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Exploring the relationship between Adverse Childhood Experiences, Moral Injury and Social Support in a Clinical Sample of UK Military Veterans.

Abstract (250 words)

Background: Increased exposure to adverse childhood experiences (ACEs) is noted amongst military veterans, who also face unique occupational stressors during military service. Veterans are at increased risk of exposure to potentially morally injurious experiences (PMIE) and Moral Injury.

Objective: To explore the relationship between ACEs and Moral Injury in a sample of UK treatment-seeking veterans.

Participants and Setting: 428 treatment-seeking veterans who accessed veterans' mental health charity Combat Stress between 2019-2020 completed a patient experience survey.

Methods: A secondary analysis of cross-sectional survey data previously collected by Combat Stress explored the relationship between ACEs and Moral Injury using linear regression analysis. Further correlational analysis explored associations between ACEs, Moral Injury and social support.

Results: The majority of respondents experienced at least one ACE (74.6%), with 35% classed as high risk (4+ ACEs). Over half (57.1%) reported exposure to a PMIE. ACEs were associated with Moral Injury ($r[239] = .207$, $p<.001$), with Personal Abuse ACEs explaining 4.4% of the variance in Moral Injury scores ($F(1,239) = 11.086$, $p = .001$, 95% CI [29.30, 33.35]). 72.2% of respondents reported low perceived social support, with social support being negatively correlated with both ACEs and Moral Injury.

Conclusions: ACEs may be a vulnerability factor increasing the risk of Moral Injury following experience of PMIEs during military service.

Keywords:
Veteran Mental Health
Adverse Childhood Experiences
Moral Injury
Perceived Social Support
Shame

Introduction

Research has shown an increased prevalence of mental health difficulties among military personnel, including posttraumatic stress disorder (PTSD), common mental health difficulties (CMD), and problematic alcohol use, compared with the general population (Rhead et al, 2022). Being subject to unique occupational stressors, including combat exposure, increases the risk of PTSD via a dose-response relationship (Clancy et al., 2006; Seal et al., 2009). Military personnel are also at risk of developing Moral Injury as they may be required to engage in actions that transgress accepted norms (Shay, 1994). Moral Injury is defined as the strong emotional response to "perpetrating, failing to prevent, bearing witness to, or learning about acts that transgress deeply held moral beliefs and expectations" (Litz et al., 2009, p.700). This can include intense feelings of guilt and shame due to involvement in incidents which conflict one's moral code, values, and beliefs, otherwise known as potentially morally injurious events (PMIEs). International literature across a range of professional roles indicates consistent associations between exposure to a PMIE and a range of psychiatric conditions including depression, suicidality, PTSD, substance misuse, and anxiety (Griffin et al., 2019; Williamson et al., 2018), Military veterans reintegrating into civilian life may come to consider previous actions as incongruent to values held outside of military contexts, impacting the way these experiences may be viewed and processed, therefore increasing the risk of experiencing psychological distress as a result.

Research suggests a possible protective role of perceived social support in reducing the risk of Moral Injury (Hollis et al., 2023; Williamson et al., 2020) but also evidence of reduced perceived safety in social support, social withdrawal, reduced resilience, increased feelings of stress and self-criticism amongst those who had been exposed to PMIEs (Williamson et al., 2018; Worthington & Langberg, 2012). Similarly, poor social bonds and low social support have been proposed as common vulnerability factors for both PTSD and MI (Charuvastra & Cloitre, 2008; Hollis et al., 2023; Williamson et al., 2020).

Adverse Childhood Experiences (ACEs) describe the experience of stressful and potentially traumatic events occurring in childhood (Karatekin & Hill, 2019). There are well-established associations between ACEs and an increased risk of poor physical and mental health outcomes in adulthood (Bellis et al., 2019; Felitti et al., 1998; Sahle et al., 2022). Exposure to just one ACE increases risk, regardless of gender or age of exposure, with exposure to four or more ACEs considered to indicate high risk of poorer mental and physical health outcomes in adulthood (Felitti et al., 1998; Sahle et al., 2022). Further, for those with a history of active military duty, the prevalence of ACEs is higher and the relationship between ACEs and mental health significantly stronger for this group than the general public (Montgomery et al., 2013).

