TECHNICAL COMMENTARY

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Negative alterations in cognition and mood

Introduction

According to the DSM-5, at least two *"negative alterations in cognitions and mood"* are required for a diagnosis of PTSD. These include negative thoughts or feelings that began or worsened after the trauma, an inability to recall key features of the trauma, overly negative thoughts and assumptions about oneself or the world, exaggerated blame of self or others for causing the trauma, negative affect (e.g., fear, horror, anger, guilt, or shame), decreased interest in activities, feeling isolated, and difficulty experiencing positive affect.

Method

We have included only systematic reviews (systematic literature search, detailed methodology with inclusion/exclusion criteria) published in full text, in English, from the year 2010 that report results separately for people with a diagnosis of PTSD. Reviews were identified by searching the databases MEDLINE, EMBASE, and PsycINFO. Hand searching reference lists of identified reviews was also conducted. Reviews with pooled data are prioritised for inclusion.

Review reporting assessment was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist that describes a preferred way to present a meta-analysis[1]. Reviews with less than 50% of items checked have been excluded from the library. The PRISMA flow diagram is a suggested way of providing information about studies included and excluded with reasons for exclusion. Where no flow diagram has been presented by individual reviews, but identified studies have been described in the text, reviews have been checked for this item. Note that early reviews may have been guided by less stringent reporting checklists than the PRISMA, and that some reviews may have been limited by journal guidelines.

Evidence was graded using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) Working Group approach where high quality evidence such as that gained from randomised controlled trials (RCTs) may be downgraded to moderate, low or very low if review and study quality is limited, if there is inconsistency in results, indirect comparisons, imprecise or sparse data and high probability of reporting bias. It may also be downgraded if risks associated with the intervention or other matter under review are high. Conversely, low quality evidence such as that gained from observational studies may be upgraded if effect sizes are large, there is a dose dependent response or if results are reasonably consistent, precise and direct with low associated risks (see end of table for an explanation of these terms)[2]. The resulting table represents an objective summary of the available evidence, although the conclusions are solely the opinion of staff of NeuRA (Neuroscience Research Australia).

Results

We found six systematic reviews that met our inclusion criteria[3-8].

- Moderate to low quality evidence finds five relevant clusters of items pertaining to negative alterations in cognition and mood. These are; decreased interest, detachment, restricted affect, foreshortened future, and guilt/shame.
- Decreased interest items include; *I lost interest in activities which used to mean a lot to me, I lost interest in my usual activities, I lost interest in free time activities that used to be important to me, I lost interest in social activities,* and *I lost interest in activities that I used to enjoy.*
- Detachment items include; *I felt distant or cut off from people,* and *no one, not even my family, understood how I felt.*

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- Restricted affect items include; *I was not able to feel normal emotions, it seemed as if I have no feelings, I felt emotionally numb, I felt unemotional about everything,* and *I was unable to have loving feelings for people who are close to me.*
- Foreshortened future items include; *I felt as if my plans for the future would not come true, I felt that I had no future, Making long term plans seemed meaningless to me, I felt as if I don't have a future,* and *I felt as if my future would somehow be cut short.*
- Guilt items include; *I felt guilty, I felt ashamed of the traumatic events that happened to me, I blamed myself, I felt guilt over things I did around the time of the event, and I felt guilty for having survived.*
- Moderate quality evidence finds support for an association between increased shame and increased PTSD symptoms. There were also relationships between symptoms and increased guilt, particularly perceived wrongdoing and self-blame.
- Moderate to high quality evidence found a large relationship between increased dysfunctional appraisals of trauma and increased PTSD symptoms in children and adolescents.
- Moderate quality evidence finds increased emotional numbing is associated with poorer mental health in general, poor social functioning, and more substance use and aggression in veterans. More emotional numbing however was also associated with more treatment initiation and better treatment retention.
- Moderate to low quality evidence found decreased reward anticipation and approach and decreased hedonic responses in people with PTSD. Decreased reward functioning was seen more in females than in males and most often in response to social positive stimuli.

