Exploring the relationship between Adverse Childhood Experiences and Moral Injury in UK Treatment-Seeking Veterans.

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The candidate confirms that the work submitted is her own and that appropriate credit has been given where reference has been made to the work of others.

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Abstract

Background: Veterans report higher rates of common mental health difficulties (CMD), post-traumatic stress disorder (PTSD) and alcohol misuse. Increased exposure to adverse childhood experiences (ACEs) is reported by military personnel and veterans, which is a known risk factor for poorer physical and mental health outcomes in adulthood. Veterans face unique occupational stressors during military service, and in transitioning back into civilian life and are at increased risk of exposure to potentially morally injurious experiences (PMIE) and Moral Injury (MI). This study aimed to examine the relationship between ACEs and MI in UK veterans.

Method: A secondary analysis of cross-sectional survey data was used to analyse 428 responses to a routine patient survey, carried out by specialist veteran mental health service Combat Stress. The relationship between ACEs and MI was explored using linear regression analysis. Further correlational analysis explored other possible associations within this relationship.

Results: The majority of respondents experienced ACEs (74.6%) and over half (57.1%) reported exposure to a PMIE. The mean Moral Injury Outcome Scale (MIOS) score was 33.48. High rates of CMD (80.7%), PTSD (68.7%), and problematic alcohol use (81.1%) were reported within the sample, with 72.2% of respondents reporting low social support. ACEs were found to be associated with MI, with Personal Abuse ACEs explaining 4.4% of the variance in MIOS scores. Social support negatively correlated with both ACEs and MI symptoms.

Conclusions: ACEs may be a vulnerability factor increasing the risk of MI following experience of PMIEs during adult military service. Personal Abuse ACEs have been associated with MI particularly in the experience of Shame-related MI symptoms, amongst this sample of treatment-seeking UK veterans. Correlational analysis indicated a potentially beneficial role of social support. Further research is needed to better understand mediating factors in the relationship between ACEs and MI, with clinical implications for supporting veterans who are at risk of, or suffering with, MI.

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List of Abbreviations

Abbreviation	Meaning
ACE	Adverse Childhood Experiences
ACE-IQ	Adverse Childhood Experiences International Questionnaire
ACE-Q	Adverse Childhood Experiences Questionnaire
ACT	Acceptance and Commitment Therapy
ADEXI	Adult Executive Functioning Index
ADHD	Attention Deficit Hyperactivity Disorder
AUDIT	Alcohol Use Disorder Identification Test
CFT	Compassion Focused Therapy
CI	Confidence Intervals
CMD	Common Mental Health Difficulties
CPT	Cognitive Processing Therapy
C-PTSD	Complex Post-Traumatic Stress Disorder
DAR-5	Dimensions of Anger Reactions 5-items
GHQ-12	General Health Questionnaire 12-items
ICD-11	International Classification of Diseases, 11th Edition
ITQ	International Trauma Questionnaire
MACE	Maltreatment and Abuse Chronology of Exposure measure
MI	Moral Injury
MIOS	Moral Injury Outcome Scale
MOD	Ministry of Defence
NHS	National Health Service
NODS-PERC	National Opinion Diagnostic Screen for Gambling Problems – Preoccupation, Escape, Risked Relationship, and Chasing Measure
OCD	Obsessive Compulsive Disorder
ONS	Office for National Statistics
OSSS-3	Oslo Social Support Scale 3-items
PE	Prolonged Exposure

PHQ-15	Patient Health Questionnaire 15-items
PMIE	Potentially Morally Injurious Events
PTSD	Post-Traumatic Stress Disorder
Q-Q Plot	Quantile-Quantile Plot
RAF	Royal Air Force
SCI	Sleep Condition Indicator
SD	Standard Deviation
SoMREC	School of Medicine Research Ethics Committee
SWEMWBS	Short Warwick Edinburgh Mental Wellbeing Scale
UCLA-3	University of California, Los Angeles Loneliness Scale 3-items
UK	United Kingdom
US	United States
VO	Voluntary Outflow
WHO	World Health Organization
Y-BOCS	Yale-Brown Obsessive-Compulsive Scale

Chapter 1: Review of The Literature

The military is one of the longest-standing institutions within the United Kingdom (UK), employing almost 200,000 individuals (Harding & Dempsey, 2021; Ministry of Defence, 2023). In recent years, there has been a welcomed growth in the literature and attention directed at the mental health impact of working in such a high-risk organisation. This research has important implications in terms of service delivery within national organisations such as the Ministry of Defence (MOD), the National Health Service (NHS), and amongst third sector organisations. There are just under 2000 Armed Forces charities, offering support to approximately 6.3 million people across the UK, including serving and ex-serving personnel (Cole et al., 2020). Data from the latest UK Census indicates that there are approximately 1.85 million people in England and Wales who have previously served in the UK Armed Forces, indicating that the veteran community represents 3.8% of the population aged 16 or over (Office for National Statistics; ONS, 2022). This reflects the considerable proportion of the UK population who are affiliated in some way, past or present, with the military and may require ongoing support.

The existing evidence base recognises the specialist psychosocial and mental health needs of the veteran population; there is an understanding that transitioning back into civilian life brings its own challenges, alongside the ongoing psychological effects of having worked in a high-risk organisation, with some exposed to potentially life-altering occupational hazards. One of the commonly identified difficulties within the field veteran mental health is post-traumatic stress disorder (PTSD; Murphy et al., 2019). However, increasingly, research is moving beyond this diagnosis, exploring the increased risk of trauma exposure faced by military personnel and the broader implications of this, such as common mental health difficulties (CMD), issues with substance use and more recently, the concept of Moral Injury (Shay, 1994). Moral Injury (MI) refers to the lasting psychological impact of engaging in or witnessing an event which transgresses one's moral code and values and is a concept which has been the subject of increasing research interest in recent years.

This scoping review of the literature aims to provide an overview of current research into military mental health, with particular attention paid to experiences of those belonging to the veteran community. Nationally within the UK, individuals are eligible for veteran status on the basis they have completed a minimum of one day paid employment within the UK Armed Forces (MOD, 2016). There will be a focus on the experiences of those veterans who have been exposed to early life adversity, and the impact this may

have on mental health difficulties experienced later in life. Given the elevated risk of trauma exposure faced by military and veteran populations, and subsequently the increased risk of reduced psychological wellbeing as a result, the impact of childhood adversity will be considered more specifically in the context of difficulties commonly associated with trauma exposure, such as MI, CMD, PTSD and substance use.

1.1 The UK Armed Forces

The UK Armed Forces are currently the eighth largest public sector employer, comprised broadly of the Army, Royal Marines, Royal Navy, and Royal Air Force (RAF) and staffed by approximately 190,160 individuals (Harding & Dempsey, 2021; MOD, 2023; ONS, 2021). For simplicity, the term 'UK Armed Forces' will be used to collectively refer to the divisions listed above when reviewing literature in this area, and unless explicitly stated, this should not be assumed to include data representative of the UK Special Forces, or to The Brigade of Gurkhas, which refers specifically to units of the British Army staffed by Nepalese Gurkha soldiers.

Within the UK Armed Forces, the Army is the biggest sector, consisting of 116,030 individuals. The Royal Marines and Navy are combined as the second largest division, employing 38,980 individuals, closely followed by the RAF with a staff size of around 37,150. These recent figures disseminated by the MOD (2023) are in-keeping with the staff distribution trends over the last several years, with the Army consistently reported as the largest division. The UK Armed Forces remain predominantly staffed by male service personnel, with female representation having gradually increased in recent years to 11.4% (MOD, 2023b).

Currently, individuals serving within the UK Armed forces must complete a minimum term of four years of service prior to terminating their employment or moving to a position within the Armed Forces Reserves (ForcesWatch, 2011). Around 16,230 individuals left the UK Armed Forces in the 12 months up until December 2022, with the most common reason for leaving cited as 'Voluntary Outflow' (VO; MOD, 2023). This reflects those individuals who choose to leave prior to the end of their agreed engagement or commission period. Approximately 61% of those leaving cited VO, whilst 22.3% cited 'other' reasons, which can include medical reasons, compassionate dismissal, misconduct, and death. These figures represent all four divisions within the UK Armed Forces. The proportion of those leaving for VO, 'other' reasons, or coming to the end of their commission period do not differ significantly between divisions. Whilst the outflow

statistics provide useful information on the percentage of individuals leaving the military each year, the way in which this data are grouped remains vague and as such, it is difficult to further explore individuals' reasons for leaving in any greater detail.

1.2 Mental Health in the Armed Forces

The latest military mental health reports indicate a stable rate of mental health related support seeking within the UK Armed Forces over the last several years, both at a GP and specialist care level. This has remained at around 12.5% of serving personnel. Of this group seeking support for mental health, 2.3% have required further support from MOD specialist mental health services (MOD, 2022). Of those accessing specialist mental health services, the most common difficulties reported were 'neurotic' disorders (i.e., adjustment disorder, generalised anxiety disorder, obsessive compulsive disorder, phobias, or PTSD). Whilst this parallels research from the UK general population, the type of 'neurotic' disorders amongst the general population differs, with higher instances of generalised anxiety, phobias, or obsessive-compulsive disorder (OCD). Instead, within the UK Armed forces, the most common type of 'neurotic' disorder was noted as "Adjustment Disorder" (MOD, 2022, p.16). The second most prevalent diagnosis within specialist military mental health services was Depression, with comparatively low rates of PTSD and Psychoactive Substance Misuse recorded (MOD, 2022).

It is important to note that military mental health data reported above by the MOD is only reflective of those currently serving. This does not consider the ongoing mental health impact for those who have left the military, i.e., the veteran population. It is possible this data is subject to the "healthy-warrior effect", a term described by Haley (p.316, 1998) to reflect the potential bias in characteristics of those military personnel who are actively deployed and remain within the military service for extended periods of time. Hayley reflects that those who enter military service are often among the healthier individuals within the wider population who, given that they must pass medical examinations and fitness tests in order to join the service, report lower levels of chronic illnesses. Further, from this sample of healthier individuals, those who go on to be selected for deployment are likely to be the sub-group soldiers who demonstrate the best physical health. As such, those who experience poorer psychological wellbeing and physical health are more disposed to leave the service or occupy non-deployment roles.

To better understand the unique mental health risks and impact associated with military service, it is necessary to consider data for both currently serving personnel and

data exploring veterans' experiences of ongoing mental health, beyond military service. Whilst the MOD (2022) reports low rates of PTSD in currently serving members of the UK Armed Forces, recent data collected from the large-scale King's Centre for Military Health Research cohort study indicates an increased prevalence of CMD, problematic alcohol use, and PTSD amongst UK veterans when compared with socio-demographically matched members of the general population (Rhead et al, 2022). This research indicates an increase in prevalence of PTSD amongst veterans, from 5% within the general population, to 8% amongst recent UK Armed Forces service leavers. This finding is perhaps unsurprising given the increased risk of exposure to trauma in military combat.