ACEs may also be a predisposing factor for Moral Injury, with maladaptive beliefs and negative self-schemas developed following exposure to early adversity and insecure parental attachment potentially priming individuals for an increased vulnerability to Moral Injury through reduced adaptive coping skills, including poor emotional regulation, increased shame proneness, and difficulties establishing safe, trusting interpersonal relationships (Bonson et al., 2023; Briere, 2002; Flach & Cariola; 2025; Thompson, 2019). Cumulative trauma, particularly originating in childhood, has been identified as predictive of greater symptom complexity, both affectively and relationally in later life (Cloitre et al., 2009), highlighting the importance of considering the role of ACEs in the understanding of the later expression and maintenance of Moral Injury. The nuance of the interaction between ACEs and Moral Injury requires further investigation, with potentially important roles for shame, guilt, and interpersonal relationships. In line with this, another common feature between ACEs and Moral Injury is the potentially mediating role of perceived social support (Cheong et al., 2017; Hollis et al., 2023; Williamson et al., 2018). Given the increased risk of developing maladaptive relational styles and interpersonal difficulties following exposure to ACEs, it is possible that after being exposed to a further PMIE, individuals may not have the social network, interpersonal competence, and coping resources to make use of and benefit from available social support in the prevention or mediation of the impact of Moral Injury (Bonson et al., 2023; Tezel et al., 2015; Williamson et al., 2020).

Understanding the interaction between military related factors, ACEs, moral injury and mental health outcomes together with possible mediating factors is therefore important to adequately support this population already identified to be at increased risk, and to inform preventative strategies (Blosnich et al., 2014; Katon et al., 2015).

Aims

This study sought to expand on previous research by exploring the relationship between ACEs and Moral Injury in a large cohort of UK Armed Forces veterans. Specifically, we investigated whether exposure to ACEs predicted higher levels of Moral Injury, looking separately at the relative impact of ACEs on both trust-based and shame-based Moral Injury. Additionally, we looked at the potential role of perceived social support in the relationship between ACEs and Moral Injury.

Method

Design

This was a secondary analysis of cross-sectional survey data collected by veterans mental health charity, Combat Stress (see Williamson et al., 2023 for details of the primary study, including further detail on the sample, measures, and procedures).

Data was collected at a single time point from individuals who had accessed mental health support from Combat Stress within a one-year period. Participants were invited to complete a survey comprising a series of self-report measures, including questions on demographic information, military history, lifestyle factors, mental and physical health symptoms.

Participants

Data was collected in 2020 as part of a patient experience survey by Combat Stress to explore the health and wellbeing outcomes of a nationally representative sample of treatment-seeking UK veterans (Williamson et al., 2023). Participants were randomly invited to participate if they had (i) attended a minimum of one assessment/intervention appointment within Combat Stress during 2019-2020, (ii) provided consent to be contacted for research purposes, and (iii) provided a contact email address. 989 veterans were invited to participate, with 428 completed survey responses received. The only significant difference observed between responders and non-responders was age, with responders more likely to be older (mean age 50.5 years) than non-responders (mean age 44.3 years; Williamson et al., 2022). No other significant differences in socio-demographic or military characteristics were found between responders and non-responders.

Measures

The original survey asked for demographic data relating to sex, age group, ethnicity, employment status, relationship status, housing status, and educational attainment. Participants were also asked to report on service branch, rank, experience of military adversities, number of years served, and reason for leaving the Armed Forces. All further measures were chosen as they are standardised, validated and have been identified as suitable for use within a military population.

Moral Injury was measured using the Moral Injury Outcome Scale (MIOS; Litz et al., 2022). This scale begins with questions exploring the presence of a potential morally injurious event (PMIE), followed by a 14-item measure of symptoms associated with moral injury. This measure can be split

into two subscales: shame (seven items) and trust (seven items). Total scores on this measure range from 0 – 56, with higher scores indicative of greater severity of symptoms of Moral Injury.