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Del Vecchio N, Elwy AR, Smith E, Bottonari KA, Eisen SV

Enhancing self-report assessment of PTSD: development of an item bank

Journal of Traumatic Stress 2011; 24: 191-9

View review abstract online

Comparison	**Self-report items relating to the PTSD symptom cluster of negative alterations in cognition and mood.**
Summary of evidence	**Moderate to low quality evidence (direct, unclear sample size, unable to assess consistency or precision) finds five relevant items; decreased interest, detachment, restricted affect, foreshortened future, and guilt.**

Items assessed on:

Acute Stress Disorder Scale (ASDS), Anxiety and Depression Detector (ADD), Beck Anxiety Inventory – Primary Care (BAI-PC), Seven Symptom Scale - Short Screening Scale for PTSD, Davidson Trauma Scale (DTS) , Detailed Assessment of Posttraumatic Stress (DAPS), Harvard Trauma Questionnaire (HTQ), Impact of Event Scale-Revised (IES-R), Late Effect of Accidental Injury Questionnaire, Los Angeles Symptom Checklist (LASC), Millon Clinical Multiaxial Inventory-III (MCMI-III), MMPI-2 Keane PTSD subscale, Mississippi Scale for Combat Related PTSD, Modified PTSD Symptom Scale (MPSS), National Anxiety Disorder Day Screen, National Women's Study-PTSD module (NWS-PTSD), Penn Inventory, Peritraumatic Distress Inventory (PDI), Posttraumatic Chronic Pain Test (PCPT), Posttraumatic Cognitions Inventory (PTCI), Posttraumatic Stress Scale (PTSS-10,14), Primary Care PTSD Screen (PC-PTSD), Psychiatric Diagnostic Screening Questionnaire (PDSQ), PTSD Checklist (PCL all versions), PTSD Diagnostic Scale (PDS), PTSD Inventory, PTSD Screening and Diagnostic Scale (PSDS), PTSD Symptom Scale-Self-Report (PSS-SR), Problem Checklist, Project IMPACT PTSD Screener, Purdue Posttraumatic Scale (PPS), Responses to Script-Driven Imagery Scale (RSDI), Revised Civilian Mississippi Scale for PTSD (R-CMS), Screen for Posttraumatic Stress Disorder (SPTSS), Short Post-Traumatic Stress Disorder Rating Interview, expanded version (SPRINT-E), Trauma Screening Questionnaire (TSQ), Trauma Stress Schedule (TSS), Traumatic Stress Symptom Checklist (TSSC), Trauma Symptom Checklist-40 (TSC-40), Trauma Symptom Inventory (TSI), UK PTSS-14

275 studies, N not reported

Decreased Interest

I lost interest in activities which used to mean a lot to me

I lost interest in my usual activities

I lost interest in free time activities that used to be important to me

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I lost interest in social activities
I lost interest in activities that I used to enjoy
Detachment
I felt distant or cut off from people
No one, not even my family, understood how I felt
Restricted Affect
I was not able to feel normal emotions
It seemed as if I have no feelings
I felt emotionally numb
I felt unemotional about everything
I was unable to have loving feelings for people who are close to me
Foreshortened Future
I felt as if my plans for the future would not come true
I felt that I had no future
Making long term plans seemed meaningless to me
I felt as if I don't have a future
I felt as if my future would somehow be cut short
Guilt
I felt guilty
I felt ashamed of the traumatic events that happened to me
I blamed myself
I felt guilt over things I did around the time of the event
I felt guilty for having survived

Consistency in results‡	Unable to assess; no measure of consistency is reported.
Precision in results§	Unable to assess; no measure of precision is reported.
Directness of results‖	Direct

Mitchell R, Brennan K, Curran D, Hanna D, Dyer KF

A Meta-Analysis of the Association Between Appraisals of Trauma and Posttraumatic Stress in Children and Adolescents

Journal of Traumatic Stress 2017; 30: 88-93

View review abstract online	
Comparison	**Dysfunctional appraisals of trauma in children and adolescents with PTSD.**
Summary of evidence	**Moderate to high quality evidence (large sample size, inconsistent, precise, direct) found a large effect size of increased dysfunctional appraisals and increased PTSD symptoms.**
Dysfunctional appraisals of trauma **Most studies used the Child Posttraumatic Cognitions Inventory (CPTCI) or the Negative Appraisals of Sexual Abuse Scale (NASAS)**	
A large effect size between increased dysfunctional appraisals and increased PTSD symptoms; 11 studies, N = 1,578, r = 0.58, 95%CI 0.47 to 0.67, $p < 0.001$, $I^2 = 88\%$ The result was similar after removal of one outlier, and there were no moderating effects of appraisal measure.	
Consistency in results	Inconsistent
Precision in results	Precise
Directness of results	Direct

Nawijn L, van Zuiden M, Frijling JL, Koch SB, Veltman DJ, Olff M

Reward functioning in PTSD: a systematic review exploring the mechanisms underlying anhedonia

Neuroscience and Biobehavioral Reviews 2015; 51: 189-204

View review abstract online

Comparison	**Reward functioning (as a reflection of anhedonia; inability to feel pleasure) in people with PTSD vs. controls.**
Summary of evidence	**Moderate to low quality evidence (direct, mixed sample sizes, unable to assess consistency or precision) found mixed results, although generally, there was decreased reward anticipation and approach and reduced hedonic responses in people with PTSD. Decreased reward functioning was seen more in females than males and most often in response to social positive stimuli.**

