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Predictors of moral injury in UK treatment seeking veterans

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ABSTRACT

Background: Moral injury is known to be associated with mental health difficulties in US military populations, however its impact on wellbeing in a UK Armed Forces (AF) context is less well understood. Additionally, it is not clear whether other factors known to affect service personnel's mental health, such as adverse childhood experiences (ACEs) or military trauma, may influence whether personnel experience moral injury.
Aim: To examine the relationship between moral injury and ACEs, adverse military events as well as the impact of moral injury on the mental health of UK AF veterans.
Method: A nationally representative sample of UK AF veterans seeking psychological treatment (n = 177) were recruited. Participants completed self-report psychometric measures and expressions of moral injury, ACEs and traumatic in-service events.
Results: Analyses yielded a significant association between ACEs and veteran expressions of moral injury ($p < .001$). A significant although weak relationship was found between veteran expressions of moral injury and experiencing adverse events during military service, including physical abuse (AOR 1.04; 95 % CI 1.02−1.06) and emotional abuse (AOR 1.03; 1.01−1.05). Those meeting criteria for mental health disorders, including probable posttraumatic stress disorder (AOR 1.09; 95 % CI 1.05−1.12), were significantly more likely to report expressions of moral injury.
Conclusions: These results illustrate the relationship between traumatic life events, including childhood adversity, and experiencing moral injury in UK AF veterans. The findings underscore the need for a validated measurement tool appropriate for the UK AF to better understand the impact of moral injury on wellbeing and to ensure that appropriate treatment can be given to those identified as suffering post-trauma.

1. Introduction

Morally injurious experiences, or events which violate one's moral or ethical code (Litz et al., 2009) are increasingly recognised as feature of military service. Experiences of potentially morally injurious events (PMIEs) are generally thought to include acts of omission, commission or betrayal by trusted others (Bryan et al., 2016). While moral injury is not a mental health disorder, experiences of PMIEs have been found to increase the risk for the development of posttraumatic stress disorder (PTSD), depression and suicidality

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(Griffin et al., 2019; Williamson, Stevelink, & Greenberg, 2018) as well as lead to challenges with psychosocial, occupational and spiritual functioning (Frankfurt & Frazier, 2016; Griffin et al., 2019).

Given the association between moral injury and adverse mental health outcomes, there is a pressing need to better understand the risk factors which increase vulnerability to suffer distress, and mental ill-health, following PMIEs. Preliminary research suggests that psychosocial or event-related factors could increase one's risk of experiencing psychological distress following PMIEs. For example, qualitative studies have found that incidents involving vulnerable victims (e.g. children, women, the elderly) may contribute to the potential onset of a moral injury (Drescher et al., 2011; Williamson et al., 2020). Traumatic interpersonal experiences during military service, including 'betrayal' events such as abuse, assault or harassment by colleagues, are also thought to be potential risk factors for moral injury-related distress.

Pre-disposing factors such as exposure to adverse childhood experiences (ACEs) has also been suggested as a potential risk factor for moral injury-related distress (Williamson et al., 2020). This is highly relevant as around 24 % of the general UK Armed Forces (AF) population report exposure to high levels of childhood adversity (Murphy & Turgoose, 2019) and such experiences in childhood have been found to increase one's risk of developing PTSD, severe substance abuse and self-harm after controlling for combat exposure (Iversen et al., 2007). ACEs and moral injury may similarly impact an individual's appraisal of themselves, others and the world (Litz et al., 2009; Vargas, Hanson, Kraus, Drescher, & Foy, 2013). For example, both ACEs, and moral injury, may lead to negative changes in cognitions that others are kind and trustworthy and the world is a good place (Cook et al., 2005; Litz et al., 2009; Vargas et al., 2013). Moreover, ACEs, and moral injury, may cause lowered self-esteem, feelings of shame and guilt, as well as giving rise to maladaptive coping behaviours (e.g. substance misuse, risk taking behaviours, social withdrawal) (Cook et al., 2005; Litz et al., 2009). Thus, it is possible that exposure to ACEs may render individuals more vulnerable to moral injury later in life because of ACE-related shame and guilt (e.g. belief that one is 'bad', others can't be trusted), low self-worth and problematic coping responses. This association is supported by a recent study in Canadian military personnel where emotional abuse in childhood was significantly associated with expressions of moral injury (Battaglia et al., 2019). However, the conclusions that can be drawn from this study are limited due to its relatively small sample size (n = 33).