Early experiences and exposure to ACEs was assessed using the 10-item Adverse Childhood Experiences Questionnaire (ACE-Q; Felitti et al., 1998). Possible scores range from 0 – 10, with scores of >4 identified as high exposure to ACEs. ACEs are split into sub-categories relating to personal abuse (e.g. Did a parent or adult in your home ever hit, beat, kick, or physically hurt you in any way?) and family disruption (e.g. Did you live with anyone who went to jail or prison?).

Social support was measured using the Oslo Social Support Scale-3 (OSSS-3; Dalgard, 1996) with possible scores on the three-items ranging from 3 – 14 and categorised into poor (3 – 8), moderate (9 – 11), and strong (12 – 14) social support.

Analysis

We examined associations between ACEs and Moral Injury using Pearson's correlation coefficients between MIOS data and ACE-Q data, including bivariate correlations between total scores and subcategories for each measure. Following this, simple linear regression was carried out to investigate the explanatory value of ACEs in the development of symptoms of Moral Injury. Four independent linear regression models were calculated to explore the relationship between ACEs and Moral Injury; Personal Abuse ACEs and Moral Injury; Personal Abuse ACEs and Trust-based symptoms of Moral Injury; and Personal Abuse ACEs and Shame-based symptoms of Moral Injury. We also explored associations between ACEs, Moral Injury and social support using descriptive and bivariate correlational analyses.

Results

Demographic information

From the 428 survey responses, a significant majority identified as male (97.4%). Just over half (56.3%) were currently employed or retired, and two-thirds (66.5%) were in a relationship. Table 1 lists socio-demographic characteristics and military history of participants.

Table 1. *Socio-demographic Characteristics and Military History of Participants.*

Demographic (No. responses)	Category	N (%)
Age (428)	<35	46 (10.7)
	35-44	86 (20.1)
	45-54	146 (34.1)
	55+	150 (35)
Gender (428)	Female	11 (2.6)
	Male	417 (97.4)
Employment Status (396)	Working or Retired	223 (56.3)
	Not Working	173 (43.7)
Relationship Status (397)	In relationship	264 (66.5)
	Not in relationship	133 (33.5)
Housing Status (397)	In Home	361 (90.9)
	Homeless	36 (9.1)
Last Rank (393)	Officer	44 (11.2)
	Other Ranks	349 (88.8)
Service (428)	Army	353 (82.5)
	Naval Services	47 (11)
	Royal Air Force	28 (6.5)
Role In Service (387)	Non-Combat	23 (5.9)
	Combat/Combat Support	364 (94.1)
Reason for Leaving (388)	Voluntary	213 (54.9)
	Non-Voluntary/Medical	175 (45.1)
Time Since Leaving (386)	<10 years	105 (27.2)
	10-19.9 years	117 (30.3)
	20 – 29.9 years	94 (24.4)
	30+ years	70 (18.1)
Early Service Leaver (385)	No	368 (95.6)
	Yes	17 (4.4)

ACEs, PMIE, and Moral Injury

Descriptive statistics for the ACEs, Moral Injury and social support are summarised in Table 2. The mean ACE-Q score was 2.72 (SD = 2.45), with 25.4% reporting no exposure and 35% high exposure to ACES (i.e., four or more). Of those reporting exposure to ACEs, 62.1% reported exposure to at least one Family Disruption ACE and 57.8% reported at least one Personal Abuse ACE.

Over half (57%) reported exposure to a PMIE, and the mean MIOS score was 33.48 (SD = 10.11) indicating presence of MI symptoms. Mean score for MIOS Shame subscale was 16.37 (SD = 6.25), and Trust subscale 16.67 (SD = 5.33). Low perceived social support was reported by 72.2% of the sample.

Table 2. Descriptive Statistics for ACEs, PMIEs and Moral Injury.