Negative alterations in cognition and mood

Reward motivation (wanting)
The following studies had significant results; 1 study (N = 308) of civilians found increased avoidance and hyperarousal PTSD symptoms, but not reexperiencing or dysphoria symptoms, were related to increased sensitivity to reward scores. 1 study (N = 851) of civilians found increased PTSD symptoms were related to lower reward responsiveness and increased drive. There was no relationship with fun seeking. 1 study (N = 23) of civilians found lower increase in heart rate and skin conductance in response to monetary reward in people with PTSD than those without PTSD. 1 study (N = 23 of civilians found slower reaction times in those with PTSD during approach trials over time and slower reaction times in non-monetary-rewarded approach trials, but not monetary reward approach trials compared to those without PTSD. 1 study (N = 23) of veterans found those with PTSD had fewer key presses to prolong watch time of attractive female faces than those without PTSD. 1 study (N = 26) of veterans found those with PTSD had lower self-reported monetary reward expectation than those without PTSD. *The following studies had no significant results;* 1 study (N = 291) of civilians found PTSD symptoms were not related to reward responsiveness, drive, or fun seeking. 1 study (N = 100) of civilians found no differences in reaction times on approach trials on a Stop-signal task. 1 study (N = 46) of veterans found no differences in reward responsiveness. 1 study (N = 72) of veterans found PTSD symptoms were not related to reaction times in approach trials on an affective Go-No go task. 1 study (N = 38) of veterans found no differences in reaction time to approach trials on a Go-No go task. 1 study (N = 73) of veterans found no differences in reaction times on approach trials on a Go-No go task. 1 study (N = 79) of veterans found no differences in reaction time to approach trials on a Stop-signal anticipation task, and no differences in brain responses during approach trials vs. rest. 1 study (N = 46) of veterans found no differences in approach to monetary reward on the Iowa gambling task.
Reward consumption (liking)
The following studies had significant results; 1 study (N = 32) of civilians found lower positive rating of happy faces and lower positive feeling in response to happy faces in a direct/averted gaze to facial expressions task.

1 study (N = 146) of civilians found slower event related potentials to happy faces in the midline posterior and right frontal EEG leads in an emotional face-recognition task. There were no differences in height of event related potentials to happy faces.

1 study (N = 38) of civilians found higher amygdala reactivity to happy faces vs. neutral faces in a masked facial affect paradigm. There were no differences in the insula, hippocampus, parahippocampal gyrus, ventromedial prefrontal cortex, orbitofrontal cortex, and anterior cingulate cortex superior ventral cortex.

1 study (N = 90) of civilians found lower self-reported experience of pleasure towards pleasurable activities.

1 study (N = 106) of civilians found lower positive emotion response to narration of positive social and non-social autobiographical events. There was lower neural reactivity in the left dorsomedial prefrontal cortex and a trend for lower reactivity in the temporal pole to narration of positive social autobiographical events. There was also higher neural reactivity in the left insula to narration of positive non-social autobiographical events.

1 study (N = 16) of civilians found higher neural reactivity in the right posterior temporal (BA39), right precentral (BA6) and right superior frontal gyrus (BA10) during passive viewing of a positive valence Walt Disney cartoon. There was lower neural reactivity in bilateral temporal pole (BA38), and left fusiform/parahippocampal gyrus (BA20/36) to positive valence Walt Disney cartoon.

1 study (N = 26) of veterans found lower self-reported monetary reward satisfaction in a Wheel-of-Fortune task in those with PTSD than those without PTSD.

1 study (N = 73) of veterans found lower pleasantness ratings of positive images in an affective image response task in those with PTSD than those without PTSD.

1 study (N = 42) of veterans found lower arousal ratings of positive images in males and females on Lang's looking-at-pictures test. There were no differences in pleasantness rating for positive images in males, but lower pleasantness ratings for positive images in females.

1 study (N = 33) of veterans found lower vertex positive potentials to happy faces in an emotional face-matching task. There were no differences in late positive potentials to happy faces.

The following studies found no differences between groups;

1 study (N = 36) of civilians found no differences in pleasantness ratings, positive emotional behavior or cardiovascular responses to positive images on Lang's looking-at-pictures test.

1 study (N = 16) of veterans found no differences in pleasantness rating or positive emotional responses during passive smelling of a positive odor.

1 study (N = 23) of veterans found no differences in attractiveness ratings of attractive faces of opposite sex in a beautiful faces paradigm.