Given the relatively high rates of childhood adversity reported by UK AF veterans, and preliminary evidence suggesting childhood adversity may increase the likelihood of endorsing moral injury following adult military service, further exploration of the links between childhood adversity and moral injury in a UK context is warranted. Whether particular traumatic events during service may also increase one's likelihood of moral injury distress is also unclear. As studies of moral injury in a UK AF context have largely been qualitative studies, further exploration of how experiences of moral injury may impact psychological outcomes are also needed. Therefore, this study aimed to examine both the relationship between moral injury and experiences of adverse events, including childhood adversity and military trauma, as well as the impact of moral injury on the mental health of a treatment seeking sample of UK AF veterans.

2. Methods

Approval for this study was granted by Combat Stress' Research Ethics Committee. Written informed consent was obtained from all participants.

3. Setting

This study was conducted at Combat Stress (CS), a national charity providing psychological interventions to UK AF veterans.

4. Participants

Participants were drawn from a 2017 study on veteran health and well-being which comprised of a nationally representative sample of treatment-seeking veterans. The sample were 20 % of veterans randomly selected from all those engaged with CS. Overall, 403 participants were recruited out of possible 600 (67.2 %) (Murphy et al., 2020). Of the original 403 participants, 69 were excluded from the present study because they had either died (n = 8), opted out of further research (n = 5) or had incomplete contact details that prevented re- contact (n = 56). The remaining sample of 334 eligible individuals were invited to participate. Individuals were requested to complete questionnaires via an initial postal mail-out which was followed up by a telephone call to remind participants about the study. Further details regarding recruitment are described by Murphy et al. (2020). Data were collected between October 2018 and April 2019. Of the 334 eligible participants, 177 returned completed questionnaires (53.0 %).

5. Materials

5.1. Mental health difficulties

To determine probable mental health disorders, a score of 34 or more on the PTSD checklist for DSM-5 (PCL-5;(Blevins, Weathers, Davis, Witte, & Domino, 2015)) was used to assess probable PTSD. This is consistent with previous studies which found a cut off score of 34 is optimal for identifying likely PTSD in treatment seeking UK veterans (Murphy, Ross, Ashwick, Armour, & Busuttil, 2017). A score of 16 or more on the Alcohol Misuse Identification Test was used as an indicator of probable alcohol misuse (AUDIT, (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001)). Common mental disorders (CMD), such as depression and anxiety, were assessed using

a cut off score of 4 or more on the General Health Questionnaire (GHQ-12; (Goldberg & Hillier, 1979)). The Dimension of Anger Reactions (DAR-5; (Forbes et al., 2014)) scale is a five-item Likert scale ranging from 0 'not at all' to 4 'very much' and a cut-off score of 12 or more was used to indicate likely anger problems.

5.2. Perceived functional impairment

The Work and Social Adjustment Scale (WSAS, (Mundt, Marks, Shear, & Greist, 2002)) was used to assess perceived functional impairment associated with a health problem. The five-item scale measures the impairment dimensions of work; relationships with others; home management; private leisure activities; and social leisure activities. A total score on the WSAS above 20 indicates moderately severe or worse psychopathology, with scores between 10–20 associated with significant functional impairment.

5.3. Adverse events

To assess moral injury, the Expressions of Moral Injury Scale (EMIS, (Currier et al., 2018)) was used. The EMIS is a 17-item self-report measure assessing prominent feelings, beliefs and behaviours for moral injury directed at self (nine items, i.e. "I am ashamed of myself because of things that I did/saw during my military service") and others (eight items, i.e. "No matter how much time passes, I resent people who betrayed my trust during my military service"). Items are rated on a 5-point Likert scale ranging from 1 ('strongly disagree') to 5 ('strongly agree'). There is no clinical cut-off for the EMIS, although higher scores are taken to indicate worse outcomes reflective of maladaptive responses associated with moral challenges (possible range of scores 17–85).