Research comparing the prevalence of mental health difficulties amongst actively serving military personnel, veterans, and the general population has yielded conflicting results. Previous data from a cross-sectional, UK-based survey indicated no relationship was found between military status and increased risk of mental health difficulties when compared to non-veterans (Woodhead et al., 2011). However, more recently, a large body of research argues this is not the case, with differences not only observed in prevalence of mental health difficulties between veterans and the general population, but also between veterans and currently serving personnel. Evidence has indicated that CMD are experienced at a higher rate amongst UK veterans in comparison to their socio-demographically matched counterparts within the general population, and at a markedly higher rate of twice as likely for currently serving military personnel (Goodwin et al., 2015; Rhead et al., 2022).

1.2.1 Risk Factors

Research amongst actively deployed personnel in the UK Armed Forces suggests poorer mental health status amongst non-officers, indicating younger age, female gender, weaker unit cohesion, poorer perceived leadership, and absence of a pre-deployment stress brief were risk factors for mental health symptoms (Mulligan et al., 2010). The pre-deployment stress brief is intended to inform personnel of the nature, effects and management of stress related to operations and is standard practice within the UK Armed Forces, despite limited evidence of its efficacy in distress reduction (Sharpley et al., 2008). Conversely, research amongst veterans identifies male gender as an increased risk factor for both mental health and alcohol misuse (Rhead et al., 2022). Within research on both veterans and currently serving personnel, a consensus appears to be reached in identifying younger age as an increased risk factor for PTSD and other mental health difficulties

(Mulligan et al., 2010; Seal et al., 2009). Whilst both serving and ex-serving military personnel have been indicated to be at increased risk of alcohol misuse, research indicates that currently serving personnel are more likely to identify social pressures as a motivation for alcohol use, whilst veterans may be more likely to describe coping motives for their problem drinking (Irizar et al., 2020). Additionally, veterans have been highlighted to be at increased risk of CMD and PTSD symptoms compared to currently serving personnel, which has been partially accounted for by reduced social participation and disengagement from military social contacts after having left the Armed Forces (Hatch et al., 2013). Across the research, various subgroups have been identified as increasingly vulnerable to experiencing mental health difficulties during or following military service, which highlights the importance of considering the intersection of differing factors which may influence an individual's vulnerabilities and experiences of mental health within and beyond the military.

1.2.2 Post-Service Risk Factors

Understanding the impact of transitioning out of military service is highly relevant when considering veteran health and psychological wellbeing, and this process may bring with it a unique set of experiences and challenges which sets apart veterans' experiences from those who remain within the Armed Forces. Qualitative research describes a sense of existential loss, disconnection, the need to adapt to unfamiliar social norms, with a challenge to one's identity following transition out of military services and into civilian life (Gordon et al., 2020). Additional risk factors which may be barriers to individuals' psychological and functional adjustment into civilian life include overcoming the mental health stigma associated with military culture, availability of specialist veteran support services, social isolation, financial burden, and engagement in meaningful employment (Ainspan et al., 2018; Blackburn, 2017; Misca et al., 2023). Consideration of the similarities, differences, and possible mediators for both serving and ex-serving personnel's mental health experiences will likely have important clinical implications with regards to offering accessible and evidence-based interventions. Understanding at which stages of the military journey differing challenges may emerge will enable more appropriate interventions to be offered from both a preventative and responsive position.

Despite the inconsistencies observed within the military and veteran mental health data, it is universally acknowledged that both serving and ex-serving personnel are exposed to unique occupational stressors, including combat exposure. This has been significantly associated with increased risk of PTSD, and a dose-response relationship has

been observed, with increased combat exposure positively correlated with PTSD symptom severity (Clancy et al., 2006; Seal et al., 2009). More specifically, research indicates that of those subject to combat exposure, personnel who have engaged in combat or witnessed colleague or civilian deaths are at increased risk of suicidal ideation and PTSD (Cesur et al., 2013). One of the identified psychological risk factors associated with combat exposure is the required engagement in actions which may transgress accepted behavioural norms, boundaries, or values (Shay, 1994). Evidence has indicated that acts of transgression have been identified by veterans to be considered significantly traumatic events, with associations identified between transgressive acts, suicidality, PTSD, and a common underlying theme observed to be combat-related guilt (Frankfurt et al., 2017). It is important to acknowledge that amongst military communities, involvement in combat and subsequent engagement in actions that would be considered morally or socially unacceptable in other contexts is commonplace. Individuals within the military are supported through shared mutual experiences, established processes, and by a supportive network of colleagues and professionals who have a good understanding of the culture and context of military life and its unique demands. However, one of the challenges of leaving the military and transitioning into civilian life may be the loss of this contextually related mutual support. Individuals may reflect and consider previous actions as incongruent to the values held in civilian life, impacting the way these experiences may be viewed and processed, therefore increasing the risk of experiencing psychological distress as a result.

1.3 Moral Injury

The concept of MI and its subsequent impact has received increasing attention in scientific research over the last decade with a small, but steadily expanding evidence base emerging, often in the context of military mental health. Early observations by Shay (1994) have acknowledged the lasting psychological impact of a “betrayal of what’s right” experienced by combat veterans (p.3). Later, Litz et al (2009) have further defined the phenomenon of MI 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” (p.700). As such, MI can be conceptualised as the psychological distress, often including intense feelings of guilt and shame, experienced as a consequence of the involvement in or witnessing of incidents which are strongly in conflict with one’s moral code, values, and beliefs.

MI is often discussed in the context of PTSD and whilst both relate to experiences of psychological distress following a traumatic event, and there may be some commonalities between the two, it is important to clearly delineate these as differing experiences which may arise following experience of or exposure to one or multiple traumatic events. Trauma itself is a broad term, often overused and used inappropriately, with well-documented controversies and difficulties defining this concept (Dalenberg, Straus & Carlson, 2017). Traumatic events have been noted to include experiences in which there may be a threat to life, threat of harm, or interpersonal loss. However, the concept of trauma is more complex, and it is acknowledged that the frequency, intensity, duration, predictability, controllability, proximity, interpretation and appraisal of these events also impacts the degree to which these events may be experienced as traumatic (Weathers and Keane, 2007). Following a traumatic experience, some individuals may then go on to develop PTSD. This is one possible trauma response, of which there are many. PTSD is a diagnostic term referring to a mental health disorder with a specific set of symptom criteria as set out in the International Classification of Diseases (ICD-11; World Health Organisation; WHO, 2019). Importantly, whilst MI may also be a possible response to traumatic experiences, it is not classified as a mental health disorder and does not have a specific set of diagnostic criteria. Instead, as defined above, the concept of MI refers to the psychological distress experienced following exposure to traumatic events which violate one's moral code and beliefs. This may present as a feature of PTSD but is not limited to this alone, and may also contribute to other emotional, social, and behavioural difficulties. It is acknowledged in the literature that there is some overlap between symptoms and the facets of distress associated with both MI and PTSD (Griffin et al., 2019). However, differing symptom profiles have been proposed to help distinguish between these two experiences, with a PTSD profile including a greater startle reflex, flashbacks, nightmares and insomnia, whilst an MI profile primarily includes guilt, shame, anger and social isolation (Bryan et al., 2018).

1.4 Impact of Moral Injury

Early research around MI sought to understand this concept in the context of military personnel, with examples given of carrying out acts which would be considered illegal or in violation of socio-cultural rules in other contexts, such as the intentional killing of another person. A range of themes have emerged within research around the kinds of military experiences which may contribute to a sense of violating one's moral code. These

have included disproportionate violence (such as acts of revenge), betrayal in the form of leadership failures, betrayal by peers or failing to live up to one's own moral standards (such as failing to prevent something, i.e., an act of omission), and within-rank violence such as friendly fire (Drescher et al., 2011).

More recent research considers the potential for MI across multiple sectors, including health care and emergency services personnel. This is especially pertinent following the COVID-19 pandemic, during which healthcare and other emergency service professionals were faced with unprecedented uncertainty, risks, and pressures, forcing them to make extremely difficult patient welfare decisions. The decisions healthcare professionals were forced to make may have been in conflict with their personal and professional values, such as not having the staff or equipment resource to be able to deliver appropriate care or caring for critically ill patients in unsafe conditions (Riedel et al., 2022). As such, high rates of MI have been reported amongst healthcare professionals following the global pandemic, with elevated levels amongst those providing medical care to patients presenting with COVID-19 (Wang et al., 2022). Further to the recent research emerging on the psychological impact for healthcare and emergency service personnel working throughout the pandemic, there appears to be greater recognition of the cross-industry importance of understanding the psychological process underpinning MI and the subsequent clinical indications of this phenomenon (Čartolovni et al., 2021; Maguen & Price, 2020).

A review of research identified firefighters, paramedics, and police officers to be at risk of experiencing potentially morally injurious events (PMIEs), with four common themes amongst professionals within these industries, including conflict with personal values, ethical decision making, spirituality, and organizational betrayal (Lentz et al., 2021). It has been acknowledged within the literature that whilst PMIEs can include exposure to traumatic events, this is not a necessary criterion and many PMIEs might not include life-threatening circumstances but instead relate to circumstances in which significant moral dissonance occurs (Litz et al., 2009). Literature exploring the healthcare profession indicates an increased risk of MI amongst this population, with core symptoms associated with MI to include guilt, shame, and loss of trust (Rushton et al., 2022; Stovall et al., 2020). Secondary difficulties included depression, anxiety, anger, interpersonal difficulties, increased risk of clinician burnout, and higher rates of medical errors. (Mantri et al., 2021; Stovall et al., 2020). Similarly, a survey of Veterinarian professionals within the UK, whose role involves making difficult decisions around animal welfare, indicated a high prevalence of exposure to PMIEs. Around 89% of those surveyed had been exposed to a PMIE, which

was significantly associated with symptoms of PTSD (Williamson, Murphy & Greenberg, 2022).

Significant associations have been consistently reported between exposure to PMIEs and a range of psychiatric conditions including PTSD, depression, and suicidality (Griffin et al., 2019; Williamson et al., 2018). International literature across a range of roles including military personnel, police officers, healthcare professionals, educators, and professionals involved with child protective services proposes an association between MI and suicidality, deliberate self-harm, aggression towards others, hostility, and substance misuse (Griffin et al., 2019). Further correlations have also been identified between MI and anxiety, burnout, chronic pain, sleep disturbances, and reduced quality of life, although these relationships have been less consistently observed within the data and may require further investigation (Hall et al., 2021; McEwen et al., 2021; Williamson et al., 2018). MI appears to be correlated, to varying extents, with a diverse range of other difficulties. It is unclear whether this is reflective of a widespread and transdiagnostic impact of MI, or whether this is a consequence of the continued absence of one clear, unified definition around the concept of MI.

Qualitative research has identified a sense of self-doubt, distrust, and decreased confidence in being able to engage with loved ones and society following the exposure to PMIEs and the subsequent development of MI (McCormack & Ell, 2017). As such, there is evidence of reduced 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). Evidence of an association between MI and increased risk of spiritual distress has also been reported, which is cause for concern given that spiritual distress has been identified as an independent risk factor for suicide (Kondrath, 2022).