1 study (N = 46) of veterans found PTSD symptoms were not related to neural reactivity to implicitly shown happy faces vs. neutral shapes.

1 study (N = 124) of veterans found no differences in pleasantness or arousal ratings of positive

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pictures on Lang's looking-at-pictures test. 1 study (N = 56) of veterans found no differences in neural reactivity towards positive vs. neutral pictures on an IAPS image rating task. 1 study (N = 25) of veterans found no differences in pleasantness or arousal ratings of positive images in an IAPS image rating task, and no differences in physiological responses to positive images (heart rate, skin conductance, frontalis muscle tension). 1 study (N = 51) of veterans found no differences in pleasantness or arousal rating of positive images on an IAPS image rating task, and no differences in zygomatic expressive-motor response or skin conductance to positive images.

Consistency in results	Unable to assess; no measure of consistency is reported.
Precision in results	Unable to assess; no measure of precision is reported.
Directness of results	Direct

Pugh LR, Taylor PJ, Berry K

The role of guilt in the development of post-traumatic stress disorder: A systematic review

Journal of Affective Disorders 2015; 182: 138-50

View review abstract online

Comparison	**Relationship between guilt and PTSD symptoms.**
Summary of evidence	**Moderate quality evidence (direct, mixed sample sizes, appears consistent, unable to assess precision) finds relationships between increased guilt and increased PTSD symptomology, particularly for perceived wrongdoing and self-blame. However, these associations are possibly confounded by feelings of shame.**

Guilt

Personal Feelings Questionnaire (PFQ), Combat Guilt Scale (CGS), Laufer-Parson Inventory (LPI), Attitudes About Guilt Survey (AAGS), Sources of Trauma Related Guilt Survey-War Zone version (STRGS-WZ) and Partner Abuse version (STRGS-PA), Abuse Related Beliefs Questionnaire (ARBQ), State Shame and Guilt Inventory (SSGI), Revised Gudjonsson Blame Attribution Inventory (GBAI), Questionnaire on Specific Guilt (QSG), Guilt Inventory (GI), Test of Self-Conscious Affect (TOSCA), Adapted version of the TOSCA (TOSCA-3), Trauma-Related Guilt Inventory (TRGI).

Guilt and/or shame were related to PTSD;

1 study (N = 75) of civilians found increased self-blame correlated with increased PTSD symptoms. External attributions of responsibility negatively correlated with PTSD symptoms. Reduction in guilt corresponded with reduction in PTSD symptoms overtime.

1 study (N = 63) of civilians found trauma-related guilt was associated directly and indirectly through avoidant coping with PTSD symptomology.

1 study (N = 45) of civilians found guilt cognitions and attributions correlated with trauma-related PTSD symptomology.

1 study (N = 63) of civilians found guilt-related distress and cognitions were positively associated with PTSD severity.

1 study (N = 650) of civilians found guilt was correlated significantly with PTSD symptomology.

1 study (N = 35) of civilians found guilt proneness and event guilt was related to trauma symptoms but not after controlling for shame.

1 study (N = 140) of civilians found PTSD symptoms were related to guilt only with high levels of shame. There was no association with guilt after controlling for shame.

1 study (N = 63) of civilians found shame, but not guilt, was a significant predictor of PTSD symptoms.

1 study (N = 50) of civilians found trauma-related guilt cognitions were related to PTSD symptoms and mediated the relationship between exposure and PTSD symptomology.

1 study (N = 108) of veterans found medium to large effects that event-related guilt and belief about role in trauma correlated with increased PTSD symptom severity.

1 study (N = 142) of veterans found small to medium-sized effects that event-related guilt correlated with increased PTSD symptom severity.

1 study (N = 40) of veterans found small to medium-sized effects that event-related guilt correlated with increased PTSD symptom severity, particularly re-experiencing and avoidance.

1 study (N = 74) of veterans found increased guilt scores were related to increased PTSD symptoms.

1 study (N = 151) of veterans found increased guilt and perceived wrongdoing was related to increased PTSD symptoms. There was no association between guilt cognitions and intrusion symptoms.

1 study (N = 240) of veterans found higher physiological responses to trauma-related cues was associated with greater PTSD severity and guilt.

1 study (N = 99) of veterans found beliefs about wrongdoing significantly correlated with PTSD symptoms.

1 study (N = 174) of veterans found guilt correlated with PTSD symptoms and was a significant predictor of PTSD severity.

1 study (N = 1,323) of veterans found combat-related guilt partially mediated the association between exposure to violence and PTSD symptoms and completely mediated it when directly

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participating. 1 study (N = 107) of veterans found shame, but not guilt, was a significant predictor of PTSD symptoms. 1 study (N = 174) of veterans found trauma-related guilt was positively related to self-reported (not clinician reported) PTSD severity. *The following studies found no significant associations;* 1 study (N = 129) found no associations between PTSD symptoms and guilt related to abuse.

