

## Exploring cultural differences in the use of emotion regulation strategies in posttraumatic stress disorder

Amanda Nagulendran and Laura Jobson 

Turner Institute of Brain and Mental Health, Monash University, Melbourne, Australia

### ABSTRACT

**Background:** Emotion regulation difficulties are central to posttraumatic stress disorder (PTSD). While cultural differences exist in the ways in which individuals regulate their emotions, researchers have not examined cultural differences in emotion regulation in PTSD.

**Objective:** This study explored emotion regulation in individuals from European and East Asian cultures with and without PTSD.

**Method:** Emotion regulation measures were administered to Caucasian Australian ( $n = 31$ ) and East Asian Australian ( $n = 38$ ) trauma survivors with and without PTSD.

**Results:** Caucasian Australians with PTSD scored significantly higher on measures of worry, expressive suppression, thought suppression, rumination, experiential avoidance, and general emotion dysregulation compared to Caucasian Australians without PTSD. Similarly, East Asian Australians with PTSD scored significantly higher on measures of rumination and experiential avoidance than East Asian Australians without PTSD. However, worry, expressive suppression, thought suppression and general emotion dysregulation did not differentiate between East Asian Australians with and without PTSD.

**Conclusion:** These findings suggest that there may be cultural differences in emotion regulation difficulties in PTSD and highlight the need for further research in this area.

### Explorando las diferencias culturales en el uso de estrategias de regulación de las emociones en el trastorno de estrés postraumático

**Antecedentes:** las dificultades de regulación emocional son fundamentales en el trastorno de estrés postraumático (TEPT). Si bien existen diferencias culturales en la forma en que los individuos regulan sus emociones, los investigadores no han examinado las diferencias culturales en la regulación de las emociones en el TEPT.

**Objetivo:** Este estudio exploró la regulación emocional en individuos de culturas europeas y de Asia oriental con y sin TEPT.

**Método:** Se administraron instrumentos para medir la regulación de emociones a australianos caucásicos ( $n = 31$ ) y australianos asiáticos orientales ( $n = 38$ ), sobrevivientes de trauma con y sin TEPT.

**Resultados:** los australianos caucásicos con TEPT obtuvieron puntajes significativamente más altos en medidas de preocupación, supresión expresiva, supresión del pensamiento, rumiación, evitación experiencial y desregulación general de las emociones en comparación con los australianos caucásicos sin TEPT. Del mismo modo, los australianos de Asia oriental con TEPT obtuvieron puntajes significativamente más altos en las medidas de rumiación y evitación experiencial que los australianos de Asia oriental sin TEPT. Sin embargo, la preocupación, la supresión expresiva, la supresión del pensamiento y la desregulación general de las emociones no fueron diferentes entre los australianos de Asia oriental con y sin TEPT.

**Conclusión:** Estos hallazgos sugieren que puede haber diferencias culturales en las dificultades de regulación de las emociones en el TEPT y resaltan la necesidad de más investigación en esta área.

### 探索在创伤后应激障碍中使用情绪调节策略的文化差异

**背景:**情绪调节困难是创伤后应激障碍 (PTSD) 的核心。虽然文化差异存在于个人调节情绪的方式中, 但研究人员尚未研究 PTSD 中情绪调节的文化差异。

**目的:**本研究探讨了有或无 PTSD 的欧洲和东亚文化背景个体的情绪调节。

**方法:**对有或无 PTSD 的高加索澳大利亚人 ( $n = 31$ ) 和东亚裔澳大利亚人 ( $n = 38$ ) 的创伤幸存者测量情绪调节方式。

**结果:**与没有 PTSD 的高加索澳大利亚人相比, 患有 PTSD 的高加索澳大利亚人在焦虑, 表达抑制, 思想抑制, 反刍思维, 体验回避和一般情绪失调方面的得分明显更高。同样, 与没有 PTSD 的东亚裔澳大利亚人相比, 患有 PTSD 的东亚裔澳大利亚人在反刍思维和体验回避方

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创伤后应激障碍; 文化; 情绪调节

### HIGHLIGHTS

- Sufferers of posttraumatic stress disorder (PTSD) have emotion regulation difficulties.
- This study highlights that culture may influence the emotion regulation strategies associated with PTSD.
- This may have implications for assessment and treatment of emotion in PTSD and highlights the need for further research in the area.