Whilst the body of literature surrounding MI grows, and expands across industries, an important criticism of this research is the lack of consistency around definitions of both MI itself, and of the type of event which can be considered potentially morally injurious (Griffin et al., 2019). This said, it is important to acknowledge the widespread impact of MI and research expanding this concept beyond military settings highlights the prevalence and impact of this difficulty. The requirement for further, robust research must be acknowledged with the aim of expanding the evidence base and better understanding how

to conceptualise, prevent, and intervene with the impact and associated difficulties related to MI.

1.5 Moral Injury and the Military

Research into MI began with a focus on military personnel and there is a consensus within the literature that given the unique risks associated with this profession, such as combat exposure, this is a population at increased risk being exposed to PMIEs and subsequently to developing symptoms of MI (Koenig & Zaben, 2021). Research into United States (US) military populations indicates that amongst active-duty military personnel with a diagnosis of PTSD, over 80% had been exposed to PMIEs and exhibited at least one symptom of MI (Volk & Koenig, 2019). Similarly high rates of MI have been indicated amongst US veterans with a diagnosis of PTSD, with over 90% reporting at least one symptom of MI (Koenig et al., 2018). This research is corroborated with other international research indicating a high prevalence of exposure to PMIEs and subsequent MI symptoms amongst military personnel and veterans in Australia, Portugal, Israel, and Canada (Battaglia et al., 2019; Ferrajão, & Oliveira, 2016; Hodgson et al., 2021; Levi-Belz et al., 2020).

Within the limited research into the risk factors and prevalence of MI in UK military populations, clinician observations have been reported to estimate a minimum of 50% of veterans presenting for mental health treatment have been exposed to PMIE (Williamson et al., 2019). Notably, research seeking to expand on the literature reporting on MI prevalence in the UK Armed Forces identified a small but significant relationship between MI and exposure to adverse events during service, which distinct from exposure to combat-based PMIEs, included emotional bullying, physical, and sexual assault (Williamson et al., 2021).

Perhaps unsurprisingly, combat exposure and deployment length have been identified to increase risk of exposure to PMIEs and the subsequent development of MI, within military populations (Frankfurt & Frazier, 2016). Age and religious faith appeared to be protective factors and were negatively correlated with MI amongst veterans (Koenig et al., 2018; Volk & Koenig, 2019). Preliminary research suggests a possible protective role of social support; evidence indicates social support from friends, family, colleagues, and superiors could be hypothesised as a potential moderator in reducing the risk of MI symptoms following exposure to a moral transgression (Hollis et al., 2023; Williamson et al., 2020). Notably, veterans who met criteria for CMD or PTSD were more likely to report

expressions of MI when compared to those who had received treatment and were considered in remission from PTSD (Ferrajão, & Oliveira, 2016; Williamson et al., 2021). It is possible this may be the result of some form of cognitive or recall bias, and further research is required to better understand this difference in the reporting of expressions of MI.

1.6 Proposed psychological Models for Moral Injury

Whilst research proposes underlying mechanisms of MI to include negative self-appraisals rooted in shame and guilt, there remains a paucity of literature clearly identifying the theoretical underpinnings in the construct of MI (Frankfurt et al., 2017). As such, current literature draws on existing psychological models of PTSD, adapting these accordingly in an attempt to more clearly conceptualise the experience of MI.

The socio-cognitive model of PTSD has been adapted to support a theoretical understanding of MI. This model posits that in the event of exposure to a traumatic incident, individuals process new information which is incompatible with existing schemas, or cognitive models, of how the world, self or others function. Further to this experience, difficulties arise integrating this new information - as it may be incongruent with previously held beliefs - which creates psychological distress in the form of self-blame, denial, and/or recurrent, intrusive thoughts (Horowitz, 1986; Janoff-Bulman, 1989). In line with this theoretical conceptualisation that distress arises following a dissonance between existing beliefs, schemas or meanings held about the world and new information acquired during a traumatic experience, Larner and Blow (2011) propose a model of meaning-making coping following trauma exposure in combat veterans. Larner and Blow's model suggests that military personnel hold pre-deployment *Global Meanings* or schemas about the world, the self, others, and what is right or wrong. If an individual then goes on to experience traumatic events during deployment which are then appraised in a way that violates pre-existing Global Meanings, this is likely to result in distress. Larner and Blow identify the discrepancy between the way in which these experiences are appraised in the context of one's Global Meanings as a key process in the experience of distress, and propose a requirement for reappraisal to support integration with Global Meanings. Litz et al. (2009) seek to expand these conceptualisations beyond PTSD and propose that in cases of MI, enacting a moral transgression violates existing schemas about what is right or wrong, and about the 'goodness' or morality of the self. Difficulties integrating these experiences with existing beliefs about the world and self may lead to intrusive thoughts and avoidance

behaviours, which may serve to maintain distress. Litz et al. (2009) acknowledge that socio-cognitive theories applied to MI need to reflect the depth and scale of altered beliefs about the self, others, and the world, and considers that individuals suffering with MI may develop strongly held and extreme views of themselves or the world as immoral and irreparably 'bad'.

Another useful model to hold in mind is emotional-processing theory (Foa & Kozak, 1986). This model expands on traditional behaviourist learning theories of fear and avoidance following traumatic events and provides a more comprehensive theoretical understanding of the distress evident in PTSD (Foa et al., 1989). Emotional-Processing Theory attributes the emergence of PTSD to the development of pathological fear memories and excessive stimulus-response patterns following trauma exposure. As with socio-cognitive theories, emotional-processing theory proposes that a consequence of these pathological fear memories is the development of dysfunctional post-trauma schemas related to the safety of the world and the coping ability of the self. In the event of avoidance or denial of the emotional experience associated with a trauma, an individual does not have adequate opportunity to emotionally process the trauma, and habituation and extinction is not possible. Therefore, the trauma-related psychological distress is maintained. Whilst this is a useful theory to hold in mind and may reflect one of the multiple aspects maintaining the distress associated with MI, it may be considered reductionist and incomplete as a theoretical explanation for a more emotionally complex experience (Litz, et al., 2009).

The cognitive model of PTSD (Ehlers & Clark, 2000) places greater emphasis on the sense of threat experienced through excessively negative appraisals of the self, the world, and others. This results in a perceptual priming or a cognitive bias to negative attributions as well as difficulties contextualising the traumatic event(s) experienced. The cognitive model of PTSD proposes that distress is maintained by a number of maladaptive cognitive and behavioural responses. Litz et al. (2009) propose that in the context of PMIEs, appraisals and attributions related to the moral transgression may influence the development of MI, and the subsequent psychosocial consequences such as shame and avoidance.

Finally, a diathesis-stress model has been proposed to support the explanation of the development of PTSD in only some individuals, rather than in all who have experienced traumatic events (Elwood et al., 2009). It has been suggested that certain individual differences existing prior to exposure to the traumatic event can increase one's

vulnerability to developing symptoms of PTSD. Elwood and colleagues hypothesise the presence of a cognitive profile; this profile includes a negative attribution style (i.e., a tendency towards hopelessness and attribution of negative outcomes to internal, stable, and global factors), rumination, anxiety-sensitivity, and an excessively threat-focused attention and interpretation bias. Litz et al., (2009) posit that Elwood et al.'s model of vulnerability may also be generalisable to the development of MI.

Whilst these models may offer initial theoretical explanations for some aspects of the development and maintenance of MI, existing theoretical models of PTSD remain insufficient in their explanation of the mechanisms involved in the maintenance of distress associated with MI. As such, the need for a comprehensive theoretical account for the processes involved in MI remains ongoing. The development of a model of MI may help to identify those individuals more vulnerable to experiencing MI following exposure to PMIE, and how best to intervene in the treatment, prevention, and distress reduction for MI.

1.7 Psychotherapeutic Interventions for Moral Injury

There is not currently an established, evidence-based treatment intervention for MI. There are several current barriers to the development of such an intervention, including the lack of consensus amongst researchers around the definition of MI, the absence of a widely used, standardised assessment tool or measure, and as discussed above the ongoing need for a comprehensive theoretical understanding of MI.

However, whilst the field of research expands, there is emerging practice-based evidence for the application of some psychological interventions which are more commonly used in the treatment of PTSD. Research indicates a reduction of MI symptoms in veterans who have received treatment and achieved remission from PTSD (Ferrajão, & Oliveira, 2016). The two most established treatments at present are Prolonged Exposure (PE) and Cognitive Processing Therapy (CPT; Griffin et al., 2019). PE to imaginal or in vivo experiences on a repeated basis in the treatment of PTSD is rooted in behaviourism and emotional processing theory and intends to habituate the individual and promote extinction of the fear response (Hembree et al., 2003). Smith et al., (2013) propose an adapted form of PE specifically for MI, with a greater focus on the emotional experiences of guilt and shame more commonly associated with MI.

CPT has been applied to MI in much the same way it has been used as an evidence-based treatment for PTSD. The treatment aim is to challenge unhelpful or inaccurate cognitions which may persist following exposure to a PMIE, with a view to develop more

adaptive, balanced, and realistic cognitions (Resick et al., 2017). A review of the limited literature on adapting evidence-based interventions in the treatment of MI indicates that both CPT and PE serve to effectively reduce the guilt and shame emotions associated with MI (Steinmetz & Gray, 2015). However, it should be noted that the mechanism of action associated with the efficacy of these treatment interventions for MI remains relatively unknown (Griffin et al., 2019).

Other therapeutic interventions which have been proposed in the treatment of MI include Acceptance and Commitment Therapy (ACT), as this has been evidenced to be effective in targeting distress associated with shame and may have transferable utility (Nieuwsma et al., 2015). In addition, research on clinicians' experiences of working with MI indicates that in clinical practice, often an integrative approach is used, with clinicians drawing on a range of models (Williamson et al., 2019). These integrated approaches may include established evidence-based PTSD interventions alongside elements of Compassion Focused Therapy (CFT; Gilbert, 2010) and imagery rescripting (Holmes et al., 2007).

1.8 Adverse Childhood Experiences

Although there is not yet a consensus in the literature on the definition of Adverse Childhood Experiences (ACEs), this term is commonly used in reference to the experience of stressful and potentially traumatic events which may occur during childhood or adolescence (Karatekin & Hill, 2019). The term ACEs can refer to a range of adverse experiences including, but not limited to, multiple forms of abuse, such as physical, sexual, and emotional. In addition, ACEs can be experienced in the form of disruptive events such as parental incarceration or parental substance use issues. ACEs have become the focus of increasing research interest in recent decades. There is now a substantial evidence-base indicating a consistent and well-established association between ACEs and an increased risk of CMD and poor physical health outcomes in adulthood, as evidenced in several meta-analyses and systematic reviews of the literature (Felitti et al., 1998; Sahle et al., 2022). There is acknowledgement, within both research and clinical practice, that early experiences play an important role in the biological, psychological, and social functioning of adults. Understanding the impact of childhood experiences has substantial clinical utility in the treatment and prevention of mental and physical health difficulties in adults (Sheffler et al., 2020).