Consistency in results	Appears consistent.
Precision in results	Unable to assess; no CIs were reported.
Directness of results	Direct

Saraiya T, Lopez-Castro T

Ashamed and afraid: A scoping review of the role of shame in post-traumatic stress disorder (PTSD)

Journal of Clinical Medicine 2016; 5: 94

View review abstract online

Comparison	**Relationship between shame and PTSD symptoms.**
Summary of evidence	**Moderate quality evidence (direct, mixed sample sizes, appears consistent, unable to assess precision) finds support for an association between increased shame and increased PTSD symptoms.**

Shame
1 study (N = 325) of civilians found past month trauma-related shame and guilt was associated with increased PTSD symptoms. Greater severity of trauma-related shame or guilt was associated with greater symptom severity. 1 study (N = 157) of civilians found shame and anger predicted PTSD symptoms at 1-month after crime victimisation. Post-traumatic shame and 1-month PTSD symptoms predicted 6-months PTSD symptoms. Post-traumatic shame mediated childhood abuse and 6-months PTSD symptoms. 1 study (N = 1,522) of civilians found peritraumatic anger, shame, and fear predicted assault related-PTSD. Peritraumatic shame was more associated with assult related-PTSD in women; peritraumatic fear was more associated with assult related-PTSD in men.

1 study (N = 63) of civilians found trait shame, guilt-related distress, and guilt cognitions positively correlated with PTSD symptoms. Shame was positively correlated with higher levels of emotional and verbal abuse. Women with interpersonal violence marked by high dominance/isolation or emotional/verbal abuse and high shame had higher PTSD severity. Guilt was not a significant moderator.

1 study (N = 109) of civilians found trait shame and depression predicted negative thoughts of the self; shame had a larger effect size than depression. Higher guilt was associated with negative thoughts of the world. Higher levels of trait shame and guilt but lower levels of depression were associated with greater self-blame.

1 study (N = 88) of civilians found shame-proneness was positively associated with higher levels of PTSD and depression symptoms. Depression was predicted by shame-proneness and HIV-related stigma whereas PTSD was predicted by HIV-related stigma and avoidant coping.

1 study (N = 152) of civilians found explicit shame and guilt were significantly different across groups; the PTSD group had the highest and the non-traumatised group had the lowest. No differences in implicit shame were found between the PTSD group and the traumatised/no PTSD group.

1 study (N = 138) of civilians found trauma-related shame experienced by a subset of participants was a significant predictor of PTSD.

1 study (N = 55) of civilians found assault-related shame, guilt, and suicidal ideation were present in the majority of rape survivors.

1 study (N = 428) of civilians found posttraumatic shameful appraisals predicted PTSD in college students and female survivors of child abuse or interpersonal crime. Posttraumatic shameful appraisals did not predict PTSD in a nonsexual interpersonal violence sample.

1 study (N = 144) of civilians found peritraumatic fear, anger, and shame were the top three predictors of avoidance and numbing symptoms. Peritraumatic guilt, fear, and anger predicted re-experiencing; shame did not. Peritraumatic guilt and shame were the strongest predictors of PTSD hyperarousal symptoms.

1 study (N = 65) of civilians found a clinical dissociation group had significantly higher levels of trait shame and guilt and state shame, guilt, and pride than a subclinical dissociation group. Dissociation, trait/state shame, and trait/state guilt significantly predicted complex PTSD.

1 study (N = 55) of civilians found child maltreatment significantly contributed to trait shame, and child abuse and neglect significantly contributed to trait guilt. Emotional abuse was the strongest predictor of both trait shame and trait guilt.

1 study (N = 97) of civilians found those with child sexual abuse identified more body areas as associated with traumatic experiences. Psychiatrically diagnosed groups rated trauma-related body areas to have more body-related shame, guilt, and disgust compared to the healthy controls.

1 study (N = 137) of civilians found trauma-related shame was a significant mediator between abuse attributions, both after the traumatic event and one year later, with both PTSD and depression symptoms.

1 study (N = 147) of civilians found trauma-related shame at abuse discovery was a small predictor of

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PTSD, depression, and low self-esteem, but trauma-related shame one year after abuse was a strong predictor of PTSD, depression, and low self-esteem. Girls showed more shame than boys at the time of abuse, but decreased in shame over a year. Boys did not show a significant decrease in shame from abuse discovery to one year later.