**CONTACT** Amanda Nagulendran  [amanda.nagulendran@gmail.com](mailto:amanda.nagulendran@gmail.com)  School of Psychological Sciences, Monash University, Melbourne, 3800, Australia

Data is available from the authors on request.

 The supplemental data for this article can be accessed [here](#).

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面的得分明显更高。然而,有/无创伤后应激障碍的东亚裔澳大利亚人的担忧,表达抑制,思想抑制和一般情绪失调并没有区别。

**结论:**这些发现表明,创伤后应激障碍的情绪调节困难可能存在文化差异,并强调了在这一领域需要进一步研究的必要性。

Emotion regulation difficulties are central to post-traumatic stress disorder (PTSD) (Seligowski, Lee, Bardeen, & Orcutt, 2015). Key emotion regulation strategies implicated in PTSD include expressive suppression, rumination, worry, experiential avoidance, and reappraisal (Table 1), with a recent meta-analysis finding moderate to large associations between these emotion regulation difficulties and PTSD (Seligowski et al., 2015). However, there is a significant limitation associated with this work. Specifically, all studies included in this meta-analysis reported predominantly Caucasian samples (Seligowski et al., 2015), highlighting the paucity of cross-cultural research in this domain. Moreover, whilst there is a pervasive assumption in the PTSD literature that central emotion regulation mechanisms operate in universally similar ways, there is accumulating cross-cultural evidence that questions this assumption.

Culture shapes individual preferences for the strategies used to self-regulate emotions and the associated psychological outcomes (Ford & Mauss, 2015). East Asian and Western European groups hold comparatively different cultural values that influence emotion regulation. For instance, Western individualistic cultures perceive the self as a unique independent entity that reflects individual attributes (including emotions), values and goals, while East Asian collectivistic cultures define the self in relation to others and value the adhering to group norms and expectations (Markus & Kitayama, 2010). East Asian cultures also tend to endorse a holistic perspective, whereby experiences are considered parts of a whole and contradiction in experiences are acceptable. Western cultures tend to endorse an analytic perspective that involves seeking knowledge by breaking

whole concepts down into their smallest parts and categorizing these parts based on their differences (De Vaus, Hornsey, Kuppens, & Bastian, 2017). These differences lead to cultural variability in which emotion regulation strategies are deemed adaptive or maladaptive (De Vaus et al., 2017; Ford & Mauss, 2015).

Cross-cultural research has identified that in East Asian cultures expressive suppression and rumination may not be as maladaptive as in Western cultures. In individualistic cultures suppression of emotion is perceived as potentially problematic as it compromises self-expression and self-authenticity, while in collectivistic cultures expressive suppression is used pro-socially to endorse interpersonal harmony (Ford & Mauss, 2015). Further, individuals from East Asian cultures tend to self-distance (due to a holistic thinking style) when ruminating more than individuals from Western cultures, which results in decreased negative affect and increased re-construing of memories in such ways that promote closure and insight (Grossmann & Kross, 2010). Consequently, in East Asian cultures expressive suppression and rumination are not necessarily associated with poor mental health (Chang, Jetten, Cruwys, & Haslam, 2017; Grossmann & Kross, 2010; Hu et al., 2014; Maxwell, Sukhodolsky, Chow, & Wong, 2005). East Asian cultures also tend to be future-oriented and focus on the avoidance of harm, while Western cultures tend to be present-oriented and focus on the attainment of positive outcomes (Schwartz & Melech, 2000). Given many East Asian cultures strongly endorse being prepared for the future, individuals within this group may be more likely to view worry as acceptable rather than a negative symptom. Thus, suppression, rumination and worry may not be as associated with detrimental posttraumatic adjustment for East Asian trauma survivors.