To assess experiences of ACEs, the Childhood Trauma Questionnaire (CTQ) was used. The CTQ is a 28-item self-report questionnaire that assesses exposure to a range of different childhood traumas (Bernstein et al., 1994). The scale consists of five subscales: physical abuse, emotional abuse, sexual abuse, physical neglect and emotional neglect. A five-point Likert scale ranging from 'never true' (0) to 'very often true' (4) is used, and a total scale score (possible range 0–112) were calculated, with higher scores suggesting more severe maltreatment.

To assess exposure to adverse events during military service, a modified version of the Life Events Checklist (LEC) was used (Murphy et al., 2020). The LEC is a 17-item, self-report measure which assesses lifetime exposure to 16 traumatic events (e.g. natural disaster, physical assault, sexual assault, life threatening illness/ injury) and the 17th item, 'any other very stressful event/experience', can be used to indicate exposure to another trauma that was not listed. For each item, the respondent checks whether the event 'happened in childhood (before age of 18)' or 'happened in adulthood (at or after age 18)'; a 'yes' (1) and 'no' (0) response format was used. The wording of items was adapted to assess whether the adverse events happened during military service or not. A cumulative

Table 1
Participant demographic characteristics.

Index	N(%)
Mean age (SD)	52.6 (11.4)
Gender, n (%)	
Male	168 (94.9 %)
Female	9 (5.1 %)
Employment status, n (%)	
Employed	56 (31.6 %)
Not employed	40 (22.6 %)
Not employed due to illness	81 (45.8 %)
Relationship status, n (%)	
In a relationship	123 (69.5 %)
Single	54 (30.5 %)
Service branch	
Royal Navy or Royal Marines	12 (6.8 %)
Army	153 (86.4 %)
Royal Air Force	12 (6.8 %)
Rank	
Officer	13 (7.3 %)
Non-commissioned officer	87 (49.2 %)
Junior rank	77 (43.5 %)
Served in combat role	
Yes, n(%)	108 (61.0 %)
No, n(%)	69 (39.0 %)
Met likely diagnostic criteria, n (%)	
PTSD	148 (83.6 %)
Alcohol misuse	37 (20.9 %)
CMD	126 (72.0 %)
Anger	132 (75.9)

Note: SD = standard deviation. Single = includes single, divorced, separated, widowed. PTSD = score of 34 or more on the PCL-5. Alcohol misuse = score of 16 or more on the AUDIT. CMD = score of 4 or more on the GHQ-12. Anger = score of 12 or more on the DAR-5.

variable was created for experiences of emotional abuse, physical abuse, sexual harassment and sexual assault during military service. Item 17 was not included as the nature of the trauma could not be identified. Combat exposure during military service was assessed using one item (0 'no', 1 'yes') as well as whether respondents had left military service early (0 'no', 1 'yes').

6. Data analysis

Descriptive analyses were conducted to provide an overview of the sample characteristics (see Table 1). To compare expressions of moral injury amongst those with and without likely mental health problems, unadjusted and adjusted ratios as well as 95 % confidence intervals are provided in Table 2. To compare moral injury amongst those with and without experiences of ACEs and adverse traumatic events during military service – including combat exposure and being an early service leaver (ESL; i.e. those with four years or less service (Buckman et al., 2013)), unadjusted and adjusted ratios are provided in Table 3. Odds ratios were calculated using logistic regression analysis and were adjusted for socio-demographic characteristics (i.e. age, sex). As individuals could meet likely criteria for more than one disorder or report multiple event exposures, overlapping 95 % confidence intervals (CI) were used to indicate non-significant differences in scores. Pearson correlations of the association between EMIS sum scores and severity of childhood adversity, PTSD symptoms, alcohol misuse symptoms and CMD were also calculated (Table 4).

7. Results

Of the 177 participants, 95.0 % were male with a mean age of 52.6 (SD 11.4) years (see Table 1). The majority had served in the British Army (86.4 %); a minority were ESLs (9.6 %). A considerable proportion of the sample met case criteria for likely mental health difficulties, especially for probable PTSD (83.6 %) and CMD (72.0 %). The mean EMIS total score for the sample was 53.3 (SD 17.3; range 17–85). The mean expression of moral injury directed towards the self (EMIS-self) score was 26.9 (SD 9.9; range 9–45) while the mean expression of moral injury directed towards others (EMIS-other) score was 26.5 (SD 8.5, range 8–40).