1 study (N = 118) of civilians found trauma-related shame one year after child sexual abuse predicted high trauma-related shame six years after child sexual abuse and PTSD symptoms of hyperarousal, intrusive recollections, and avoidance. Children low in trauma-related shame have better treatment prognosis.

1 study (N = 27) of civilians found shame-proneness was the only predictor of autonomic arousal in a trauma reminder task. Inactivation of the peripheral nervous system in PTSD patients was associated with fear and shame at baseline, anxiety and shame during the task, and shame during recovery period. Trait shame predicted lower respiratory sinus arrhythmia during recovery suggesting difficulty regulating affect after trauma reminders. State shame was the only predictor of lower respiratory sinus arrhythmia during the task, more so than fear and anxiety.

1 study (N = 110) of civilians found the multiple trauma group reported more recent shame experiences than the single trauma group, independent of PTSD severity. Association between shame and childhood versus adult trauma group did not hold after controlling for PTSD severity.

1 study (N = 49) of civilians found shame-proneness was positively correlated with self-criticising thinking style after controlling for severity of PTSD and depressive symptoms.

1 study (N = 72) of civilians found trauma-related shame provided direct and indirect (through avoidant coping) pathways for the relationship between trauma-related guilt and PTSD severity.

1 study (N = 99) of civilians found peritraumatic shame mediated the relationship between trauma type and number of potentially traumatic events and PTSD symptoms.

1 study (N = 75) of civilians found trait shame did not significantly differ between reckless drivers who had caused an accidental death and the control group.

1 study (N = 137) of civilians found coherence between facial and verbal shame expression correlated with PTSD severity in a non-disclosing group of child sexual abuse survivors.

1 study (N = 45) of civilians found state shame, but not trait shame, correlated with PTSD symptoms.

1 study (N = 156) of civilians found shame-proneness independent of guilt-proneness, predicted PTSD symptoms whereas guilt independent of shame did not.

1 study (N = 140) of civilians found event-related shame predicted PTSD symptoms.

1 study (N = 103) of civilians found trait shame accounted for the association between posttraumatic symptoms and aggressive behavior whereas trait guilt did not.

1 study (N = 35) of civilians found both shame-proneness and event-related shame were positively correlated with severity of posttraumatic distress. Level of event-related shame mediated the effect of shame-proneness on posttraumatic symptoms.

1 study (N = 47) of civilians found speed of implicit shame processing and PTSD severity were

negatively correlated. Shame processing mediated the relationship between PTSD severity and frequency of interpersonal perpetration.

1 study (N = 32) of civilians found both trauma-related shame and guilt were positively correlated with PTSD severity.

1 study (N = 63) of civilians found shame-proneness significantly predicted of PTSD symptoms, and guilt-proneness did not.

1 study (N = 172) of civilians found event-related shame directly predicted PTSD, whereas attribution style did not.

1 study (N = 25) of civilians found shame positively correlated with traumatic stress.

1 study (N = 69) of military personnel found guilt and trait shame were higher in military personnel with a history of suicidal ideation. Both guilt and trait shame mediated the relationship between PTSD or depression and suicidal ideation; guilt had a stronger relationship with suicidal ideation.

1 study (N = 127) of veterans found PTSD predicted trait shame and global guilt. When controlling for global guilt, shame partially mediated PTSD symptoms and verbal aggression.

1 study (N = 107) of veterans found shame-proneness, but not guilt-proneness, positively correlated with PTSD severity.

The following studies found no significant associations with shame;

1 study (N = 264) of veterans found trait shame mediation of PTSD and interpersonal violence perpetration relationship were not significant when depression was taken into account.

1 study (N = 38) of civilians found no correlation between shame-proneness and PTSD severity once depression severity was controlled for. Similar findings were found for guilt-proneness.

1 study (N = 67) of civilians found shame-proneness predicted depression, but not PTSD symptoms or anxiety. Guilt was a significant predictor of PTSD symptoms, depression, and anxiety.

Consistency in results	Appears consistent.
Precision in results	Unable to assess; no CIs are reported.
Directness of results	Direct

Schuman DL, Bricout J, Peterson HL, Barnhart S

A systematic review of the psychosocial impact of emotional numbing in US combat veterans

Journal of Clinical Psychology 2019; 75: 644-63

View review abstract online

Comparison	Relationship between emotional numbing and symptoms and functioning in veterans.
Summary of evidence	Moderate quality evidence (direct, mixed sample size, appears consistency and precise) finds increased emotional numbing is associated with poorer mental health, social functioning, substance use, and aggression, but more treatment initiation and retention.