As with MI, one of the challenges within the ACEs literature, is inconsistency amongst the both the definition of ACEs, and the assessment of ACE exposure. The ACEs

Questionnaire (ACE-Q), initially developed by Felitti et al. (1998) is a commonly used measure, exploring experiences of psychological, sexual, or physical abuse, neglect, and household disruption. The ACE-Q measure can be largely grouped into two subsets of experiences: Personal Abuse (psychological, physical, and sexual abuse and neglect items) and Family Disruption (household disruption items). It should be noted that the ACE-Q, like many other commonly used measures of ACEs, rely entirely on self-report data, however the consistency of data obtained from such a large sample size of over 8000 participants in Felitti et al.'s research suggests a degree of reliability for this measure. Additionally, amongst the literature, it is widely recognised that the ACE-Q provides some homogeneity in the assessment of ACEs and holds a stronger dose-response predictive validity than other available measures (Hughes et al, 2017; Zarse et al., 2019).

1.9 Mental Health Impact of ACEs

Research continues to demonstrate a reliable association between ACEs and CMD in adulthood, indicating a marked increase to risk of anxiety disorders, internalizing disorders, depression, and suicidality (Bellis et al., 2019; Sahle et al., 2022). There is evidence that exposure to even 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). Evidence suggests that ACEs can contribute to development of a range of clinically complex difficulties, including PTSD, emotional regulation difficulties, and many other co-morbid physical health difficulties (Herzog & Schmahl, 2018). Not only are individuals exposed to a greater number of ACEs at increased risk of developing such difficulties; there is also evidence to suggest that an earlier age of illness onset, greater symptom severity, and poorer treatment outcomes may be related to childhood maltreatment (Teicher & Samson, 2013).

Neuroimaging research has indicated associations between exposure specifically to Personal Abuse ACEs and an increased sensitivity to multiple, interconnected regions of the brain associated with processing and interpretation of threat and emotional regulation, including the amygdala and hippocampus (Gerin et al., 2019; Hein & Monk, 2017; Phelps & LeDoux, 2005; Teicher & Samson, 2016). Researchers have questioned the role that the type and timing of ACEs may play, proposing the possibility of vulnerable developmental phases wherein the risk of neurobiological alterations may be increased (Herzog & Schmahl, 2018). In line with this, research amongst a sample of psychiatric inpatients

indicates associations between physical and emotional neglect in early childhood and an increased risk of dissociation in adulthood (Schalinski et al., 2016). This same research also observed a dose-response pattern of ACEs in the development of PTSD in adulthood; emotional neglect in middle childhood was also observed to be related to increased severity of depression in later life. Whilst Schalinski et al.'s findings support valuable emerging ideas that there may be developmentally sensitive periods in which exposure to ACEs may increase vulnerability to differing but specific difficulties in later life, it is important to note that this research has been carried out retrospectively on a sample of adults diagnosed and in treatment for psychiatric illness. Therefore, the sample is inherently biased and only reflective of those who have struggled with severe and enduring mental health difficulties and accessed support. It must be held in mind that these findings may not reflect the experiences of those who have been exposed to ACEs but do not present to mental health services.

To reduce the risk of bias from retrospective research, the longitudinal UK millennium cohort study was established with the intention of following a large sample of nationally representative children, born in 2000-2001, and collecting survey data throughout their childhood from the age of nine months and again at three, five, seven, 11, and 14 years of age (Connelly & Platt, 2014). Research from the millennium cohort study has supported previous evidence of a dose-response relationship between ACEs and poor psychological, physiological, and social outcomes evident from as early as age 3 and persisting into adolescence, with an indication that this vulnerability is increased for those exposed to three or more ACEs (Bevilacqua et al., 2021). This study also provides support for prior research proposing differences in outcome depending on the type and timing of ACE exposure. Bevilacqua et al. (2021) identified associations between harsh parenting and physical punishment with conduct difficulties and hyperactivity in children. They also observed a negative association with prosocial behaviours, such as sharing and being kind to peers, in children exposed to harsh parenting and physical punishment, both of which notably appeared to impact males more than females.

The negative impact of ACEs and mental health outcomes is now widely accepted in the literature; more recent research is exploring the nuances of relationship in greater depth, and beginning to distinguish between the two subsets of ACEs, household disruption (referred to in the current research as Family Disruption) and maltreatment (referred to as Personal Abuse) and exploring how these may differently impact health outcomes. A systematic review of ACEs literature focused on the impact of Personal Abuse ACEs, recognising this subtype to be a greater risk factor in the development of depression,

anxiety disorders and substance misuse in adulthood (De Venter et al., 2013). This is corroborated by later research proposing that exposure to personal abuse ACEs may be more negatively impactful than Family Disruption (Negriff, 2020). Negriff's research identifies the Personal Abuse ACEs to primarily account for mental health symptoms, even when both subtypes of ACEs were analysed together, and noted statistically significant associations between Personal Abuse ACEs and depression, anxiety, trauma, and externalising behaviours. This has important implications for further research, clinical use of ACE assessment tools, and in the consideration of how to prioritise preventative interventions such as parenting support. Emerging evidence suggests a role of perceived social support in moderating the adverse mental health impact of ACE exposure, with this to be strongest for those individuals who had experienced Personal Abuse ACEs (Cheong et al., 2017; McCutchen et al., 2023).

In addition to further exploring the influence of type and timing of ACEs, research is also beginning to explore the transgenerational impact of ACEs, with a relationship emerging between parental ACEs and their children's behavioural difficulties, including attention deficit hyperactivity disorder (ADHD) and emotional disturbance (Schickedanz et al., 2018). Recent research has indicated that maternal history of ACEs has been negatively associated with children's health outcomes, with a significantly increased risk of behavioural, conduct and learning difficulties (Luo et al., 2023). The potential of a transgenerational impact of ACE exposure, i.e. the possibility that a parent's exposure to ACEs may impact their child's development and wellbeing, requires further research as little is known in this area and a greater understanding of the risk and impact factors will have important clinical and preventative utility. This research also identified a rejecting parenting style as a possible mediator in the relationship between maternal ACEs and children's behavioural difficulties. It may be the case that a parent's exposure to ACEs may influence their own parenting style, and Luo et al., (2023), identified a rejecting parenting style to be a mediator in the relationship between maternal ACEs and children's behavioural difficulties. However, it should be noted that from this research it is not possible to infer that it is ACEs which have shaped or influenced parenting style. As such, further research is required to better understand any possible impact of early childhood adversity on parenting styles in adulthood. Understanding the factors which influence parenting style, and the potential role of ACEs in informing parenting style has broad clinical implications and may help to support development of parenting support interventions, early attachment work, infant mental health services, and children and young people's wellbeing services.

1.10 Physical Health and Socio-Economic Impact of ACEs

In addition to the extensive literature highlighting the association between ACEs and increased risk of mental health difficulties in adulthood, there is a strong body of research indicating an association with poorer physical health outcomes. A systematic review of US ACEs literature indicates a range of physical health difficulties associated with self-reported ACEs, including cardiovascular, respiratory, and autoimmune illnesses, all of which are likely to incur greater healthcare utilization and associated costs in the billions of dollars (Bellis et al., 2019; Kalmakis & Chandler, 2015). Consistent with research highlighting the mental health impact of ACEs, Felitti et al. (1998) observed a dose-response relationship for the physical health impact of ACEs, find a higher number of ACEs experienced to be positively associated with the presence of adult illnesses including cancer, skeletal fractures, chronic lung, and liver diseases.

Research also indicates an association between ACEs and health-risk behaviours, such as increased likelihood of obesity, physical inactivity, smoking, and substance misuse (Bellis et al., 2019; Chang et al., 2019; Dube et al., 2010; Felitti et al., 1998; Rogers et al., 2022). A positive association has been shown between ACEs and the development and severity of substance use disorders in adulthood (Leza et al., 2021). Poor socioeconomic factors, which have consistently been negatively associated with health outcomes, have also been explored, with research indicating an association between ACES and risk of lower educational attainment, income, an increased likelihood of incarceration, unintentional pregnancy, and employment difficulties in adulthood (Bellis et al., 2014a; Cutler et al., 2008; Dube et al., 2010).

A systematic review of literature from UK, Canada, and US data indicates a high lifetime prevalence of ACEs amongst adults experiencing homelessness, with over 85% of those studied having experienced at least one ACE, and over 50% of homeless adults experiencing four or more ACEs (Liu et al., 2021). Similarly, an association between ACEs and incarceration has been observed with Graf et al., (2021) identifying a dose-response relationship between number of ACEs experienced and likelihood of criminal justice system contact. This research has been corroborated by national, longitudinal data from the UK which indicates that accumulated exposure to ACEs is associated with increased likelihood of police contact (Jackson et al., 2022). Although it should be noted that in this research, police contact was more likely to be experienced by young people who were older, male, and Black – suggesting there may some intersection with other factors, such as gender or racial biases, as well as ACEs, influencing young people's experiences of police contact.

This said, Jackson et al. identified that compared to those with no self-reported ACEs, those with three or more ACEs were more than twice as likely to have had police contact. It is difficult to establish clear causality between exposure to ACEs and socioeconomic difficulties in adulthood, however associations have been made between individuals growing up in greater areas of social deprivation and higher number of reported ACEs, suggesting a possible cyclical impact of ACE exposure (Bellis et al., 2014a).

The evidence base continues to grow, with consistent findings internationally and cross culturally, in support of a clear and distinct association between ACEs and poor biological, psychological, and social outcomes in adulthood over the last two decades. Research has consistently indicated a dose-response relationship between ACEs and health outcomes (Felitti et al., 1998; Tan & Mao, 2023; Zarse et al., 2019), with evidence that greater ACEs are resultant in increased risk of poor physical and mental health outcomes and lower socioeconomic status (Dube et al., 2010; Hughes et al., 2017; Rogers et al., 2022). Despite the consensus amongst the literature with regards to the negative impact of ACEs, there are some methodological limitations to note amongst this research. The ACEs literature is most often based on retrospective self-reported ACE history, which is vulnerable to inaccuracy and subjectivity. In addition, there is a lack of consistency in the measures used to assess ACEs, as noted above, with some research using the ACE-Q (Felitti et al., 1998), and others using the ACE International Questionnaire (ACE-IQ; WHO, 2018) or the Maltreatment and Abuse Chronology of Exposure measure (MACE; Teicher & Parigger, 2015). This said, a relative strength of the ACEs literature is that it is well researched internationally with consistent results across different countries and cultures (Hughes et al., 2017). However, despite the breadth of international research being identified as a strength of the ACE literature, it is argued that much of the cross-cultural literature remains in high income countries, with further research required in middle- and low-income countries (Sahle et al., 2022).

1.11 Underlying Mechanisms associated with ACEs

Whilst there has been a wealth of research into the association between ACEs and both physical and mental health outcomes, the psychological mechanisms underlying this relationship, and other factors which may moderate these associations, remain relatively poorly understood (Cloitre et al., 2019). Preliminary research has suggested possible roles for social support and for emotional regulation skills in mediating the impact of ACEs in adulthood, which may have useful clinical implications, however a sound theoretical

understanding of the psychological processes impacted by exposure to ACEs remains lacking (Cheong et al., 2017; Cloitre et al., 2019).

A stress-sensitization model has been proposed in the context of ACEs and experiences of CMD in adulthood, with research indicating that mental health difficulties may be more easily triggered in those who have been exposed to ACEs (Hammen et al., 2000). Whilst this highlights an important vulnerability, once again, this model does not explain the mechanisms impacted by experiencing childhood adversity.