A number of veterans reported experiencing adverse life events, with more than half (61.0 %) reporting having been in a combat role. During their time in the military, 46.0 % (n = 75) reported experiencing emotional bullying, 38.9 % (n = 61) physical assault, 7.6 % (n = 11) sexual harassment, and 9.0 % (n = 13) sexual assault. The mean score on the CTQ was 5.6 (SD 3.6; range 0–14), with 48.0 % (n = 85) of veterans reporting experiencing six or more adverse childhood events.

8. Impact of moral injury on psychological wellbeing

Individuals meeting case criteria for likely PTSD were consistently more likely to endorse high scores of expressions moral injury generally (EMIS total score AOR 1.10; 95 % CI 1.06−1.14), expressions of moral injury directed towards the self (EMIS-self AOR 1.18; 95 % CI 1.11−1.26), and expressions of moral injury directed towards others (EMIS-other AOR 1.16; 95 % CI 1.09−1.23) compared to those who did not meet PTSD case criteria (Table 2). Odds ratios found for individuals with probable PTSD were greater than the odds ratios of those meeting criteria for likely CMD, anger, functional impairment or alcohol misuse across all three moral injury scales; however, overlapping confidence intervals indicate these differences may not be statistically significant. Pearson's correlations between PTSD symptom severity and the EMIS total score ($r = 0.58$, $p < 0.001$), EMIS-self ($r = 0.60$, $p < 0.001$) and EMIS-other ($r = 0.47$, $p < 0.001$) were all positively statistically significant (Table 4). Further analysis examining the relationship between the PCL-5 subscales (e.g. intrusions, arousal, avoidance, negative mood) and the EMIS found that all PCL-5 subscales were significantly associated with expressions of moral injury, with the PCL-5 negative mood subscale most strongly associated with expressions of moral injury (EMIS total score $r = 0.57$, $p < .001$; EMIS-self score $r = 0.58$ $p < .001$; EMIS- other score $r = 0.49$, $p < .001$) [data not shown].

Although the odds ratios were not as large as those meeting criteria for probable PTSD, individuals meeting criteria for likely anger problems also strongly endorsed expressions of moral injury and were significantly more likely to endorse moral injury across all three EMIS scales compared to those not meeting criteria for likely anger difficulties (EMIS total score AOR 1.09; 95 % CI 1.05−1.12; EMIS-self AOR 1.14; 95 % CI 1.09−1.20; EMIS-other AOR 1.15; 95 % CI 1.09−1.22) (Table 2). Notably, odds and adjusted odds ratios for those meeting case criteria for likely anger problems were largest for expressions of moral injury directed towards others. Those meeting case criteria for likely CMD (EMIS total score AOR 1.06; 95 % CI 1.04−1.09) and functional impairment (EMIS total score AOR

Table 2
OR and AOR for EMIS scale summary scores for individuals meeting case criteria for likely mental health difficulties versus those who did not meet criteria for each disturbance.

EMIS scales		PTSD	Alcohol misuse	CMD	Anger	Functional impairment
EMIS total score	OR (95 % CI)	**1.09 (1.05−1.12)**	1.03 (1.00−1.05)	**1.05 (1.03−1.08)**	**1.08 (1.05−1.11)**	**1.03 (1.01−1.05)**
	AOR (95 % CI)	**1.10 (1.06−1.14)**	1.02 (0.99−1.05)	**1.06 (1.04−1.09)**	**1.09 (1.05−1.12)**	**1.03 (1.01−1.05)**
EMIS self	OR (95 % CI)	**1.16 (1.10−1.24)**	**1.05 (1.01−1.09)**	**1.10 (1.06−1.14)**	**1.14 (1.09−1.20)**	**1.05 (1.01−1.08)**
	AOR (95 % CI)	**1.18 (1.11−1.26)**	1.04 (0.99−1.08)	**1.12 (1.07−1.17)**	**1.14 (1.09−1.20)**	**1.05 (1.01−1.09)**
EMIS other	OR (95 % CI)	**1.15 (1.09−1.22)**	1.05 (1.00−1.10)	**1.09 (1.04−1.14)**	**1.15 (1.09−1.21)**	**1.07 (1.03−1.11)**
	AOR (95 % CI)	**1.16 (1.09−1.23)**	1.05 (0.99−1.10)	**1.10 (1.05−1.15)**	**1.15 (1.09−1.22)**	**1.07 (1.03−1.11)**

