan, K.H., 2016. Past trauma, alexithymia, and posttraumatic stress among perpetrators of violent crime. Traumatology 22 (2), 104–112.
Chung, M.C., Farmer, S., Grant, K., Newton, R., Payne, S., Perry, M., et al., 2002. Self-esteem, personality and post traumatic stress symptoms following the dissolution of a dating relationship. Stress Health 18 (2), 83–90.
Chung, M.C., Hunt, L., 2014. Posttraumatic stress symptoms and well-being following relationship dissolution: past trauma, alexithymia, suppression. Psychiatr. Q. 85 (2), 155–176.
Chung, M.C., Jalal, S., Khan, N.U., 2017. Posttraumatic stress symptoms, co-morbid psychiatric symptoms and distorted cognitions among flood victims of different ages. J. Ment. Health 26 (3), 204–211.
Chung, M.C., Rudd, H., Wall, N., 2012. Posttraumatic stress disorder following asthma attack (post-asthma attack PTSD) and psychiatric co-morbidity: the impact of alexithymia and coping. Psychiatry Res. 197 (3), 246–252.
Chung, M.C., Wall, N., 2013. Alexithymia and posttraumatic stress disorder following asthma attack. Psychiatr. Q. 84, 287–302.
Coriale, G., Bilotta, E., Leone, L., Cosimi, F., Porrari, R., De Rosa, F., et al., 2012. Avoidance coping strategies, alexithymia and alcohol abuse: a mediation analysis. Addict. Behav. 37 (11), 1224–1229.
Cusack, K., Jonas, D.E., Forneris, C.A., Wines, C., Sonis, J., Middleton, J.C., et al., 2016. Psychological treatments for adults with posttraumatic stress disorder: a systematic review and meta-analysis. Clin. Psychol. Rev. 43, 128–141.
Diehle, J., Schmitt, K., Daams, J.G., Boer, F., Lindauer, R.J., 2014. Effects of psychotherapy on trauma-related cognitions in posttraumatic stress disorder: a meta-analysis. J. Trauma. Stress 27 (3), 257–264.
Edwards, V.J., Holden, G.W., Felitti, V.J., Anda, R.F., 2003. Relationship between multiple forms of childhood maltreatment and adult mental health in community respondents: results from the adverse childhood experiences study. Am. J. Psychiatry 160 (8), 1453–1460.
Ehlers, A., Clark, D.M., Hackmann, A., McManus, F., Fennell, M., 2005. Cognitive therapy for post-traumatic stress disorder: development and evaluation. Behav. Res. Ther. 43 (4), 413–431.
Elhai, J.D., Miller, M.E., Ford, J.D., Biehn, T.L., Palmieri, P.A., Frueh, B.C., 2012. Posttraumatic stress disorder in DSM-5: estimates of prevalence and symptom structure in a nonclinical sample of college students. J. Anxiety Disord. 26 (1), 58–64.
Enders, C.K., 2001. A primer on maximum likelihood algorithms available for use with missing data. Struct. Equ. Model. 8 (1), 128–141.
Fink, E.L., Anestis, M.D., Selby, E.A., Joiner, T.E., 2010. Negative urgency fully mediates the relationship between alexithymia and dysregulated behaviours. Per. Ment. Health 4 (4), 284–293.
Foa, E.B., Steketee, G., Rothbaum, B.O., 1989. Behavioral/cognitive conceptualizations of post-traumatic stress disorder. Behav. Ther. 20 (2), 155–176.
Frazier, P., Anders, S., Perera, S., Tomich, P., Tennen, H., Park, C., et al., 2009. Traumatic events among undergraduate students: prevalence and associated symptoms. J. Couns. Psychol. 56 (3), 450–460.
Fu, Y., Chen, Y., Wang, J., Tang, X., He, J., Jiao, M., et al., 2013. Analysis of prevalence of PTSD and its influencing factors among college students after the Wenchuan earthquake. Child Adolesc. Psychiatry Ment. Health 7 (1), 1.
Goldberg, D., Hillier, V.F., 1979. A scaled version of the general health questionnaire. Psychol. Med. 9 (01), 139–145.
Goldberg, D., Williams, P., 1988. A User's Guide to the GHQ. NFER-Nelson, Windsor.