As such, Sheffler et al. (2020) draw on a range of existing research to propose a bio-psycho-social model of core areas of development impacted by exposure to ACEs. It is suggested that on a biological level, individuals exposed to ACEs have increased activity in the body's threat system. Areas of the brain, such as the amygdala, have been highlighted as demonstrating heightened reactivity to threat, with a downstream effect of this sensitized stress response being increased inflammation, a biomarker associated with multiple mental and physical health difficulties (Nusslock & Miller, 2016). On a behavioural level, Sheffler et al., (2020) note that maltreated children, due to their adverse experiences and the neurobiological changes discussed above, may be more likely to perceive the environment around them as threatening or unpredictable and in turn may establish some avoidant coping behaviours. Whilst it is acknowledged these avoidance strategies may be necessary to survival at the time of the mistreatment, ongoing use of these behaviours can be detrimental in adulthood, with the absence of established adaptive coping, emotional regulation, and problem-solving skills in the context of both interpersonal and environmental stressors in later life (Briere, 2002). The psychological impact of exposure to ACEs is also considered with reference to early theories of relational schema development (Baldwin, 1992). It is proposed that exposure to maltreatment alters the internalised view of the self, world, and others, with increased risk of individuals viewing themselves as unacceptable and viewing the world and others as untrustworthy and threatening (Briere, 2002). This may then impact the ability to establish and maintain healthy and stable interpersonal relationships in adulthood. In addition, evidence suggests that exposure to ACEs may increase the risk of developing a negative cognitive style, including biased appraisals, negative attributions, and an internalised self-critical narrative (Sachs-Ericsson et al., 2006). It is possible that a consequence of this is increased vulnerability to mental health difficulties through some form of confirmation bias, with individuals' anticipating or misinterpreting criticism and negativity as default. This cognitive profile is associated with poor emotional regulation, a feature of a wide range of mental health disorders, including depression, personality disorders, and PTSD (Scheffler et

al., 2020). Understanding the wide-ranging impact ACE exposure may have on the biological, behavioural, and psychological processes noted above is essential in the interest of developing and delivering a holistic approach to treatment which may include a combination of psychological, social, and pharmacological interventions. It is also important to consider, when approaching clinical interventions, that these processes may be impacted both independently and interactively and are likely to contribute to the development and to the maintenance of social, physical, and mental health difficulties in adulthood.

1.12 ACEs and Military Mental Health

In line with the wider body of evidence exploring the impact of ACEs on health and social outcomes, evidence suggests that for those with a history of active military duty, exposure to ACEs increases risk of homelessness, as well as physical and mental health difficulties (Montgomery et al., 2013). This is unsurprising given similar outcomes observed amongst the general population (Bellis et al., 2014a; Sahle et al., 2022). However, whilst a comparable risk of homelessness and poor physical health in adulthood was observed for both veterans and members of the general population who had a history of exposure to ACEs, the relationship between ACEs and mental health was significantly stronger for those with a history of active military duty (Montgomery et al., 2013). This indicates a greater vulnerability amongst military personnel, with a history of exposure to ACEs, in the development of mental health difficulties in adulthood. Evidence suggests that the prevalence of ACEs is higher amongst military personnel, when compared with general population, and therefore understanding the interaction between military related factors, ACEs, and mental health outcomes is essential to adequately support this population identified to be at increased risk (Blosnich et al., 2014; Katon et al., 2015). Research indicates that amongst a sample of UK military personnel, 76% of individuals had been exposed to two or more childhood vulnerability factors prior to enlisting (Iversen et al., 2007).

Research has also indicated a gender difference in the experience and impact of ACEs amongst both Canadian and US military personnel, with women identified as more likely to report exposure to ACEs when compared to both their civilian counterparts, and male military personnel (Gottschall et al., 2022; Katon et al., 2015). Amongst a sample of UK female veterans, Personal Abuse ACEs were more frequently reported, with strong associations noted between exposure to ACEs and mental health disorders, including PTSD,

as well as adversities experienced during military service such as bullying, sexual harassment, and assault (Williamson, Baumann & Murphy, 2022a). Despite the higher prevalence of ACEs amongst female military personnel, evidence suggests a greater negative impact of ACEs on male military personnel's health outcomes and health quality of life (Katon et al., 2015). Additionally, a stronger association was observed between Personal Abuse ACEs and symptoms of PTSD and depression amongst male military personnel (Gottschall et al., 2022).

Given that military populations have been identified at increased risk, understanding the mediating factors between ACEs and mental health outcomes in adulthood may help to inform the clinical interventions and preventative strategies targeted specifically to these groups. Evidence suggests the relationship between ACEs and mental health in adulthood may be mediated by social support, sense of mastery, and number of combat stressors. These factors may be important to consider when establishing and delivering treatment interventions to minimize the impact of ACEs on health and social outcomes in later life, for military personnel (Lee et al., 2016).

1.13 ACEs & MI

Emerging evidence seeking to understand the underlying mechanisms by which exposure to ACEs influences adult mental health has indicated a role for MI (Bonson et al., 2023; Roth et al., 2022). Early life experiences and parental interactions have been identified as influential in the development of moral sensibility, conscience development, empathy, and prosocial behaviours (Thompson, 2019). As such, exposure to childhood adversity and insecure parental attachment has been linked to disrupted relationship development, maladaptive interpersonal styles, and the development of negative self-schemas (Briere, 2002; Tezel et al., 2015; Thompson, 2019). The presence of maladaptive interpersonal styles and a negatively biased cognitive profile have also been recognised as common underlying mechanisms by which vulnerability to MI may be increased (Litz et al., 2009).

Socio-cognitive perspectives of MI suggest that exposure to ACEs may be a predisposing factor to MI, and that the maladaptive beliefs and schemas developed following exposure to early adversity may prime individuals for an increased vulnerability to MI, following exposure to a PMIE (Bonson et al., 2023). In addition, another common feature between ACEs and MI is the potentially mediating role of social support (Cheong et al., 2017; Hollis et al., 2023; Williamson et al., 2018). Given the increased risk of

developing maladaptive relational styles and subsequent interpersonal difficulties as a result of exposure to ACEs, it is possible that at the time of being exposed to a PMIE, individuals may not have developed the social network and coping resources to make use of and benefit from social support in the prevention or mediation of the impact of MI (Bonson et al., 2023; Tezel et al., 2015; Williamson et al., 2020).

Recent research has sought to understand the interaction between ACEs and MI. Findings of preliminary research has identified MI to hold a mediating role between exposure to ACEs and mental health difficulties in adulthood, with emotional regulation also identified as a significant moderator in this relationship between ACEs and mental health outcomes in later life (Roth et al., 2022).

1.14 ACES & MI in Military

Much of the limited research into the relationship between MI and ACEs has been conducted in the context of military personnel. In line with the theoretical and empirical evidence above, Williamson et al. (2020) have identified exposure to ACEs as a possible risk factor for the development of MI following exposure to PMIE. Significant associations have been observed between exposure to ACEs and MI in both UK and Canadian treatment-seeking veterans (Battaglia et al., 2019; Williamson et al., 2021). The link between ACEs and MI is of particular interest to clinicians and researchers, given the increased rates of ACEs observed amongst military personnel, and the increased risk of exposure to PMIEs as an occupational hazard (Blosnich et al., 2014; Koenig & Zaben, 2021). This is an important area of clinical research, given the association between exposure to ACEs and increased risk of developing PTSD, substance misuse difficulties, suicidality, and other mental health difficulties, even after for controlling for combat related traumatic experiences (Iversen et al., 2007; Sareen et al., 2013).

Research amongst treatment-seeking Canadian military personnel indicated an increased prevalence of exposure to Personal Abuse ACEs and noted this was significantly correlated with symptoms of MI following exposure to PMIE during military service (Battaglia et al., 2019). This raises questions as to the role of Personal Abuse ACEs specifically, in increasing the risk of experiencing MI. Further research is required to better understand this association, with the hope of identifying vulnerability factors which may mediate the risk of developing MI amongst those at increased risk of exposure to PMIEs.

1.15 The Current Study and Research Aims

The development and experience of mental health problems in those who are currently serving or have previously served in the Armed Forces have long been an area of clinical and research interest. A particular focus of the research has been PTSD, given the long-standing association with military service and combat exposure, however more recently this focus is expanding beyond PTSD. Understanding the variables which may act as risk or protective factors among military personnel for the later development of mental health problems, including PTSD, is of great importance, with considerable clinical implications. Recent literature has highlighted two promising areas for research: ACEs and MI.

Evidence indicates that the development of MI, following exposure to PMIE, is an important risk factor for PTSD, as well as other presentations of psychological distress which may be of particular relevance for the veteran community. In addition, evidence is emerging suggesting that exposure to ACEs during early life may increase the likelihood of experiencing symptoms of MI. This is pertinent to the military and veteran community who may be increasingly vulnerable given the higher prevalence of ACEs reported amongst these populations, which may then be further compounded by the elevated risk of exposure to PMIEs during military service and combat.

The current project seeks to expand on previous research by Williamson et al. (2020) and Battaglia et al. (2019) and aims to explore the relationship between two key variables, ACEs and MI, and the development of mental health problems in a large cohort of UK Armed Forces veterans. Using secondary analysis of data from a large cross-sectional survey, the current research will aim to address the following questions:

(i) Do ACEs explain worse Moral Injury outcome?
(ii) Do Personal Abuse ACEs explain severity of Moral Injury symptoms?
(iii) Do Personal Abuse ACEs explain Trust-based symptoms of Moral Injury?
(iv) Do Personal Abuse ACEs explain Shame-based symptoms of Moral Injury?

Chapter 2: Method

2.1 Design

The current research was a secondary analysis of cross-sectional survey data, undertaken with support of Combat Stress, a UK-based military veterans mental health charity (see Appendix A for Data Sharing Agreement). Combat Stress is a large third sector service, commissioned by the NHS to deliver specialist trauma care, delivering both residential and community-based multidisciplinary mental health interventions nationally across the UK, receiving approximately 2,600 referrals per year (Busuttil, 2017; Murphy et al., 2019).

Secondary analysis involves making use of an existing data set to explore previously unaddressed research questions or hypotheses (Doolan & Froelicher, 2009). Advantages of secondary data analysis include flexibility, and a reduced time and cost demand which can accelerate the pace of research and maximise the investigative opportunities from large data sets before the information collected becomes outdated (Dunn et al., 2015). However, secondary analysis can be limited by incomplete data sets, improperly measured variables, and reduced familiarity with the data collection process by the researcher (Dunn et al., 2015; Johnston, 2014). Another recognised disadvantage of secondary analysis is that the data have been collected for a different primary purpose. Therefore, key information required to answer the secondary research questions may not have been collected and consequently analysis may be limited (Boslaugh, 2007). Despite these limitations, secondary data analysis has been identified as an effective and efficient approach when careful consideration of the data set's available power and data quality is applied in support of a robust and systematic analysis (Doolan & Froelicher, 2009; Dunn et al., 2015; Johnston 2014).

Data was collected at a single time point from individuals who had accessed the service within a one-year period and had also provided consent to participate in research. Participants were invited to complete a survey comprising a series of self-report measures, including questions around demographic information, military history, lifestyle factors, mental and physical health symptoms (see Appendix B for Patient Needs Survey).