Note: CMD = common mental disorders, includes participants meeting case criteria on the GHQ-12. OR = odds ratios. AOR = adjusted odds ratio. Adjusted for sex and age. CI = confidence interval. PTSD = score of 34 or more on the PCL-5. Alcohol misuse = score of 16 or more on the AUDIT. CMD = score of 4 or more on the GHQ-12. Anger = score of 12 or more on the DAR-5. Bold values denote statistical significance.

Table 3
OR and AOR for EMIS scale summary scores for individuals who experienced military adverse events versus those who did not report in-service event exposure.

EMIS scales		Emotional abuse	Physical abuse	Sexual harassment	Sexual assault	Combat	ESL
EMIS total score	OR (95 % CI)	**1.03 (1.01−1.05)**	**1.04 (1.02−1.07)**	1.01 (0.97−1.04)	1.02 (0.99−1.06)	1.01 (1.0−1.03)	1.01 (0.98−1.05)
	AOR (95 % CI)	**1.03 (1.01−1.05)**	**1.04 (1.02−1.06)**	1.02 (0.98−1.06)	1.04 (1.00−1.08)	1.02 (1.0−1.04)	1.01 (0.98−1.05)
EMIS self	OR (95 % CI)	1.04 (1.00−1.07)	**1.07 (1.03−1.11)**	1.01 (0.95−1.08)	1.04 (0.98−1.11)	1.03 (1.0−1.06)	1.01 (0.98−1.05)
	AOR (95 % CI)	1.03 (1.00−1.07)	**1.06 (1.02−1.10)**	1.03 (0.96−1.10)	1.07 (0.99−1.14)	1.04 (1.00−1.07)	1.02 (0.97−1.08)
EMIS other	OR (95 % CI)	**1.09 (1.04−1.13)**	**1.09 (1.04−1.14)**	1.01 (0.94−1.09)	1.04 (0.97−1.12)	1.01 (0.97−1.05)	1.03 (0.97−1.08)
	AOR (95 % CI)	**1.08 (1.04−1.13)**	**1.08 (1.04−1.13)**	1.03 (0.95−1.12)	1.07 (0.99−1.15)	1.02 (0.98−1.05)	1.03 (0.96−1.10)

Note: OR = odds ratios. AOR = adjusted odds ratio. Adjusted for sex and age. ESL = early service leaver. CI = confidence interval. Bold values denote statistical significance.

1.03; 95 % CI 1.01−1.05) were also significantly more likely to endorse expressions of moral injury compared to those not meeting case criteria for CMD or functional impairment.

Notably, after adjusting for age and sex, those meeting criteria for likely alcohol misuse problems were not significantly more likely to endorse expressions of moral injury compared to those who did not meet case criteria (EMIS total score AOR 1.02; 95 % CI 0.99−1.05). However, higher AUDIT scores were significantly positively associated with expressions of moral injury (EMIS total score $r = 0.10$ $p < 0.01$; EMIS-self $r = 0.21$ $p < 0.001$; EMIS-other $r = 0.17$ $p < .05$), but this relationship was weaker than the associations between PTSD or CMD symptom severity and moral injury (Table 4).