Gross, J.J., 1998. The emerging field of emotion regulation: an integrative review. Rev. Gen. Psychol. 2 (3), 271–299.
Guo, L., Li, G., Liu, Q., 2013. Research on Wuhan college students' psychological trauma of events and impact. Med. Soc. 26 (9), 73–76.
Haagen, J.F., Smid, G.E., Knipscheer, J.W., Kleber, R.J., 2015. The efficacy of recommended treatments for veterans with PTSD: A metaregression analysis. Clin. Psychol. Rev. 40, 184–194.
Hardison, H.G., Neimeyer, R.A., Lichstein, K.L., 2005. Insomnia and complicated grief symptoms in bereaved college students. Behav. Sleep Med. 3 (2), 99–111.
Hayes, A.F., 2016. Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach. The Guilford Press, New York.
He, X.I., Zhang, Y., Xu, X., 2013. The influence of alexithymia on subjective well-being among college students. Chin. J. School Health 34 (5), 534–536.
Heim, C., Nemeroff, C.B., 2001. The role of childhood trauma in the neurobiology of mood and anxiety disorders: preclinical and clinical studies. Biol. Psychiatry 49 (12), 1023–1039.
Helmes, E., McNeill, P.D., Holden, R.R., Jackson, C., 2008. The construct of alexithymia: associations with defense mechanisms. J. Clin. Psychol. 64 (3), 318–331.
Hill, J., 2003. Childhood trauma and depression. Curr. Opin. Psychiatry 16 (1), 3–6.
Hoelterhoff, M., Chung, M.C., 2017. Death anxiety resilience; a mixed methods investigation. Psychiatr. Q. 88 (3), 635–651.
Honkalampi, K., Hintikka, J., Tanskanen, A., Lehtonen, J., Viinamäki, H., 2000. Depression is strongly associated with alexithymia in the general population. J. Psychosom. Res. 48 (1), 99–104.
Hu, L.T., Bentler, P.M., 1999. Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. Struct. Equ. Model. 6 (1), 1–55.
Hund, A.R., Espelage, D.L., 2006. Childhood emotional abuse and disordered eating among undergraduate females: mediating influence of alexithymia and distress. Child Abuse Negl. 30 (4), 393–407.
Jayawickreme, N., Jayawickreme, E., Foa, E.B., 2013. Using the individualism- collectivism construct to understand cultural differences in PTSD. In: Gow, K.M., Celinski, M.J. (Eds.), Wayfinding Through Life's Challenges: Coping and Survival. Nova Science Publishers, New York.
Kamimura, A., Nourian, M.M., Assasnik, N., Franchek-Roa, K., 2016. Intimate partner violence–related experiences and mental health among college students in Japan, Singapore, South Korea and Taiwan. Int. J. Soc. Psychiatry 62 (3), 262–270.
Karukivi, M., Hautala, L., Kaleva, O., Haapasalo-Pesu, K.M., Liuksila, P.R., Joukamaa, M., et al., 2010. Alexithymia is associated with anxiety among adolescents. J. Affect. Disord. 125 (1), 383–387.
Kessler, R.C., Aguilar-Gaxiola, S., Alonso, J., Bromet, E.J., Gureje, O., Karam, E.G., et al., 2018. The associations of earlier trauma exposures and history of mental disorders with PTSD after subsequent traumas. Mol. Psychiatry 23 (9), 1–8.
Kessler, R.C., Berglund, P., Demler, O., Jin, R., Merikangas, K.R., Walters, E.E., 2005. Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. Arch. Gen. Psychiatry 62 (6), 593–602.
Kessler, R.C., Sonnega, A., Bromet, E., Hughes, M., Nelson, C.B., 1995. Posttraumatic stress disorder in the National Comorbidity Survey. Arch. Gen. Psychiatry 52 (12), 1048–1060.
Kim, J., Cicchetti, D., 2003. Social self-efficacy and behavior problems in maltreated and nonmaltreated children. J. Clin. Child Adolesc. Psychol. 32 (1), 106–117.
Kleinman, A., 1982. Neurasthenia and depression: a study of somatization and culture in China. Cult. Med. Psychiatry 6 (2), 117–190.