Emotional numbing and symptoms and functioning

Measured on the Posttraumatic Stress Disorder Checklist (PCL), the Clinician-Administered PTSD Scale for DSM-IV (CAPS), or the Davidson Trauma Scale (DTS)

Mental health

1 study (N = 267) found a small effect that greater severity of emotional numbing predicted symptom non-improvement (OR = 0.93, 95%CI 0.87 to 0.99).

1 study (N = 1,484) found medium-sized effects that greater severity of emotional numbing predicted more suicidal ideation (β = 0.69), depression (β = 0.69), anxiety (β = 0.68), worse mental health-related functioning (β = -0.70), and worse quality of life (β = -0.60).

1 study (N = 150) controlled for depression symptoms and found a medium-sized effect that greater severity of emotional numbing predicted negative cognitions about self (β = 0.58), with a small relationship with self-blame (β = 0.10).

1 study (N = 233) found a medium-sized effect that greater severity of emotional numbing predicted poorer mental health (β = -0.50).

1 study (N = 318) found a medium-sized effect that greater severity of emotional numbing predicted poorer mental health quality of life (β = -0.32).

Social functioning

1 study (N = 249) found a small effect that greater emotional numbing symptom severity predicted partners' desire for changes in intimacy (β = 0.18).

1 study (N = 92) found a small effect that greater severity of emotional numbing predicted social skills deficits (β = 0.17).

1 study (N = 128) found medium-sized effects that greater severity of emotional numbing predicted less dyadic adjustment (*r* = -0.46), constructive communication (*r* = -0.31), and intimacy (*r* = -0.45).

1 study (N = 219) found small effects that greater severity of emotional numbing predicted poorer relationship functioning (β = -0.26), and relationship satisfaction (β = -0.14).

1 study (N = 137) found a small to medium-sized effect that greater severity of emotional numbing predicted higher scores on functioning in romantic relationships (β = 0.327).

1 study (N = 943) found medium-sized effects that more emotional numbing symptom severity predicted poorer social functioning (*b* = -0.68), and general health (*b* = -0.49).

1 study (N = 233) found a medium-sized effect that greater severity of emotional numbing predicted

poorer social functioning (β = -0.65).

Substance use

1 study (N = 478) found greater emotional numbing symptom severity predicted greater alcohol misuse.

1 study (N = 634) found greater emotional numbing symptom severity predicted hazardous drinking in females.

1 study (N = 24) found a small effect that greater emotional numbing symptom severity predicted greater next day alcohol craving (*b* = 0.06).

1 study (N = 863) found greater emotional numbing symptom severity predicted greater smoking intensity.

Aggression

1 study (N = 1,090) found a small effect that greater emotional numbing symptom severity predicted anger and irritability (OR = 1.36).

1 study (N = 97) found a small effect that greater emotional numbing symptom severity predicted aggression (*r* = 0.21).

1 study (N = 359) found small effects that greater severity of emotional numbing predicted more suicidal ideation (β = 0.28), and aggression (β = 0.05).

1 study (N = 866) did not find correlations between emotional numbing and aggression.

Treatment factors

1 study (N = 137) found a small effect that emotional numbing predicted treatment retention (OR = 1.15, 95%CI 1.06 to 1.24).

1 study (N = 52,456) found small effects that higher emotional numbing predicted less wait times for treatment (OR = 0.98, 95%CI 0.97 to 0.99), more treatment initiation (OR = 1.15, 95%CI 1.11 to 1.19), and greater number of psychotherapy visits (IRR = 1.09, 95%CI 1.08 to 1.11).

Gender and ethnic differences

1 study (N = 2,341) found a small effect of higher emotional numbing in men than in women (*d* = 0.14).

1 study (N = 79,938) found small effects that Asian/Pacific Islander women (OR = 1.65, 95%CI 1.80 to 2.30), Hispanic women (OR = 1.23, 95%CI 1.04 to 1.45), and Black men (OR = 1.09, 95%CI 1.03 to 1.15) were more likely to endorse emotional numbing than White people.

Consistency in results	Appears consistent.
Precision in results	Precise where CIs are reported.
Directness of results	Direct

Explanation of acronyms

CI = confidence interval, *d* = Cohen's d, standardised mean difference between groups, N = number of participants, OR = odds ratio, *r, b,* β = correlation coefficients, vs. = versus

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Explanation of technical terms

* Bias has the potential to affect reviews of both RCT and observational studies. Forms of bias include; reporting bias – selective reporting of results; publication bias - trials that are not formally published tend to show less effect than published trials, further if there are statistically significant differences between groups in a trial, these trial results tend to get published before those of trials without significant differences; language bias – only including English language reports; funding bias - source of funding for the primary research with selective reporting of results within primary studies; outcome variable selection bias; database bias - including reports from some databases and not others; citation bias - preferential citation of authors. Trials can also be subject to bias when evaluators are not blind to treatment condition and selection bias of participants if trial samples are small[9].