9. Impact of adverse events and moral injury

Experiences of childhood adversity were significantly positively associated with expressions of moral injury ($r = 0.35$, $p < .001$), including self-directed moral injury ($r = 0.22$, $p < .001$) and moral injury directed towards others ($r = 0.34$, $p < .001$) (Table 4). This positive relationship indicates greater exposure to childhood adversity is associated with higher expressions of moral injury. In terms of adverse military events, compared to those who did not report exposure, those who had experienced in-service emotional abuse were more likely to endorse expressions of moral injury generally (AOR 1.03; 95 % CI 1.01−1.05) and expressions of moral injury directed towards others (AOR 1.08; 95 % CI 1.04−1.13) (see Table 3). Compared to those who did not report exposure, those who reported experiencing in-service physical abuse were also more likely to endorse expressions of moral injury (EMIS total score AOR 1.04; 95 % CI 1.02−1.06; EMIS-self AOR 1.06; 95 % CI 1.02−1.10; EMIS-other AOR 1.08; 95 % CI 1.04−1.13). Individuals who reported experiencing combat exposure during military service were not significantly more likely to endorse expressions of moral injury than those who did not experience combat (EMIS total score AOR 1.01; 95 % CI 1.0−1.03). Similarly, those who reported experiencing sexual harassment (EMIS total score AOR 1.02; 95 % CI 0.98−1.06) or sexual assault (EMIS total score AOR 1.04; 95 % CI 1.0–1.08) during military service were not significantly more likely to endorse expressions of moral injury compared to those who did not report such experiences.

10. Discussion

This study had four main findings. First, this research is the first to identify a significant association between self-reported childhood adversity and expressions of moral injury in a clinical sample of UK AF veterans. Second, we identified a small, but significant, relationship between expressions of moral injury and the experience of particular adverse events during military service, namely emotional or physical abuse. Third, personnel meeting criteria for probable PTSD, CMD, functional impairment and anger problems were more likely to report expressions of moral injury compared to those who did not. Last, we did not identify a consistent relationship between alcohol misuse and reporting greater expressions of moral injury.

Table 4
Associations between EMIS scale summary scores and experiences of childhood adversity and scores on measures of mental health.

EMIS scales	Childhood adversity	PTSD	Alcohol	CMD
EMIS total score	0.35***	0.58***	0.20**	0.38***
EMIS self	0.22***	0.60***	0.21***	0.40***
EMIS other	0.34***	0.47***	0.17*	0.31***

Note: PTSD = score of 34 or more on the PCL-5. Alcohol misuse = score of 16 or more on the AUDIT. CMD = score of 4 or more on the GHQ-12. *= $p < 0.05$; ** = $p < 0.01$; ***= $p < 0.001$.

The rates of adverse experiences in childhood in this present study were high, with 48.0 % of the sample reporting six or more ACEs. This is consistent with previous studies of UK AF personnel and veterans (Iversen et al., 2007; Murphy & Turgoose, 2019) and is perhaps unsurprising given the high prevalence rates of mental health difficulties within this sample of treatment seeking individuals. The reported extent of moral injury was also high, with an average total score of 53.3 reported on the EMIS, with 85.0 being the upper boundary of the sample – the maximum possible score on the EMIS scale. As a comparison, a recent examination of moral injury in samples of US veterans who had completed at least one deployment to a war zone during military service reported average scores on the EMIS to range between 32.1–33.4 (Currier et al., 2018). While this study design prevents suggestion of causation, our findings provide preliminary evidence that adverse experiences in childhood could be a potential risk factor for personnel exposed to PMIEs to develop moral injury during their military service. As childhood adversity is associated with generalised vulnerability to PTSD following subsequent trauma later in life (McLaughlin et al., 2017), it may well be the alterations in cognitions about the self, others or the world that may follow ACEs predispose personnel to negative responses of shame, worthlessness and guilt typical of a moral injury. Further research is needed to explore whether certain types of ACEs may confer greater risk of distress following moral injury in the UK AF. These findings also suggest that clinicians providing treatment following moral injury may also want to include an assessment of ACEs during the course of treatment. Moreover, additional studies are needed to examine whether morally injured patients with a history of childhood adversity may have unique treatment needs.

Our finding that adverse events experienced during military service, including in-service physical and emotional abuse were associated with higher expressions of moral injury is consistent with previous work showing that moral injury may follow incidents of perceived betrayal by trusted others (Bryan et al., 2016). The prevalence of bullying, hazing and other forms of abuse within the UK AF remains poorly understood (Hernandez, 2015). As the EMIS measure does not relate to a specific event, it is possible that the expressions of moral injury reported were a result of incidents of abuse during military service although we note that the strength of the association between the two was weak. We note that, qualitative studies of moral injury in the UK AF have found that morally injurious events included betrayal or abusive acts by comrades (Williamson et al., 2020). Nonetheless, just as traumatic events do not always lead to PTSD (Santiago et al., 2013), the mere exposure to adverse event during military service may not always result in moral injury. A more focused measure of moral injury, assessing exposure to morally injurious events as well as the psychological reactions to such events in distinct items would be helpful to better understand how moral injury develops. Longitudinal, prospective studies which measure the severity of moral injury pre- and post- enlistment or deployment, as well as the timing of PMIEs would also help to clarify the onset of moral injury.