Lopez, S.R., Guarnaccia, P.J., 2000. Cultural psychopathology: uncovering the social world of mental illness. Annu. Rev. Psychol. 51 (1), 571–598.
Macdonald, A., Greene, C.J., Torres, J.G., Frueh, B.C., Morland, L.A., 2013. Concordance between clinician-assessed and self-reported symptoms of posttraumatic stress disorder across three ethnoracial groups. Psychol. Trauma 5 (3), 201.
MacKinnon, D.P., Lockwood, C.M., Williams, J., 2004. Confidence limits for the indirect

effect: distribution of the product and resampling methods. Multivar. Behav. Res. 39 (1), 99–128.
Markus, H.R., Kitayama, S., 1991. Culture and the self: implications for cognition, emotion, and motivation. Psychol. Rev. 98 (2), 224.
Marx, B.P., Sloan, D.M., 2002. The role of emotion in the psychological functioning of adult survivors of childhood sexual abuse. Behav. Ther. 33 (4), 563–577.
Mattila, A.K., Saarni, S.I., Salminen, J.K., Huhtala, H., Sintonen, H., Joukamaa, M., 2009. Alexithymia and health-related quality of life in a general population. Psychosomatics 50 (1), 59–68.
Mazzeo, S.E., Mitchell, K.S., Williams, L.J., 2008. Anxiety, alexithymia, and depression as mediators of the association between childhood abuse and eating disordered behavior in African American and European American women. Psychol. Women Q. 32 (3), 267–280.
Mikulincer, M., Shaver, P.R., 2007. Attachment in adulthood: Structure, Dynamics, and Change. Guilford Press, New York.
Mikulincer, M., Shaver, P.R., Pereg, D., 2003. Attachment theory and affect regulation: the dynamics, development, and cognitive consequences of attachment-related strategies. Motiv. Emot. 27 (2), 77–102.
Miller, M.W., Kaloupek, D.G., Dillon, A.L., Keane, T.M., 2004. Externalizing and internalizing subtypes of combat-related PTSD: a replication and extension using the PSY-5 scales. J. Abnorm. Psychol. 113 (4), 636–645.
Nemiah, J.C., 1996. Alexithymia: present, past–and future? Psychosom. Med. 58 (3), 217–218.
Nemiah, J.C., Sifneos, P.E., 1970. Psychosomatic illness: a problem in communication. Psychother. Psychosom. 18 (1–6), 154–160.
Niu, R.H., Wang, C., Xue, Y.X., 2011. Status of alexithymia and mental health among college students. Chin. J. Health Edu. 27 (8), 610–612.
Norris, F.H., Perilla, J.L., Ibañez, G.E., Murphy, A.D., 2001. Sex differences in symptoms of posttraumatic stress: does culture play a role? J. Trauma. Stress 14 (1), 7–28.
O'Brien, C., Gaher, R.M., Pope, C., Smiley, P., 2008. Difficulty identifying feelings predicts the persistence of trauma symptoms in a sample of veterans who experienced military sexual trauma. J. Nerv. Ment. Dis. 196 (3), 252–255.
Orcutt, H.K., King, L.A., King, D.W., 2003. Male-perpetrated violence among Vietnam veteran couples: relationships with veteran's early life characteristics, trauma history, and PTSD symptomatology. J. Trauma. Stress 16 (4), 381–390.
O'Donnell, M.L., Creamer, M., McFarlane, A.C., Silove, D., Bryant, R.A., 2010. Should A2 be a diagnostic requirement for posttraumatic stress disorder in DSM-V? Psychiatry Res. 176 (2–3), 257–260.
Owens, G.P., Chard, K.M., 2006. PTSD severity and cognitive reactions to trauma among a college sample: an exploratory study. J. Aggress. Maltreat. Trauma 13 (2), 23–36.
Oyserman, D., Lee, S.W., 2008. Does culture influence what and how we think? Effects of priming individualism and collectivism. Psychol. Bull. 134 (2), 311–342.
Parker, J.D.A., Taylor, G.J., Bagby, R.M., 1998. Alexithymia: Relationship with ego defense and coping styles. Compr. Psychiatry 39 (2), 91–98.
Pennebaker, J.W., 1995. Emotion, Disclosure, & Health. American Psychological Association, Washington DC.