Measure	n	Mean (SD)	Minimum/Maximum
ACE-Q Total	346	2.72 (2.45)	0/10
ACE-Q Family Disruption	346	1.61 (1.6)	0/5
ACE-Q Personal Abuse	346	1.11 (1.22)	0/5
MIOS Total	244	33.48 (10.11)	2/56
MIOS Shame	253	16.37 (6.25)	0/28
MIOS Trust	254	16.67 (5.33)	0/28
OSSS-3	360	7.26 (2.47)	3/14

Measure	Category	N (%)	Total n
ACE			346
	Score 0	88 (25.4)	
	Score 1	51 (14.7)	
	Score 2	45 (13)	
	Score 3	41 (11.8)	
	Score 4+ (High)	121 (35)	
	Family Factors	215 (62.1)	
	Personal Factors	200 (57.8)	
PMIE			428
	Exposure	244 (57)	
PMIE Type			244
	Self	148 (60.7)	
	Others	142 (58.2)	
	Betrayal	141 (57.8)	
OSSS-3			360
	Poor Social Support	260 (72.2)	

ACEs and Moral Injury

Correlations between ACEs and Moral Injury are described in Table 3. Strong positive correlations were found between total ACE scores and total Moral Injury scores (r[239] = .207, p < .001), and between ACE scores and both Trust and Shame subscales of Moral Injury (r[239] = .186, p = .002; r[239] = .189, p = .002). Correlations were found between Personal Abuse ACEs and total MI (r[239] = .211, p < .001), as well as between Personal Abuse ACEs and both the Trust-based (r[239] = .20, p < .001) and the Shame-based subscales of Moral Injury (r[239] = .181, p = .002).

Significant but weaker positive correlations were also observed between the Family Disruption domain of ACEs and overall Moral Injury (r[239] = .141, p = .014), Trust-based Moral Injury (r[239] = .138, p = .016) and the Shame-based Moral Injury (r[239] = .120, p = .031).

Table 3. *Pearson's correlation co-efficient between ACE-Q and MIOS Scores.*

	ACE-Q Total	ACE-Q Personal Abuse	ACE-Q Family Disruption	MIOS Total	MIOS Trust
ACE-Q Total	-				
ACE-Q Personal Abuse	.902**	-			
ACE-Q Family Disruption	.833**	.513**	-		
MIOS Total	.207**	.211**	.141*	-	
MIOS Trust	.186**	.181**	.138*	.890**	-
MIOS Shame	.189**	.200**	.120*	.923**	.646**

N.B.
** Correlation is significant at the 0.01 level.
* Correlation is significant at the 0.05 level.

A linear regression model (Model 1; see Table 4) explored the predictive power of exposure to ACEs for Moral Injury, producing a significant regression equation (F(1, 239) = 10.669, p =.001, 95% CI [29.35, 33.08]), with an R^2 of .043. This indicates that exposure to ACEs has a small but significant explanatory value for Moral Injury, explaining 4.3% of the variance of MIOS scores within this sample.

A second linear regression model (Model 2; see Table 4) explored the predictive power of exposure to Personal Abuse ACEs for Moral Injury, producing a significant regression equation (F(1,239) = 11.086, p = .001, 95% CI [29.30, 33.35]), with an R^2 of .044. This indicates that exposure to Personal Abuse ACEs has small but significant explanatory value and accounted for 4.4% of the variance in total Moral Injury score.

A third linear regression model (Model 3; see Table 4) explored the predictive power of exposure to Personal Abuse ACEs for Trust-based Moral Injury producing a significant regression equation (F(1,249) = 7.134, p = .008, 95% CI [14.75, 16.65]), with an R^2 of .028, indicating that exposure to Personal Abuse ACEs has a small but significant explanatory value in the relationship with Trust-based Moral Injury, accounting for 2.8% of the variance on the Trust subscale.

Finally, a fourth linear regression model (Model 4; see Table 4) explored the predictive power of exposure to Personal Abuse ACEs for Shame-based Moral Injury, producing a significant regression equation (F(1,248) = 8.679, p = .004, 95% CI [14.22, 16.25]), with an R^2 of .034, indicating that exposure to Personal Abuse ACEs has a small but significant explanatory value in the relationship with Shame-based Moral Injury, accounting for 3.4% of the variance on the Shame subscale.