Despite this literature, no research to date has investigated the influence of culture on emotion regulation in the context of PTSD. The aim of the present study was to conduct the first study exploring whether there were cultural differences in the relationship between key emotion regulation strategies and PTSD. We hypothesized that Caucasians with PTSD would report higher levels of habitual thought suppression, expressive suppression, rumination, worry, experiential avoidance, and general emotion dysregulation, and lower levels of reappraisal than Caucasians without PTSD. Second, we hypothesized

**Table 1.** Definitions of emotion regulation strategies implicated in posttraumatic stress disorder.

Emotion Regulation Strategy	Definition
Expressive Suppression	Inhibiting the outward expression of an emotion
Thought suppression	Suppressing a specific thought and the emotions associated with it
Rumination	Dwelling on one's symptoms of distress and their consequences
Worry	Directing attention towards future-oriented negative outcomes
Experiential Avoidance	Avoiding contact with uncomfortable thoughts, feelings, and memories
Reappraisal	Reinterpreting the meaning of a stimulus to change its emotional impact

that the differences in the use of expressive suppression, rumination, and worry would be less marked between East Asians with and without PTSD, when compared to the differences observed in the Caucasian group. Given experiential avoidance, reappraisal, thought suppression and general dysregulation are also associated with PTSD (Seligowski et al., 2015), these strategies were also explored. However, due to limited previous cross-cultural research, these investigations were exploratory.

## 1. Method

### 1.1. Participants

Participants ( $N = 69$ ) with trauma exposure were recruited through flyers displayed in the community and on social media. Adopting the approach of previous cross-cultural clinical research (Dritschel, Kao, Astell, Neufeind, & Lai, 2011; Jobson & Dalgleish, 2014), participants were sampled from two cultural groups: individuals who identified as East Asian Australians (hereon referred to as 'East Asian') with both parents and all four grandparents born in an East Asian country (China, Japan, South Korea, Taiwan), and Caucasian Australians (hereon referred to as 'Caucasian') with both parents and all four grandparents born in a Western individualistic country (Australia, UK, New Zealand, Canada, USA). Exclusion criteria included a current diagnosis of substance use disorder, a history of psychosis, and an inability to complete the tasks in English. No participants were excluded based on these criteria.

Participants were allocated to the PTSD or no-PTSD groups based on the Clinician-Administered PTSD Scale for DSM-5 (CAPS-5; Weathers et al., 2013). The CAPS-5 was administered and scored by AN, a trainee clinical psychologist in her final year of training. LJ, who is a clinical psychologist and blind to group, co-rated 25% of the randomly-selected interviews. There was complete agreement between raters. Identified index traumas included accidents (33.3%), family violence (23.2%), life-threatening illnesses (18.8%), sexual assaults (14.5%), non-sexual assaults (7.2%), and natural disasters (2.9%). No significant differences were found between groups with respect to trauma type or trauma history.

### 1.2. Procedure

The research gained ethical approval from Monash University Human Research Ethics Committee (1209). Following informed consent, trauma exposure was assessed using the Trauma History Questionnaire (Green, 1996). Eligible participants were then interviewed using the CAPS-5. To assess emotion regulation, we administered a series of gold-standard measures;

*Emotion Regulation Questionnaire* (Gross & John, 2003) (expressive suppression and reappraisal); *White Bear Suppression Inventory* (Wegner & Zanakos, 1994) (habitual thought suppression); *Penn State Worry Questionnaire* (Meyer, Miller, Metzger, & Borkovec, 1990) (habitual worry); *Acceptance and Action Questionnaire-II* (Bond et al., 2011) (habitual experiential avoidance); *Response Styles Questionnaire* (Nolen-Hoeksema & Morrow, 1991) (habitual rumination); *Responses to Intrusions Questionnaire* (Clohessy & Ehlers, 1999) (trauma-related rumination), and *Difficulties in Emotion Regulation Scale* (Gratz & Roemer, 2004) (general emotion dysregulation). The Hopkins Symptom Checklist-25 (Derogatis, Lipman, Rickels, Uhlenhuth, & Covi, 1974) assessed depression. All measures have been used in cross-cultural research and internal consistency was adequate (see Supplemental Material). Participants were reimbursed A\$20.