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† Different effect measures are reported by different reviews.

Prevalence refers to how many existing cases there are at a particular point in time. Incidence refers to how many new cases there are per population in a specified time period. Incidence is usually reported as the number of new cases per 100,000 people per year. Alternatively some studies present the number of new cases that have accumulated over several years against a person-years denominator. This denominator is the sum of individual units of time that the persons in the population are at risk of becoming a case. It takes into account the size of the underlying population sample and its age structure over the duration of observation.

Reliability and validity refers to how accurate the instrument is. Sensitivity is the proportion of actual positives that are correctly identified (100% sensitivity = correct identification of all actual positives) and specificity is the proportion of negatives that are correctly identified (100% specificity = not identifying anyone as positive if they are truly not). A receiver operating characteristic (ROC) curve represents sensitivity/specificity pairs corresponding to different cut-off values. A guide for interpreting the area under the curve (AUC) statistic is; 0.90 to 1.00 = excellent, 0.80 to 0.90 = good, 0.70 to 0.80 = fair, 0.60 to 0.70 = poor, and 0.50 to 0.60 = fail.

Weighted mean difference scores refer to mean differences between treatment and comparison groups after treatment (or occasionally pre to post treatment) and in a randomized trial there is an assumption that both groups are comparable on this measure prior to treatment. Standardized mean differences are divided by the pooled standard deviation (or the standard deviation of one group when groups are homogenous) that allows results from different scales to be combined and compared. Each study's mean difference is then given a weighting depending on the size of the sample and the variability in the data. 0.2 represents a small effect, 0.5 a moderate effect, and 0.8 and over represents a large effect[9].

Odds ratio (OR) or relative risk (RR) refers to the probability of a reduction (< 1) or an increase (> 1) in a particular outcome in a treatment group, or a group exposed to a risk factor, relative to the comparison group. For example, a RR of 0.75 translates to a reduction in risk of an outcome of 25% relative to those not receiving the treatment or not exposed to the risk factor. Conversely, a RR of 1.25 translates to an increased risk of 25% relative to those not receiving treatment or not having been exposed to a risk factor. A RR or OR of 1.00 means there is no difference between groups. A medium effect is considered if RR > 2 or < 0.5 and a large

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effect if RR > 5 or < 0.2[10]. lnOR stands for logarithmic OR where a lnOR of 0 shows no difference between groups. Hazard ratios measure the effect of an explanatory variable on the hazard or risk of an event.

Correlation coefficients (eg, r) indicate the strength of association or relationship between variables. They can provide an indirect indication of prediction, but do not confirm causality due to possible and often unforseen confounding variables. An r of 0.10 represents a weak association, 0.25 a medium association and 0.40 and over represents a strong association. Unstandardized (*b*) regression coefficients indicate the average change in the dependent variable associated with a 1 unit change in the independent variable, statistically controlling for the other independent variables. Standardized regression coefficients represent the change being in units of standard deviations to allow comparison across different scales.

‡ Inconsistency refers to differing estimates of effect across studies (i.e. heterogeneity or variability in results) that is not explained by subgroup analyses and therefore reduces confidence in the effect estimate. I^2 is the percentage of the variability in effect estimates that is due to heterogeneity rather than sampling error (chance) - 0% to 40%: heterogeneity might not be important, 30% to 60%: may represent moderate heterogeneity, 50% to 90%: may represent considerable heterogeneity and over this is considerable heterogeneity. I^2 can be calculated from Q (chi-square) for the test of heterogeneity with the following formula[9];

$$I^2 = \left(\frac{Q - df}{Q}\right) \times 100\%$$

§ Imprecision refers to wide confidence intervals indicating a lack of confidence in the effect estimate. Based on GRADE recommendations, a result for continuous data (standardised mean differences, not weighted mean differences) is considered imprecise if the upper or lower confidence limit crosses an effect size of 0.5 in either direction, and for binary and correlation data, an effect size of 0.25. GRADE also recommends downgrading the evidence when sample size is smaller than 300 (for binary data) and 400 (for continuous data), although for some topics, these criteria should be relaxed[11].

‖ Indirectness of comparison occurs when a comparison of intervention A versus B is not available but A was compared with C and B was compared with C that allows indirect comparisons of the magnitude of effect of A versus B. Indirectness of population, comparator and/or outcome can also occur when the available evidence regarding a particular population, intervention, comparator, or outcome is not available and is therefore inferred from available evidence. These inferred treatment effect sizes are of lower quality than those gained from head-to-head comparisons of A and B.

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