Table 4. *Simple Linear Regression Models to explain MI outcome (overall MI, Trust-based MI symptoms, and Shame-based MI symptoms).*

	Model 1	**Model 2**	**Model 3**	**Model 4**
F	10.669**	11.086**	7.134*	8.679*
Regression df	1	1	1	1
Residual df	239	239	249	248
P Value	p = .001**	p = .001**	p = .008*	p = .004*
R^2	.043	.044	.028	.034
Adjusted R^2	.039	.040	.024	.030
Standard Error of Estimate	9.960	9.952	5.295	6.163
Unstandardised Coefficient B	.838**	1.323**	.557* (.209)	.714*
Standard Error	.257	.397	.209	.242

** Significant at the 0.001 level.
* Significant at the 0.01 level.

ACEs, Moral Injury and social support

There was a significant negative correlation between exposure to ACEs and perceived social support (r[186] = -.247, p < .001), indicating that increased ACEs exposure is associated with a reduced sense of social support. Looking at Moral Injury scores, there was a strong negative correlation with perceived social support (r[186] = -.345, p > .001).

Discussion

We know military veterans are more at risk of a range of mental health problems following moral injury. Yet, this study addressed the importance of understanding more fully the factors that may increase or reduce risk, and this paper explored the role of a likely risk factor – prior exposure to ACES – and a potential protective factor – social support.

This study showed that amongst these treatment seeking veterans, ACEs - and in particular Personal Abuse – influenced the development of moral injury following exposure to a PMIE, with evidence of a stronger association for Moral Injury symptoms related to a sense of shame. This indicates a possible childhood factor in the development of Moral Injury in later life amongst military personnel.

As expected, the high prevalence of self-reported ACE exposure observed was comparable with prior research indicating an increased prevalence of ACEs in military populations compared to the general population (Blosnich et al., 2014; Iversen et al., 2009). Associations have previously been found between increased exposure to ACEs, lower socioeconomic status, and military service (Bellis et al., 2014; Lutz, 2008) and it has been hypothesised that a possible motivation for enlisting in the military is to escape difficult life circumstances. 57.8% of ACEs reported in the current sample were Personal Abuse ACEs and 62.1% Family Disruption ACEs. There is little evidence amongst clinical populations or the general population within the UK relating to prevalence of types of ACEs experienced so it is difficult to contextualise and compare this finding more broadly. It is also important to note the risks of potential memory bias associated with historical self-report tools such as the ACE-Q which, whilst difficult to avoid, may influence the data.

Over half the sample (57%) reported exposure to a PMIE, supporting previous research on the association between combat exposure and risk of PMIEs in veterans (Battaglia et al., 2019; Ferrajão, & Oliveira, 2016; Frankfurt & Frazier, 2016; Hodgson et al., 2021; Koenig & Zaben, 2021; Levi-Belz et al., 2020). Notably, many respondents reported exposure to multiple PMIEs and multiple types of PMIE. There is limited research on the impact of differing types of PMIE, although a recent review identified four key aspects which may make development of MI more likely: value conflict, feeling morally overwhelmed and detaching to cope, senselessness, and the surrealness of the circumstance (Fleming, 2022). It may be that the type of PMIE is less relevant than the way the event transgresses one's moral code and values, although further investigation is needed.

Scores on the MIOS measure indicated substantial symptoms of Moral Injury amongst this sample. In recent international research on veterans by Litz et al., (2022), the UK sample reported higher scores than those from Canada, USA, and Australia, with mean scores comparable to that observed in this study.

The finding that exposure to ACEs was associated with Moral Injury is in line with previous research proposing that exposure to ACEs may result in a childhood vulnerability to development of Moral Injury later in life (Battaglia et al., 2019; Williamson et al., 2020). Given exposure to PMIEs is more likely in

veterans, it is important to explore the factors which may determine why only some individuals go on to develop Moral Injury (Blosnich et al., 2014; Koenig & Zaben, 2021). Identifying ACEs exposure as a vulnerability factor is particularly noteworthy given the increased prevalence of ACEs amongst the military personnel as found in the current study and previous research (Blosnich et al., 2014) and raises questions for further research around possible mediators in the relationship between ACEs and Moral Injury.