### 1.3. Data analysis plan

Group characteristics were examined using a series of 2 (cultural group; East Asian, Caucasian)  $\times$  2 (diagnosis; PTSD, no-PTSD) analysis of variances (ANOVAs). We conducted correlation analyses between the study variables. To assess our hypotheses, we used a series of 2 (cultural group; East Asian, Caucasian)  $\times$  2 (diagnosis; PTSD, no-PTSD) ANOVAs with each emotion regulation strategy as the dependent variable.

## 2. Results

### 2.1. Group characteristics

Table 2 presents group characteristics. The Caucasian group was significantly older than the East Asian group,  $F(1,65) = 7.06$ ,  $p = .01$ ,  $\eta_p^2 = .10$ . The diagnosis main effect and interaction were both non-significant. The four groups did not differ significantly in gender or education distribution. As expected, the Caucasian group reported having lived in Australia for significantly longer than the East Asian group,  $F(1,65) = 66.90$ ,  $p < .001$ ,  $\eta_p^2 = .51$ . The diagnosis main effect and interaction were non-significant. A similar pattern of results to that reported below emerged when age and length of time in Australia were included as covariates.

As expected, the PTSD groups reported significantly greater PTSD symptoms than the no-PTSD group,  $F(1,65) = 177.40$ ,  $p < .001$ ,  $\eta_p^2 = .73$ . The culture main effect and interaction were non-significant. The culture  $\times$  diagnosis interaction was significant for depression,  $F(1,65) = 4.91$ ,  $p = .03$ ,  $\eta_p^2 = .07$ . Follow-up analysis revealed that both PTSD groups reported significantly greater depression than the no-PTSD groups; East Asian,  $F(1,35) = 4.23$ ,  $p < .05$ ,  $\eta_p^2 = .11$ , Caucasian,

**Table 2.** Mean and (Standard Deviations) for group characteristics for demographic and study variables.

	Caucasian no-PTSD ( <i>n</i> = 15)	Caucasian PTSD ( <i>n</i> = 16)	East Asian no- PTSD ( <i>n</i> = 23)	East Asian PTSD ( <i>n</i> = 15)
Age (years)	29.40 (13.87)	30.81 (12.66)	23.74 (6.72)	23.53 (5.04)
Gender F:M ( <i>n</i> )	13:2	14:2	16:7	14:1
Education <sup>a</sup>	9:6:0	7:7:2	15:5:3	9:6:0
Years in Australia	26.27 (15.61)	30.00 (11.69)	3.63 (9.37)	6.46 (9.51)
Years since trauma	6.09 (8.62)	6.33 (7.96)	7.69 (9.74)	4.24(5.22)
Depression	1.54 (0.35)	2.57 (0.67)	1.85 (0.61)	2.26 (0.57)
Reappraisal	32.80 (5.06)	25.19 (6.64)	27.78 (5.90)	29.53 (8.11)
Expressive Suppression	12.60 (4.70)	18.69 (4.40)	14.87 (4.13)	16.20 (5.49)
Experiential Avoidance	19.40 (7.53)	33.50 (9.19)	23.45 (8.13)	29.80 (9.72)
Worry	42.67 (12.56)	55.69 (14.36)	49.43 (15.60)	47.73 (13.48)
Thought Suppression	41.07 (10.49)	62.34 (9.39)	48.55 (13.18)	55.55 (7.65)
Rumination	43.00 (9.16)	58.38 (12.19)	49.83 (13.19)	58.87 (11.65)
Rumination – Trauma	16.87 (8.43)	34.06 (9.59)	20.07 (10.52)	33.07 (9.10)
General Emotional Dysregulation	65.14 (16.49)	96.04 (27.51)	79.85 (20.37)	88.22 (19.86)

<sup>a</sup>high school:undergraduate diploma/degree:postgraduate.

$F(1,28) = 28.11, p < .001, \eta_p^2 = .50$ . The East Asian PTSD and Caucasian PTSD groups,  $F(1,28) = 1.97, p = .17, \eta_p^2 = .07$ , and East Asian no-PTSD and Caucasian no-PTSD groups,  $F(1,35) = 3.05, p = .09, \eta_p^2 = .08$ , did not differ significantly in terms of depression.