Raphael, B., Lundin, T., Weisaeth, L., 1989. Post-traumatic symp tom scale PTSS-10: reactions following an accident or a disaster. Acta Psychiatr. Scand. 80, 58.
Read, J.P., Ouimette, P., White, J., Colder, C., Farrow, S., 2011. Rates of DSM–IV–TR trauma exposure and posttraumatic stress disorder among newly matriculated college students. Psychol. Trauma 3 (2), 148–156.
Resick, P.A., Schnicke, M., 1993. Cognitive Processing Therapy for Rape Victims: A treatment Manual 4 Sage Publications, Newbury Park.
Rohany, N., Ahmad, Z.Z., Rozainee, K., Shahrazad, W.W., 2011. Family functioning, self-esteem, self-concept and cognitive distortion among juvenile delinquents. Social Sci. 6 (2), 155–163.
Sayar, K., Kirmayer, L.J., Taillefer, S.S., 2003. Predictors of somatic symptoms in depressive disorder. Gen. Hosp. Psychiatry 25 (2), 108–114.
Scarpa, A., Fikretoglu, D., Bowser, F., Hurley, J.D., Pappert, C.A., Romero, N., et al., 2002. Community violence exposure in university students: a replication and extension. J. Interpers. Violence 17 (3), 253–272.
Schlenger, W.E., Silver, R.C., 2006. Web-based methods in terrorism and disaster research. J. Trauma. Stress 19 (2), 185–193.
Schnurr, P.P., Spiro, A., Vielhauer, M.J., Findler, M.N., Hamblen, J.L., 2002. Trauma in the lives of older men: findings from the normative aging study. J. Clin. Geropsychol. 8 (3), 175–187.
Sifneos, P.E., Apfel-Savitz, R., Frankel, F.H., 1977. The phenomenon of 'alexithymia'. Psychother. Psychosom. 28 (1–4), 47–57.
Smyth, J.M., Hockemeyer, J.R., Heron, K.E., Wonderlich, S.A., Pennebaker, J.W., 2008. Prevalence, type, disclosure, and severity of adverse life events in college students. J. Am. Coll. Health 57 (1), 69–76.
Sterling, M., 2011. General Health Questionnaire- 28 (GHQ-28). J. Physiother. 57 (4), 259.
Taylor, G.J., Bagby, R.M., Parker, J.D., 1997. Disorders of Affect Regulation: Alexithymia in Medical and Psychiatric Illness. Cambridge University Press, Cambridge.
Taylor, G.J., Bagby, R.M., Parker, J.D., 2003. The 20-item toronto alexithymia scale: IV. Reliability and factorial validity in different languages and cultures. J. Psychosom. Res. 55 (3), 277–283.
Vallejo, M.A., Jordán, C.M., Díaz, M.I., Comeche, M.I., Ortega, J., 2007. Psychological assessment via the internet: a reliability and validity study of online (vs paper-and-pencil) versions of the General Health Questionnaire-28 (GHQ-28) and the Symptoms Check-List-90-Revised (SCL-90-R). J. Med. Internet Res. 9 (1), e2.
Verhaeghe, P., Vanheule, S., 2005. Actual neurosis and PTSD: the impact of the other. Psychoanal. Psychol. 22 (4), 493–507.
Weathers, F.W., Litz, B.T., Keane, T.M., Palmieri, P., Marx, B., Schnurr, P., 2013. The PTSD Checklist for DSM-5 (PCL-5). National Center for PTSD. www.ptsd.va.gov.
Wise, T., Arnone, D., Marwood, L., Zahn, R., Lythe, K.E., Young, A.H., 2016. Recruiting for research studies using online public advertisements: examples from research in affective disorders. Neuropsychiatr. Dis. Treat 12, 279–285.
Zeng, Q.W., Liu, A.S., Li, S.Y., 2015. The relationship between childhood psychological maltreatment and trait depression:a chain mediating effect of rumination and post-traumatic cognitive changes. Chin. J. Clin. Psychol. 23 (4), 665–669.
Zhou, X., Wu, X., Yuan, X., 2015. The Role of core beliefs challenge, subjective fear, and intrusive rumination in association between severity of traumatic exposure and posttraumatic stress disorder among adolescent survivors after the Yaan earthquake. Acta Psychol. Sinica 47 (4), 455–465.