Consistent with previous studies in the US military, this study found that those veterans meeting criteria for probable PTSD, CMD, functional impairment and anger problems were more likely to report expressions of moral injury than those not meeting case criteria. That PTSD symptoms of negative mood appeared the most strongly associated with moral injury tentatively suggests that the distress experienced by individuals following PMIEs is more complex than traditional conceptualisations of PTSD which has typically emphasised distress due to a sense of ongoing threat (Ehlers & Clark, 2000). That those meeting criteria for likely anger difficulties were particularly likely to report expressions of moral injury related to others is also consistent with previous US studies following betrayal events (Griffin et al., 2019; Litz, Lebowitz, Gray, & Nash, 2017) and provides early evidence of how particular morally injurious events may differentially impact UK AF wellbeing. Notably, compared to those who did not meet diagnostic criteria, participants with probable alcohol misuse generally did not report greater expressions of moral injury. This is inconsistent with US studies which have found strong positive associations between moral injury and substance abuse (Battles, Kelley, Jinkerson, Hamrick, & Hollis, 2019). It is possible that our finding reflects the relatively older age of the present sample or possibly social desirability bias. Qualitative studies of UK AF veterans who experience moral injury have found veterans to report using alcohol or illicit drugs as an avoidance coping strategy following PMIEs (Williamson et al., 2020) and additional research in UK AF veterans who have not sought formal mental health treatment may be beneficial in better understanding the impact of PMIEs on psychological adjustment.

This present study's strengths include sampling from a nationally representative study of treatment seeking veterans. Nonetheless, a limitation is the inclusion of only treatment seeking veterans. As the severity of mental health difficulties can be a barrier to seeking help and engaging with support, those with more complex presentations may be underrepresented and the prevalence of moral injury-related distress may be underestimated. Furthermore, the sample size of the present study was modest, although not inconsistent with other studies of moral injury in the US and Canadian AF (Battaglia et al., 2019; Battles et al., 2019; Currier et al., 2018). The retrospective nature of reporting ACEs is also a potential limitation and it is possible that experiences of childhood adversity may be under (or less likely, over) reported. Finally, the EMIS does not require participants to respond relating to a specific event, and several EMIS questions simultaneously measure exposure to events as well as one's psychological responses in the same item (e.g. 'I feel anger over being betrayed by someone who I had trusted while I was in the military'). Future studies should examine moral injury with less methodologically problematic measures (Frankfurt & Frazier, 2016).

Despite these limitations, the present study is the first to highlight an association between experiences of childhood adversity and moral injury in UK AF veterans. This finding illustrates the need for comprehensive trauma history taking in clinical settings. Secondly, while there is currently a lack of clarity regarding the best treatment(s) to support individuals affected by moral injury, it may be beneficial for future developing treatments to include consideration of the impact of ACEs on patient interpretations of PMIEs which may assist in cognitively reframing the experience. Whilst the association between adverse military experiences, such as emotional and physical abuse, and expressions of moral injury was only weak, this finding underscores the need for a validated measurement tool appropriate for the UK AF to not only better understand the impact of moral injury on veteran wellbeing, but also to ensure that appropriate treatment can be given to those identified as suffering having experienced adverse events during service. Finally, that those meeting case criteria for mental health difficulties were more likely to endorse expressions of moral injury highlights the particularly complex symptom profiles of the veterans who seek formal treatment following morally injurious events and highlights

the importance of future efforts to develop a manual for the treatment of moral injury related mental health problems.

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Data sharing statement

No additional data are available.

Ethics approval

Combat Stress Research Ethics Committee.

Declaration of Competing Interest

Authors had financial support from a Forces in Mind Trustgrant for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous 3 years; no other relationships or activities that could appear to have influenced the submitted work.

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