## 2.2. Emotion regulation

As seen in Table 3, for the Caucasian group PTSD symptoms was significantly associated with all of the emotion regulation strategies. In contrast, for the East Asian group only experiential avoidance, thought suppression, habitual rumination and trauma-specific rumination were associated with PTSD symptoms. Furthermore, the correlation coefficients significantly differed between the two cultural groups for reappraisal,  $Z = 1.94, p = .05$ , experiential avoidance,  $Z = 2.29, p = .02$ , worry,  $Z = 1.96, p = .05$ , thought suppression,  $Z = 2.25, p = .02$ , and general emotion dysregulation,  $Z = 2.29, p = .02$ . For both cultural groups, depression was significantly associated with all of the emotion regulation measures.

The culture x diagnosis interactions were significant for reappraisal,  $F(1,69) = 8.80, p < .01, \eta_p^2 = .12$ , expressive suppression,  $F(1,69) = 4.40, p = .04, \eta_p^2 = .06$ , worry,  $F(1, 69) = 4.46, p < .05, \eta_p^2 = .06$ , thought suppression,  $F(1,64) = 7.60, p < .01, \eta_p^2 = .11$ , and general emotional dysregulation,  $F(1, 64) = 5.48, p = .04, \eta_p^2 = .07$ . Follow-up analyses showed that, as predicted, the Caucasian PTSD group reported significantly less use of reappraisal,  $t(29) = 3.58, p = .001, d = 1.29$ , and greater use of expressive suppression,  $t(29) = 3.73, p = .001, d = 1.33$ , worry,  $t(29) = 2.68, p = .01, d = .97$ , thought suppression,  $t(29) = 5.86, p < .001, d = 2.14$ , and emotion dysregulation,  $t(24.80) = 3.76, p = .001, d = 1.36$ , than the Caucasian controls. In contrast, for the East Asian groups reappraisal,  $t(36) = .77, p = .45, d = 0.25$ , expressive suppression,  $t(36) = .85, p = .40, d = .27$ , worry,  $t(36) = .35, p = .73, d = .12$ , thought suppression,  $t(35) = 1.80, p = .08, d = .63$ , and emotion

dysregulation,  $t(35) = 1.24, p = .22, d = .42$ , did not differentiate between East Asians with and without PTSD.<sup>1</sup>

For habitual rumination,  $F(1, 65) = 17.73, p < .001, \eta_p^2 = .21$ , trauma-specific rumination,  $F(1,65) = 41.51, p < .001, \eta_p^2 = .39$ , and experiential avoidance,  $F(1, 64) = 23.23, p < .001, \eta_p^2 = .27$ , the diagnosis main effects were significant; those with PTSD reported significantly greater habitual rumination, trauma-related rumination and experiential avoidance than those without PTSD. The cultural main effects (habitual rumination,  $F(1, 65) = .22, p = .64, \eta_p^2 < .01$ , trauma-specific rumination,  $F(1,65) = .05, p = .82, \eta_p^2 < .001$ , experiential avoidance,  $F(1,64) < .01, p = .93, \eta_p^2 < .001$ ) and interactions (habitual rumination,  $F(1, 65) = .80, p = .37, \eta_p^2 = .01$ , trauma-specific rumination,  $F(1,65) = 1.18, p = .28, \eta_p^2 = .02$ , experiential avoidance,  $F(1,64) = 3.34, p = .07, \eta_p^2 = .05$ ) were all non-significant.

## 3. Discussion

This study explored cultural differences in the use of emotion regulation strategies in East Asian and Caucasian participants with and without PTSD. As predicted, Caucasians with PTSD reported significantly greater expressive suppression, thought suppression, rumination, experiential avoidance and worry, and lower levels of reappraisal than Caucasians without PTSD. Furthermore, for the Caucasian group all of these emotion regulation strategies significantly correlated with PTSD symptoms. However, as predicted, the differences in expressive suppression and worry between East Asians with and without PTSD were less marked than that found for the Caucasian group; indeed, expressive suppression and worry did not differentiate between East Asians with and without PTSD. Additionally, for the East Asian group worry and expressive emotion did not correlate with PTSD symptoms. Contrary to predictions, in both cultural groups those with PTSD reported significantly greater habitual and trauma-

**Table 3.** Correlation coefficients between the main study variables for the overall sample and the East Asian (presented bottom half of the diagonal) and Caucasian (presented top half of the diagonal) groups separately.