2.2 Ethical Considerations

2.2.1 Ethical Approval

Ethical approval for this project was granted on 28th February 2023 from the University of Leeds: School of Medicine Research Ethics Committee (SoMREC; Ref: MREC 21-053; Appendix C).

Ethical approval for the initial data collection was granted by the Combat Stress Research Committee (Williamson et al., 2022b).

2.2.2 Confidentiality and Data Protection

To protect anonymity, no personally identifiable information was included with the data received from Combat Stress. Instead, participants were coded for the purpose of identification during analysis. Storage of all electronic data was carried out in line with University of Leeds Data Protection Policy.

2.3 Participants

Data for the current study was collected as part of more extensive and routine research completed by Combat Stress. As part of regular assessment of the experiences and needs of the service users attending Combat Stress, large-scale patient experience surveys are carried out. The most recent survey was carried out in 2020, from which the current study's data have been sought. This survey was disseminated to a randomly selected sample of patients who had previously attended support via Combat Stress, to explore the health and wellbeing outcomes of a nationally representative sample of treatment-seeking UK veterans (Williamson et al., 2022b).

Treatment-seeking veterans were randomly selected and invited to participate in this research on the basis they had (i) attended a minimum of one assessment/intervention appointment within Combat Stress during the previous one-year period of 2019-2020, (ii) provided consent to be contacted for research purposes, and (iii) provided a contact email address. A total of 989 participants 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.,

2022b). No other significant differences in socio-demographic or military characteristics were found between responders and non-responders.

It should be noted that for the purpose of this research, treatment-seeking has been defined as an individual who had attended a minimum of one treatment appointment with Combat Stress (Williamson, et al., 2022b). As noted previously, nationally within the UK, individuals are eligible for veteran status on the basis they have completed a minimum of one day paid employment within the UK Armed Forces (MOD, 2016), and as such this will be the criterion used to define veteran status for the purpose of this research.

2.4 Survey Procedure

Following the initial random selection, identified veterans who had accessed Combat Stress and met the criteria detailed above (N = 989) were contacted via email and invited to take part in the research study by completing an online version of the survey. The online version was distributed by Survey Monkey, an online survey creation and collection tool. In total, five email invitations were sent to eligible participants over a period of six weeks, with data collected between August and September 2020. Following this preliminary phase of data collection, all remaining eligible participants who had not yet responded (n = 692) were sent a paper copy of the survey, by post, in October 2020.

2.5 Measures

2.5.1 Measures used in the survey

The original research study disseminated a 10-page questionnaire, split into eight sections; (1) About You, (2) Your Military History, (3) Questions About Your Health, (4) Questions About Your Social Network, (5) Questions About Your Lifestyle, (6) Questions About Feeling Stressed or Angry, (7) Questions About Symptoms Related to a Stressful Event, (8) Questions About Life Growing Up.

As part of the 'About You' section, participants were asked to complete demographic data relating to sex, age group, ethnicity, employment status, relationship status, housing status, and educational attainment. To collect information on military history, participants were 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.

Questions about health included data on healthcare service utilization, such as NHS 111 and Accident and Emergency services, as well as questions exploring sleep quality, physical health, CMD and cognitive function. Sleep quality was measured using the Sleep Condition Indicator (SCI; Espie et al., 2014). Physical health data were collected using the 15-item Patient Health Questionnaire (PHQ-15; Spitzer et al., 1999). CMD, such as depression and anxiety, were measured by the 12-item General Health Questionnaire, on which a score of four or higher is indicative of possible presence of CMD (GHQ-12; Goldberg & Williams, 1988). Cognitive functioning was measured by the Adult Executive Functioning Inventory (ADEXI; Holst & Thorell, 2018). The final aspect of health assessed was mental wellbeing, as measured by the Short Warwick Edinburgh Mental Wellbeing Scale (SWEMWBS; Vaingankar et al., 2017).

Questions about social network included measures around social connection and support. The Oslo Social Support Scale-3 (OSSS-3; Dalgard, 1996) was used to measure perceived social support, 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. The three-item University of California, Los Angeles Loneliness Scale (UCLA-3; Hughes et al., 2004) was used to measure loneliness and social connection.

Lifestyle questions collected data around gambling and alcohol use habits. The four-item National Opinion Research Center Diagnostic Screen for Gambling Problems – Preoccupation, Escape, Risked Relationship, and Chasing measure (NODS-PERC; Volberg et al., 2011) was used to assess pathological gambling. Data on alcohol use was obtained through the Alcohol Use Disorder Identification Test (AUDIT; Babor et al., 2001; Saunders et al., 1993). Possible scores on this measure range from 0 – 40, with higher scores indicative of more severe difficulties with alcohol use. Scores can also be categorised into hazardous alcohol use (scores of >8) and harmful alcohol use (scores of >16).

Alongside questions about feeling stressed or angry, questions were included about obsessions and compulsions, as measured by the Yale-Brown Obsessive-Compulsive Scale (Y-BOCS; Goodman et al., 1989). Feelings of anger were measured by the Dimensions of Anger Reactions-5 (DAR-5; Forbes et al., 2014).

Symptoms related to a stressful event were evaluated through two measures exploring trauma and moral injury. The International Trauma Questionnaire (ITQ; Cloitre et al., 2018; Murphy et al., 2020) was used to measure symptoms of PTSD and Complex PTSD (C-PTSD). The ITQ comprises two nine-item sections, scored on a five-point Likert scale from 0 (not at all problematic) to 4 (extremely problematic). Items in the first section explore recent difficulties with re-experiencing symptoms, avoidance, and hyperarousal, whilst items in the second section explore difficulties related to C-PTSD as measured by disturbances in self-organisation; affective dysregulation, negative self-concept, and disturbances in relationships. Possible scores on each section range from 0 – 36 and an overall total is calculated by combining both sections, with a maximum possible score of 72. To satisfy diagnostic criteria for PTSD, a score of >2 must be observed in each domain in the first section. Criteria for C-PTSD is met when PTSD criteria is met, with the addition of a score of >2 in each of the symptom clusters in the second section. Higher scores are indicative of greater symptoms of PTSD experienced in the past month. 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, rated on a five-point Likert scale of 0 (strongly disagree) to 4 (strongly agree). 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 MI.

Data about early experiences and exposure to ACEs was collected using the 10-item Adverse Childhood Experiences Questionnaire (ACE-Q; Felitti et al., 1998). This measure covers a range of ACE items, with two identified subscales: Personal Abuse ACEs and Family Disruption ACEs. Personal Abuse ACEs include physical, emotional, sexual abuse and neglect. Family Disruption ACEs refer to familial or household disruption such as parental incarceration, substance misuse, mental health issues, or domestic violence. Possible scores on the ACE-Q measure range from 0 – 10, with scores of >4 identified as high exposure to ACEs.

The measures used in the original survey are listed below in Table 1.

Table 1. *List of standardised measures used in survey, with those obtained for current secondary analysis research highlighted in grey.*

Measure	Construct	Reference
Sleep Conditions Indicator (SCI)	Sleep Disorders	(Espie et al., 2014)
Patient Health Questionnaire (PHQ-15)	Somatic Symptoms	(Spitzer et al., 1999)
General Health Questionnaire (GHQ-12)	CMD	(Goldberg & Williams, 1988)
Adult Executive Functioning Inventory (ADEXI)	Executive Functioning	(Holst & Thorell, 2018)
Short Warwick Edinburgh Mental Wellbeing Scale (SWEMWBS)	CMD	(Vaingankar et al., 2017)
Oslo Social Support Scale (OSSS-3)	Perceived Social Support	(Dalgard, 1996)
University of California, Los Angeles Loneliness Scale (UCLA-3)	Loneliness	(Hughes et al., 2004)
National Opinion Research Center Diagnostic Screen for Gambling Problems – Preoccupation, Escape, Chasing and Risked Relationship (NODS-PERC)	Problem Gambling	(Volberg et al., 2011)
Alcohol Use Disorder Identification Test (AUDIT)	Alcohol Use	(Babor et al., 2001; Saunders et al., 1993)
Yale-Brown Obsessive Compulsive Scale (Y-BOCS)	Obsessions and Compulsions	(Goodman et al., 1989)
Dimensions of Anger Reactions (DAR-5)	Anger	(Forbes et al., 2014)
International Trauma Questionnaire (ITQ)	PTSD & Complex-PTSD	(Cloitre et al., 2018; Murphy et al., 2020)
Moral Injury Outcome Scale (MIOS)	Moral Injury	(Litz et al., 2022)
Adverse Childhood Experience Questionnaire (ACE-Q)	ACEs	(Felitti et al. 1998)

2.5.2 Measures used in Current Research

Responses to the following measures were included in the data set provided by Combat Stress: SCI, PHQ-15, GHQ-12, OSSS-3, UCLA-3, AUDIT, Y-BOCS, DAR-5, ITQ, MIOS & ACE-Q; in addition, demographic data and military history data were also provided.

The current secondary analysis study focused only on those measures pertinent to the research questions. Table 2 lists the scales, subscales, and demographic information utilised in the secondary analysis, colour coded for whether it was thought to be an outcome, predictor, confounder, or possible mediator variable.

Symptoms associated with MI, as measured by the MIOS, were the primary outcome of interest. Data collected on exposure to ACEs, as measured by the ACE-Q, was explored in possible association with MI. Data reflecting experiences of CMD, PTSD and/or C-PTSD, alcohol use, and perceived social support, as measured by the GHQ-12, ITQ, AUDIT, and OSSS-3 respectively, were preliminarily explored as factors potentially associated in the relationship between MI & ACEs. All other data available, such as demographics, military history, and other health information were treated as possible confounders.

Table 2 *Summary of data analysed in current secondary analysis study.*

Domain	**Measure**	**Data Type**	**Outcome**	**Predictor**	**Confounder**	**Mediator**
Demographics	Gender	Categorical				
	Age	Ordinal				
	Employment Status	Dichotomous				
	Relationship Status	Dichotomous				
	Housing Status	Dichotomous				
	Last Rank *(officer or non-officer)*	Dichotomous				
	Service	Categorical				
	Role in Service *(Combat or non-combat)*	Dichotomous				
	Reason for Leaving *(VO or Non-VO)*	Dichotomous				
	Years Since Leaving	Continuous				
	Time Since Leaving (Group)	Ordinal				
	Length of Service	Continuous				
	Early Service Leaver	Dichotomous				
Moral Injury	Moral Injury Outcome Scale: Exposure Items *(PMIE, Self, Other, Betrayal)*	Dichotomous				
	MIOS Total Score	Continuous				
	MIOS Trust Subset	Continuous				
	MIOS Shame Subset	Continuous				

Domain	Measure	Data Type	Outcome	Predictor	Confounder	Mediator
ACEs	ACE-Q Total Score	Continuous				
	ACE Family Factors	Continuous				
	ACE Personal Factors	Continuous				
Mental Health	General Health Questionnaire (GHQ-9)	Continuous				
	International Trauma Questionnaire (ITQ) Total	Continuous				
	ITQ – Section A – PTSD Threshold met.	Dichotomous				
	ITQ – Section B – CPTSD Threshold met	Dichotomous				
General Functioning	Oslo Social Support Scale (OSSS-3)	Continuous				
	Alcohol Use Disorders Identification Test (AUDIT)	Continuous				
	AUDIT Hazardous Drinking	Dichotomous				
	AUDIT Harmful Drinking	Dichotomous				

2.6 Data Cleaning

Upon receipt of the data file, information was cross checked to ensure all required data was included. Grouping of data was checked to identify and correct any errors. The category labelled 'High ACEs' was adjusted to reflect participants scoring four or more on the ACE-Q, as this was previously including only those who scored over five on the measure.