Significant associations were also found between Personal Abuse ACEs and Moral Injury, at a value comparable to that observed for overall ACEs and Moral Injury. This finding, and previous research in Canadian military populations by Battaglia et al., (2019), raises questions for future research around how much of the overall ACE scores' explanatory value, in the context of Moral Injury, may be accounted for by Personal Abuse ACEs. Previous research has suggested that exposure to Personal Abuse ACEs may be more negatively impactful later in life than exposure to Family Disruption ACEs (Bevilacqua et al., 2021; Negriff, 2020). The current findings add to the growing body of literature exploring the impact of differing types of ACEs and provide further evidence of the vulnerability to emotional disturbance later in life which can be attributed to childhood maltreatment and abuse. Whilst further research is required, it may be appropriate to consider those members of the military who have suffered prior exposure to Personal Abuse ACEs to be at increased risk of poorer mental health outcomes.

Additional exploratory analysis found perceived social support significantly correlated with both ACEs and Moral Injury, supporting previous research proposing a protective role for social support amongst military populations, potentially reducing the risk of developing symptoms of Moral Injury following exposure to a PMIE (Hollis et al., 2023; Williamson et al., 2020). Further, it suggests that one aspect of this may be reducing the risk of developing of Moral Injury, even in the context of early exposure to childhood adversity. Implications of this in terms of prevention and therapeutic treatment are discussed below.

Strengths and limitations

This study had several strengths, including use of large-scale data from a nationally representative sample of treatment-seeking UK veterans. The sample was somewhat skewed demographically towards older White men, although this is reflective of the general make-up of the UK military veteran population

Analysis could not control for all possible variables in the regression models, which is acknowledged as a limitation, as is the use of predominantly correlational analysis and simple linear regressions. Adjusting for some demographic factors such as age, employment status, relationship status, time since leaving the military, or gender may have yielded differing results, and explained some of the associations which were found in the current study. Whilst we can assume that exposure to ACEs precedes the onset of Moral Injury in this sample, we cannot necessarily conclude from these analyses that ACEs are a causal factor in the onset of Moral Injury.

Implications for Future Research and Clinical Practice

This study found the experience of ACES was high in veterans, that veterans reported very high exposure to PMIEs, that many experienced MI and that there was a possible connection between them. ACES, particularly when they involve Personal Abuse, are associated with a higher risk of MI after a PMIE. If this is confirmed, what implications are there for how we support veterans?

We would argue that ACES need to be considered by those providing psychological interventions as a routine part of the assessment. Further, if the association is confirmed in further research, there may be value in screening for particular ACES and targeting those more vulnerable in prevention initiatives.

Recent years have seen the development of psychological interventions targeting shame and guilt, and these would also appear to be relevant for this group (Gilbert, 2009), with consideration to the potential benefits of this being offered in a group format where appropriate to strengthen peer support networks. Additionally, developing robust trauma-informed formal and informal military peer support systems may support the potentially protective role of strengthened perceived social support. As current findings identify an association between ACEs, Moral Injury, and reduced perceived social support, this may also be an area of clinical development and research.

Future research should further investigate the association between PMIEs and Moral Injury, such as the potentially varying impact of differing types of PMIE. For example, exploring whether a PMIE related to the self, others, or betrayal may increase the risk of developing symptoms of Moral Injury, and whether the type of PMIE experienced increases the risk of developing either Trust-based or Shame-based symptoms of Moral Injury. This might lead to greater understanding of the mechanisms by which exposure to PMIE may increase risk of the development of Moral Injury. Additionally, future research could build upon the preliminary analysis conducted within the current study and further explore the role of perceived social support as a potential mediator between ACEs and Moral Injury, with consideration given to adopting a more in-depth mediation analysis.

Conclusions

To our knowledge, this is the first study to explore the relationship between ACEs and Moral Injury amongst a sample of treatment-seeking UK veterans, with a focus on the impact of Personal Abuse ACEs.

The key findings echo much previous research and indicate a high prevalence of ACEs, Moral Injury and a reduced perception of social support in this population. Exposure to ACEs prior to military service was found to have substantial explanatory power in the later development of Moral Injury, particularly for Personal Abuse ACEs and the development of Shame-based Moral Injury. Social support appeared to be a protective factor.

More research is needed to explore the relationship between ACEs and Moral Injury, including possible mediators, with the aim to better understand some of the risk and resilience factors impacting veteran mental health. This may help to inform clinical interventions, service development and identify areas for universal, targeted, and specialist intervention within military and veteran support services.

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