Overall Sample	PTSD Symptoms	Depression Symptoms	Reappraisal	Expressive Suppression	Experiential Avoidance	Worry	Thought Suppression	Rumination	Rumination-Trauma	General Emotion Dysregulation
PTSD Symptoms	1.00	.57** [.38-.71]	-.27* [-.50-.01]	.33** [.01-.53]	.54** [.32-.71]	.17 [-.03-.36]	.55** [.38-.70]	.41** [.19-.60]	.65** [.49-.79]	.46** [.23-.63]
Depression Symptoms	-	1.00	-.41** [-.56--.22]	.50** [.33-.66]	.77** [.67-.86]	.50** [.30-.66]	.63** [.48-.75]	.69** [.51-.83]	.65** [.49-.78]	.77** [.64-.86]
Reappraisal	-	-	1.00	-.03 [-.28-.23]	-.29* [-.51--.04]	-.30* [-.53-.05]	-.15 [-.33-.05]	-.25* [-.43-.06]	-.13 [-.33-.11]	-.40** [-.57--.20]
Expressive Suppression	-	-	-	1.00	.60** [.43-.75]	.41** [.20-.60]	.47** [.27-.64]	.48** [.34-.60]	.45** [.29-.61]	.50** [.30-.67]
Experiential Avoidance	-	-	-	-	1.00	.63** [.49-.75]	.70** [.56-.80]	.65** [.51-.75]	.68** [.54-.80]	.78** [.66-.86]
Worry	-	-	-	-	-	1.00	.51** [.29-.69]	.55** [.35-.71]	.38** [.16-.56]	.64** [.47-.78]
Thought Suppression	-	-	-	-	-	-	1.00	.60** [.44-.72]	.75** [.60-.86]	.64** [.49-.76]
Rumination	-	-	-	-	-	-	-	1.00	.67** [.51-.79]	.65** [.47-.79]
Rumination-Trauma	-	-	-	-	-	-	-	-	1.00	.52** [.31-.69]
General Emotion Dysregulation	-	-	-	-	-	-	-	-	-	1.00
<b>Separate Cultural Groups</b>										
Caucasian Group above the diagonal; East Asian Group below the diagonal										
PTSD	1.00	.75** [.60-.86]	-.52** [-.75--.22]	.53** [.27-.75]	.74** [.57-.86]	.43* [.13-.70]	.74** [.62-.89]	.51** [.27-.76]	.70** [.51-.92]	.68** [.46-.82]
Symptoms	.39* [.10-.64]	1.00	-.47** [-.68--.21]	.61** [.39-.80]	.87** [.77-.94]	.67** [.49-.80]	.67** [.47-.85]	.65** [.35-.84]	.69** [.49-.84]	.80** [.59-.90]
Depression	-.08 [-.46-.39]	-.35* [-.58-.05]	1.00	-.46** [-.68--.16]	-.47** [-.71--.20]	-.37* [-.72-.01]	-.37* [-.64--.11]	-.36* [-.61-.05]	-.35 [-.64--.04]	-.46** [-.75--.13]
Symptoms	.12 [-.26-.49]	.38* [.09-.62]	.38* [.01-.67]	1.00	.66** [.44-.81]	.58** [.31-.79]	.50** [.19-.72]	.49** [.26-.69]	.48** [.20-.68]	.65** [.38-.83]
Reappraisal	.35* [-.05-.66]	.67** [.47-.82]	-.11 [-.46-.26]	.50** [.15-.74]	1.00	.67** [.48-.83]	.81** [.63-.92]	.71** [.49-.86]	.81** [.66-.91]	.86** [.71-.94]
Expressive Suppression	-.04 [-.32-.23]	.33* [.01-.64]	-.25 [-.56-.12]	.28 [-.11-.57]	.55** [.33-.74]	1.00	.65** [.43-.82]	.66** [.46-.80]	.59** [.35-.76]	.81** [.69-.89]
Experiential Avoidance	.36* [.01-.56]	.58** [.33-.74]	.07 [-.19-.34]	.43** [.10-.67]	.55** [.32-.73]	.34* [-.03-.67]	1.00	.68** [.50-.82]	.88** [.81-.94]	.75** [.60-.87]
Worry	.37* [.08-.64]	.74** [.50-.89]	-.16 [-.43-.13]	.48** [.26-.67]	.60** [.43-.74]	.43** [.14-.70]	.54* [.26-.75]	1.00	.72** [.50-.85]	.78** [.61-.90]
Thought Suppression	.61** [.36-.79]	.61** [.32-.83]	.07 [-.25-.38]	.42** [.19-.63]	.54** [.27-.75]	.17 [-.15-.49]	.61** [.33-.83]	.64** [.39-.82]	1.00	.70** [.48-.84]
Rumination	.24 [-.12-.53]	.73** [.56-.87]	-.34* [-.56-.05]	.31 [-.03-.58]	.67** [.48-.81]	.43** [.10-.70]	.49** [.20-.72]	.52** [.17-.76]	.31 [-.06-.65]	1.00
Rumination-Trauma										
General Emotion Dysregulation										