2.7 Data Analysis

The data was analysed using SPSS version 28 (IBM Corp, 2021). Missing or incomplete data was not included in the analyses. The data was explored using descriptive statistics (means, standard deviations, minimum and maximum values), frequencies and histograms. In addition to descriptive statistics, normality testing, and quantile-quantile (Q-Q) plots were used to explore the distribution of the data and determine suitability for further parametric testing (see Appendix D for preliminary data exploration to assess distribution of data). This initial exploration of the data was carried out for data on ACEs, MI, CMD, PTSD/C-PTSD symptoms, alcohol use, social support, and all socio-demographic data (i.e., age, gender, employment, relationship, housing status, rank, role, service, reason for leaving, length of service, and time since leaving). Total MIOS scores were the only data set to be identified as normally distributed following normality testing, however Q-Q plotted data for distribution of ACE scores did not indicate any marked issues with kurtosis, though the data did appear slightly skewed. Given the characteristics of the sample, i.e., treatment-seeking UK Veterans, it was expected that many aspects of the data would be skewed, such as gender distribution, age, and CMD scores. As the Q-Q plots indicate that the quantiles fall sufficiently close to a normal distribution, it was determined that parametric testing would be appropriate, as this has been identified within research as a preferred approach to data analysis (Grech & Calleja, 2018).

Descriptive statistics were calculated for all variables noted above, with means and standard deviations calculated for continuous variables and frequency counts used to reflect dichotomous and categorical variables.

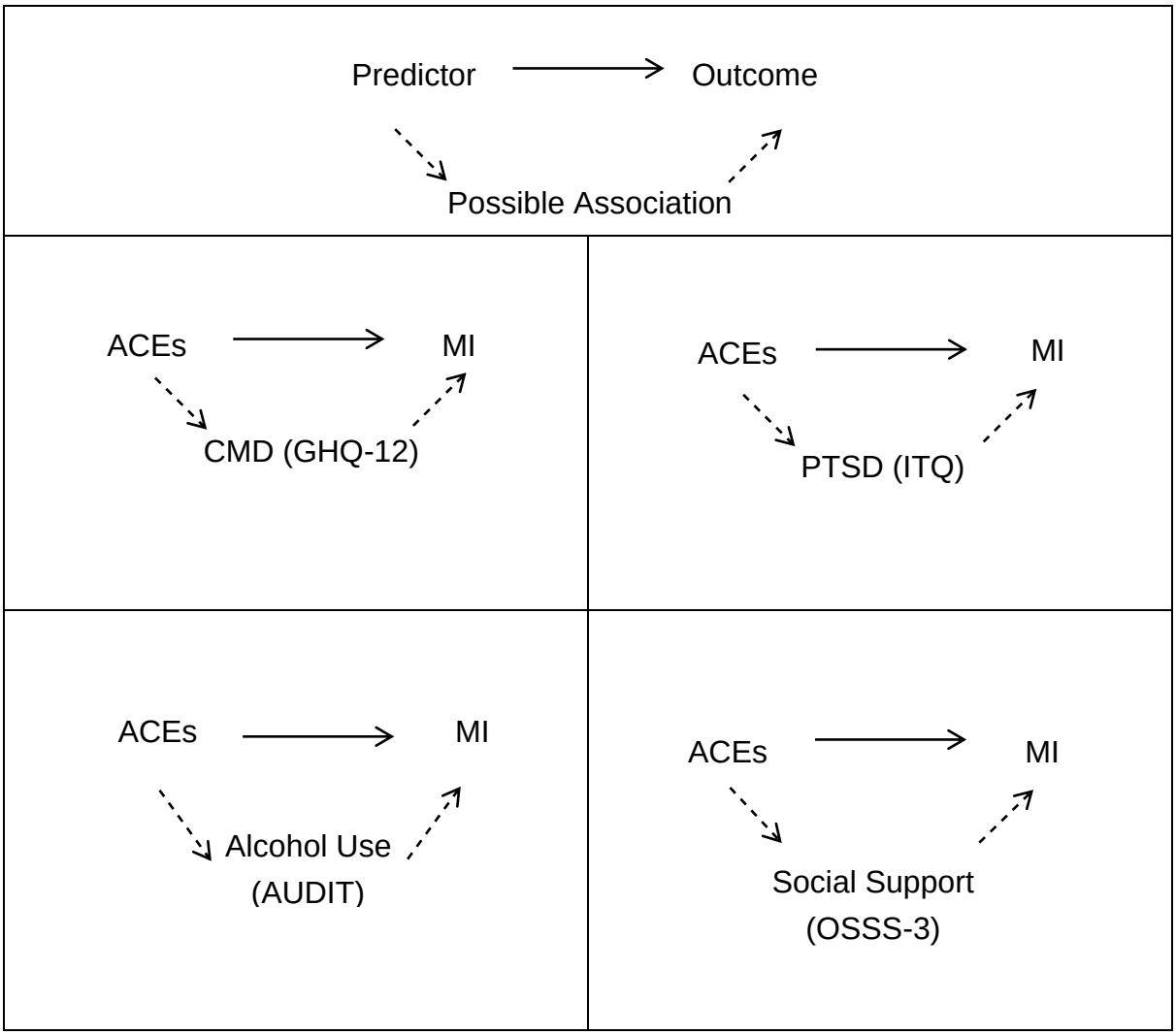
Consultation was sought from a statistician affiliated with the University of Leeds to review data analysis and seek guidance on any further or alternative tests required. From this, it was deemed parametric testing was appropriate, which is in keeping with the

previous approach to analysis of this data set by Williamson et al. (2022b). It was also decided that further preliminary exploration of possible variables associated in the relationship between ACEs and MI could be sufficiently carried out using descriptive statistics and correlational analysis.

The next stage of analysis was to examine any associations between ACEs and MI. This was carried out by calculating the Pearson's correlation coefficient 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 explore the explanatory value of ACEs (identified as the independent variable) in the later development of symptoms of MI (the dependent variable), with a particular focus on the impact of Personal Abuse ACEs on overall symptoms of MI, and in both domains of trust and shame. This method of analysis was selected to reflect the research questions of the current project, in which a single predictor is being explored in the context of a single outcome, with a linear relationship hypothesised. A strength of this method of analysis is its simplicity in presenting the relationship between two clinically relevant variables, and the ability from this to draw inferences about larger populations or data sets, and make predictions about future data (Marill, 2004). Four independent linear regression models were calculated to explore the relationship between ACEs and MI; Personal Abuse ACEs and MI; Personal Abuse ACEs and Trust-based symptoms of MI; and Personal Abuse ACEs and Shame-based symptoms of MI. Outputs from each model are reported with 95% Confidence Intervals (CI), and with p-values of ≤ 0.05 considered statistically significant.

The final stage of analysis was to use descriptive and correlational analyses to explore any possible factors associated with the relationship between ACEs and MI. As such, associations between ACES, MI and the following variables were explored; CMD, symptoms of PTSD, alcohol use, and perceived social support. Descriptive analysis included comparing means for each item in relation to observed means for ACEs and MI. Bivariate correlational analysis was carried out by calculating the Pearson's correlation coefficient between ACE-Q and MIOS scores, as well as correlation coefficients between these variables and the following measures, respectively: GHQ-12, ITQ, AUDIT & OSSS-3 scores (See Figure 1 for a visual representation of possible variables associated with the relationship between ACEs and MI explored).

Figure 1. *Explanatory Model with Possible Associations, as explored in current study.*



Chapter 3: Results

3.1 Demographic Information & Sample Characteristics

A total of 428 survey responses were received as part of this research. Of this sample, a significant majority of participants were male (97.4% versus 2.6% female respondents). Just over half of the sample (56.3%) were currently employed or retired, with 43.7% not currently working. Around two-thirds of respondents (66.5%) reported themselves to be in a relationship and 33.5% identified themselves as not in a relationship. Table 3 further describes the socio-demographic characteristics and military history of participants. The majority of participants had served in the British Army (82.5%), with a smaller proportion having served in the Navy (11%) and the smallest group being those who had served in the Royal Air Force (6.5%). Only 4.4% of respondents were early service leavers, i.e., those who leave prior to completing four years of continuous service. Just over half of participants (54.9%) left the military voluntarily, with the remainder of the sample (45.1%) identifying their reason for leaving as non-voluntary/medical. Most participants had combat or combat support roles during their military service (94.1%), with a small proportion being employed in non-combat roles (5.9%). At the time of leaving the military, 11.2% of the sample were employed as Officers, whereas the remaining 88.8% of the sample were employed in other roles.

Table 3. *Socio-demographic Characteristics and Military History of Participants.*

Demographic	Category	N	Total 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			396	
Status	Working or Retired	223		56.3
	Not Working	173		43.7
Relationship			397	
Status	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

Demographic	Category	N	Total N	%
Early Service			385	
Leaver	No	368		95.6
	Yes	17		4.4

3.2 Prevalence of ACEs, PMIE, Health & Wellbeing Outcomes

Descriptive statistics for the ACE-Q, MIOS, and their respective subscales are summarised in Table 4, along with each of the health and wellbeing outcomes of interest (GHQ-12, ITQ, AUDIT & OSSS-3). The mean ACE-Q score for this sample was 2.72 (SD = 2.45), with 25.4% of respondents reporting no ACE exposure and 35% of respondents indicating high exposure to ACES (i.e., four or more). Of those reporting exposure to ACEs, 62.1% reported exposure to Family Disruption, and 57.8% reported exposure to Personal Abuse ACEs.

Over half of respondents (57%) reported exposure to a PMIE, and the mean MIOS score for the sample was 33.48 (SD = 10.11) indicating the presence of MI symptoms amongst this cohort. This measure has a possible range of 0 – 56, and a sample range of 2 - 56. Broken down by subscale, the mean score for MIOS Shame-based items was 16.37 (SD = 6.25), and the mean score for MIOS Trust-based items was 16.67 (SD = 5.33).

Amongst wider health and wellbeing outcomes the most frequently reported outcome was CMD, with 80.7% of respondents meeting criteria for this, and a mean GHQ-12 score of 7.4 (SD = 3.99) being reported. The next most frequently reported outcome was alcohol use with a mean overall AUDIT score of 10.51 (SD = 8.41), and 81.1% of the sample reporting hazardous (55.9%) or harmful alcohol use (25.2%). Low perceived social support was reported by 72.2% of respondents and rates of probable PTSD were also high (68.7% overall), with 62.5% of respondents experiencing symptoms of C-PTSD, and the remaining 6.2% of those meeting criteria reporting symptoms of PTSD.