PTSD = Posttraumatic stress disorder. \*  $p < .05$ , \*\*  $p < .01$ .

specific rumination than those without PTSD and both forms of rumination significantly correlated with PTSD symptoms. With respect to our exploratory analyses, while East Asians with PTSD reported significantly greater experiential avoidance than East Asians without PTSD, reappraisal, thought suppression and general emotion dysregulation did not differentiate between East Asians with and without PTSD. Additionally, while experiential avoidance and thought suppression significantly correlated with PTSD symptoms in both groups, the correlation coefficients were significantly weaker for the East Asian group when compared to the Caucasian group. Therefore, our findings support the immense research conducted with Western populations identifying these emotion regulation strategies as being associated with PTSD (Seligowski et al., 2015). However, our findings also align with emerging cross-cultural research that has identified cultural differences in the emotion regulation strategies deemed detrimental and associated with poor mental health (De Vaus et al., 2017; Ford & Mauss, 2015).

Contrary to expectations, increased rumination was associated with PTSD in both cultural groups. Thus, the expected cross-cultural difference typically found in healthy populations was not observed. There are two types of rumination: intrusive rumination and deliberate rumination (Blackburn & Owens, 2016). Intrusive rumination is characterized as involuntary or being triggered by a reminder in the environment, and often focuses on 'what if' or 'if only' thoughts, while deliberate rumination involves mindfully choosing to think about past experiences in a non-judgemental manner (Treynor, Gonzalez, & Nolen-Hoeksema, 2003). Deliberate rumination is more consistent with a holistic thinking style and may therefore be the sub-type of rumination used by East Asians when prompted to ruminate (Grossmann & Kross, 2010). Intrusive rumination has been the focus of Western PTSD research (Seligowski et al., 2015), and as such was assessed here. In previous cross-cultural research rumination has often been considered in terms of self-reflection and has been assessed using different measures to that used in the current study (e.g. Grossmann & Kross, 2010). Future research needs to consider the specific type and function of rumination.

Experiential avoidance was found to be associated with PTSD for East Asians. This is consistent with Ehlers and Clark (2000) model of PTSD, which argues that meaningful interactions with internal experiences are necessary in order to develop adaptive appraisals about trauma-related stimuli. However, we found that reappraisal did not differentiate between East Asians with and without PTSD. One potential explanation for this finding is that the reappraisal questionnaire may not capture East

Asians' reappraisal tendencies. The Emotion Regulation Questionnaire frames items in the context of a desire to change current emotional experience. However, East Asian cultures tend to be more accepting of negative emotional experiences and often aim to adapt to current situations (De Vaus et al., 2017). Therefore, the goal of reappraisal may not be to change current emotional experience but rather to develop a holistic understanding of the trauma.

Theoretically, emotion regulation difficulties have been implicated as a key factor in PTSD (Ehlers & Clark, 2000). However, this study suggests that the strategies for regulating emotions may differ between East Asian and Caucasian trauma survivors. This supports recent positions claiming that culture influences the way in which emotions are perceived and appraised, thereby, impacting emotional disorders (De Vaus et al., 2017). There is a need for the integration of PTSD models with cross-cultural models of emotion to better understand emotion regulation in culturally-diverse populations. Additionally, some of the gold-standard measures of emotion regulation used in PTSD research may not capture emotion regulation disruptions in East Asian patients. Clinically, these preliminary findings suggest that there is a need to consider cultural background in the assessment and treatment of emotion regulation in PTSD. Given the preliminary nature of these findings, we cannot make clinical recommendations for culturally tailoring treatment. Rather, there is a clear impetus for the undertaking of further research.

The shortcomings of this study are acknowledged. First, the small sample size may have resulted in the study being insufficiently powered to detect small or medium effect sized interactions. Thus, due to the small sample size and preliminary nature of the study, it cannot be assumed that these findings are generalizable to the larger population. The findings, rather than providing definitive answers to the research questions, convincingly demonstrate a need for further research in this area. Second, this study was conducted in Australia, a predominately Western cultural environment. Thus, our findings may have been influenced by factors such as acculturation. Third, as with all cross-cultural research, language and task understanding must be considered. Fourth, future research should include assessing underpinning mechanisms. Fifth, while the two PTSD groups and two no-PTSD groups did not differ significantly in depression, the interaction was significant. Thus, depression may have influenced the findings. From our correlation analyses it appeared that depression and PTSD symptoms may have differing relationships with emotion regulation. Associated with this we did not assess co-morbidity in the clinical interview. Thus, we cannot be certain of the influence of comorbidity factors in accounting our findings. Sixth,

this study focused on specific emotion regulation strategies. Current literature indicates the importance of emotion regulation flexibility in PTSD (e.g. Levy-Gigi et al., 2016) and the need to consider the use of emotion regulation strategies within the situation, specific emotion, timeframe, and individual's motivation (Jobson et al., 2019; Sheppes & Gross, 2011; Tamir & Ford, 2012). Finally, as a cross-sectional study, no causal inferences can be made. Despite these limitations, this study provides an important first step in exploring cross-cultural differences in the use of emotion regulation strategies in PTSD and highlights the urgent need for further research.

## Note

1. For the non-hypothesis-related follow-up tests, we found that the PTSD groups did not differ significantly for expressive suppression,  $t(29) = 1.40$ ,  $p = .17$ ,  $d = .50$ , worry,  $t(29) = 1.59$ ,  $p = .12$ ,  $d = .57$ , reappraisal,  $t(29) = 1.67$ ,  $p = .11$ ,  $d = .59$ , or general emotion dysregulation,  $t(29) = .91$ ,  $p = .37$ ,  $d = .33$ . However, the East Asian PTSD group reported significantly lower thought suppression than the Caucasian PTSD group,  $t(29) = 2.27$ ,  $p = .03$ ,  $d = .82$ . The no-PTSD groups did not differ significantly for expressive suppression,  $t(36) = 1.57$ ,  $p = .13$ ,  $d = .51$ , worry,  $t(36) = 1.41$ ,  $p = .17$ ,  $d = .63$ , or thought suppression,  $t(35) = 1.84$ ,  $p = .08$ ,  $d = .63$ . However, the Caucasian no-PTSD group reported significantly greater reappraisal,  $t(36) = 2.71$ ,  $p = .01$ ,  $d = .91$ , and lower general emotion dysregulation,  $t(35) = 2.32$ ,  $p = .03$ ,  $d = .79$ , than the East Asian no-PTSD group.

## Disclosure statement

No potential conflict of interest was reported by the authors.

## ORCID

Laura Jobson  <http://orcid.org/0000-0002-1534-897X>

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