Table 4. *Descriptive Statistics for ACEs, MI, PMIE, and Health & Wellbeing Outcomes*

Measure	n	Minimum	Maximum	Mean	SD
ACE-Q Total	346	0	10	2.72	2.453
ACE-Q Family Disruption	346	0	5	1.61	1.596
ACE-Q Personal Abuse	346	0	5	1.11	1.223
MIOS Total	244	2	56	33.48	10.110
MIOS Shame	253	0	28	16.37	6.247
MIOS Trust	254	0	28	16.67	5.332
GHQ-12	373	0	12	7.40	3.994
ITQ Total	355	0	48	32.20	11.048
AUDIT	286	0	40	10.51	8.414
OSSS-3	360	3	14	7.26	2.467

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
ITQ			355	
	PTSD Threshold	244		68.7
	C-PTSD Threshold	222		62.5
AUDIT			286	
	Hazardous Drinking (scores of >8)	160		55.9
	Harmful Drinking (scores of >16)	72		25.2
OSSS-3			360	
	Threshold	260		72.2

Measure	n	Minimum	Maximum	Mean	SD
GHQ-12			373		
	Threshold	301		80.7	

3.3 ACEs and Moral Injury Correlations

An overview of the strength of the correlations between ACEs and MI are described in Table 5. A significant positive correlation was found between total ACE scores and total MI scores (r[239] = .207, p < .001). A significant positive correlation was also observed between ACE scores and both Trust and Shame subscales of MI (r[239] = .186, p = .002; r[239] = .189, p = .002). There was a significant correlation between ACE scores in the Personal Abuse domain and total MI (r[239] = .211, p < .001) and between Personal Abuse ACEs and the Trust subset of MI (r[239] = .20, p < .001). Personal Abuse ACEs were also observed to have a significant positive correlation with the Shame subset of MI (r[239] = .181, p = .002). Weaker significant positive correlations were also observed between the Family Disruption domain of ACEs and overall MI (r[239] = .141, p = .014), the Trust subset of MI (r[239] = .138, p = .016) and the Shame subset of MI (r[239] = .120, p = .031).

As may be expected, a significant positive correlation was found between total ACE scores and both domains of ACEs: Personal Abuse and Family Disruption (r[239] = .902, p < .001; r[239] = .833, p < .001). Additionally, a significant positive correlation was found between total MI scores and the Trust and Shame based subset of MI (r[239] = .890, p < .001; r[239] = .923, p < .001).

Table 5. *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.

3.4 Further Analyses of Possible Variables Associated with Both ACEs and MI

An overview of the strength of the correlations between ACEs, MI, and identified possibly associated variables (CMD as measured by GHQ-12; PTSD and C-PTSD symptoms as measured by ITQ; Alcohol use as measured by AUDIT; and perceived social support as measured by OSSS-3) are described in Table 6. There was a significant negative correlation between exposure to ACEs and perceived social support (r[186] = -.247, p < .001), indicating that increased ACE exposure is associated with a reduced sense of social support. There was a very weak significant positive correlation between ACEs and symptoms of PTSD and C-PTSD (r[186] = .160, p = .014). No significant correlations were found between ACEs and CMD or Alcohol use for this sample.

There was a significant positive correlation between MI symptoms and CMD (r[186] = .295, p < .001). A significant negative correlation was observed between MI symptoms and perceived social support (r[186] = -.345, p > .001). A weaker significant positive correlation was evident between MI and Alcohol use (r[186] = .182, p = .006). Finally, a moderate significant positive correlation was found between MI symptoms and symptoms of PTSD and C-PTSD (r[186] = .554, p < .001). The only variables which correlated significantly with both ACEs and MI, and therefore might be considered as possibly associated within the relationship between ACEs and MI, were perceived social support and symptoms of PTSD and C-PTSD.

Table 6. *Exploratory Correlational analysis of possible variables associated with both ACEs & MI.*

	ACE-Q	**MIOS**	**GHQ-12**	**ITQ**	**AUDIT**
ACE-Q	-				
MIOS	.234**	-			
GHQ-12	.040	.295**	-		
ITQ	.160*	.554*	.510**	-	
AUDIT	.042	.182**	.040	.073	-
OSSS-3	-.247**	-.345**	-.269**	-.366**	-.032

N.B.

** Correlation is significant at the 0.01 level.

* Correlation is significant at the 0.05 level.

3.5 Research Questions

3.5.1 Do ACEs explain Moral Injury Outcome?

Four simple linear regression models were calculated to explore the explanatory power of ACEs, specifically the explanatory value of Personal Abuse ACEs on symptoms of MI:

(i) Model 1 – simple linear regression exploring explanatory value of ACEs on MI
(ii) Model 2 – simple linear regression exploring explanatory value of Personal Abuse ACEs on MI
(iii) Model 3 – simple linear regression exploring explanatory value of Personal Abuse ACEs on Trust subscale of MI
(iv) Model 4 – simple linear regression exploring explanatory value of Personal Abuse ACEs Shame subscale of MI

These models are referred to in the text and in Table 7 as Models 1, 2, 3, and 4 respectively.

Model 1 was calculated to explain symptoms of MI (as measured by MIOS) based on exposure to ACEs (as measured by ACE-Q). A significant regression equation was found ($F(1, 239) = 10.669$, $p = .001$, 95% CI [29.35, 33.08]), with an R^2 of .043, indicating that exposure to ACEs has a small but significant explanatory value of MI Symptoms, and is able to explain 4.3% of the variance to MIOS Score within this sample. Analysis indicated that for every one-point increase in ACE-Q score, the MIOS score increased by .838, $p = .001$.

3.5.2 Do Personal Abuse ACEs explain Moral Injury Outcome?

Model 2 was calculated to explain symptoms of MI based on exposure to Personal Abuse ACEs (as measured by ACE-Q, questions 1-5). A significant regression equation was found ($F(1,239) = 11.086$, $p = .001$, 95% CI [29.30, 33.35]), with an R^2 of .044, indicating that exposure to Personal Abuse ACEs has small but significant explanatory value and accounted for 4.4% of the variance to MI Symptoms. Analysis indicated that for every one-point increase in Personal Abuse ACE-Q score, the MIOS score increased by 1.323, $p = .001$.

3.5.3 Do Personal Abuse ACES explain Trust Moral Injury?

Model 3 was calculated to explain trust-based symptoms of MI based on exposure to Personal Abuse ACEs. A significant regression equation was found ($F(1,249) = 7.134$, $p = .008$, 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 symptoms of MI, accounting for 2.8% of the variance on the Trust subscale of MIOS scores within this sample. Analysis indicated that for every one-point increase in Personal Abuse ACE-Q score, the MIOS Trust subscale score increased by .557, p = .008.

3.5.4 Do Personal Abuse ACES explain Shame Moral Injury?

Model 4 was calculated to explain shame-based symptoms of MI based on exposure to Personal Abuse ACEs. A significant regression equation was found (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 symptoms of MI, accounting for 3.4% of the variance on the Shame subscale of MIOS scores within this sample. Analysis indicated that for every one-point increase in Personal Abuse ACE-Q score, the MIOS Shame subscale score increased by .714, p = .004.

Table 7. *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.

Chapter 4: Discussion

4.1 Summary of main findings

Mental health within the UK Armed Forces and veteran community has been a growing area of research for some time, with a recognition of the increased risks and vulnerabilities often faced by these populations. Large scale research indicates high rates of CMD, PTSD, and problematic alcohol use experienced by veterans (Rhead et al., 2022). Furthermore, higher exposure to early adversity has been noted within military and veteran populations, which is a known risk factor for the later development of a range of mental health, physical, and social difficulties (Bellis et al., 2019; Montgomery et al., 2013; Sahle et al., 2022). It is acknowledged that military personnel face a range of unique occupational stressors, including combat exposure, which has been identified as a risk factor in the subsequent development of mental health difficulties, most notably PTSD (Clancy et al., 2006; Seal et al., 2009). Additional to the occupational hazards which may arise during military service, veterans are also faced with potential challenges whilst transitioning out of the military and back into civilian life. Research has identified some of these potential challenges to include a sense of disconnection, adapting to differing social norms, existential loss, and having to adapt to a differing sense of identity (Gordon et al., 2020). This may be further compounded by ongoing mental health stigma associated with military culture, social isolation, and inconsistent or limited availability of specialist veteran support services (Ainspan et al., 2018; Blackburn, 2017; Misca et al., 2023). Given the increased frequency of ACE exposure reported by military personnel and veterans, and the further risk factors faced during and upon completing military service, the veteran community can be considered a population at higher risk of mental health difficulties. Therefore, further exploration of the risk factors and potential vulnerabilities amongst veterans is important to better understand the needs of this group, identify gaps in current service provision, and establish opportunities to offer meaningful and effective support to reduce the prevalence and severity of mental health difficulties experienced by the veteran community.

The current study has been an opportunity to explore, in detail, an existing database for the purposes of secondary analysis. The evidence base around MI has been steadily growing over the last decade, with further investigation of the impact of MI, and the factors which may be influential in its development. MI has been identified as a risk factor for PTSD and has also been associated with a range of additional psychological

difficulties (Hall et al., 2021; Koenig et al., 2018). This concept is highly relevant to the military and veteran populations, given the risk of exposure to PMIE during combat. Recent research is indicating an association between ACEs and MI, both of which are prevalent at higher rates amongst veterans.

The main aims of the current research were to further explore the possible relationship between ACEs and MI amongst a population of treatment-seeking British military veterans. At the time this research was conducted, it was the first study to explore the associations between these two variables within a treatment-seeking sample of UK veterans. The main findings indicate that, following exposure to a PMIE, ACEs hold an explanatory power in the later development of MI. This indicates a possible childhood risk factor in the development of MI in later life amongst military personnel, with implications for support. Furthermore, the current research indicates that ACEs experienced within the Personal Abuse domain have been identified as explanatory of vulnerability to later development of MI, with evidence of a stronger association for MI symptoms related to a sense of shame.

4.1.1 Summary of Demographic Findings

In line with known demographic trends within the UK Armed Forces, the majority of survey respondents were male (97.4%) and had served in the British Army (82.5%). This is unsurprising given this is the largest division with the UK Armed Forces, and previous demographic data have indicated that females remain a minority group within the military (MOD, 2023; MOD 2023b). Whilst the current sample's demographic distribution is reflective of the general make up of the UK Armed Forces, this is an important factor to hold in mind when interpreting and understanding the findings of the current study. The current findings may be less reflective of female veterans or those who have served in the Navy, RAF or special forces. Similarly, it is also important to caveat all findings from this study by holding in mind the clinical nature of the current sample. The population surveyed reflects those who have struggled with mental health, sought help, and been able to access support. Therefore when comparisons are made with other populations, it must be held in mind that the current findings are reflective of a largely male, treatment-accessing sample of veterans, most of whom have served in the Army, and therefore may not be reflective of broader populations of veterans or indeed of civilians.

Just under half of respondents, around 45.1%, indicated they had left the military non-voluntarily and/or for medical reasons – as noted previously, the vague language used in recording military outflow means that it is difficult from this data to ascertain the

proportion of individuals who left the military for reasons specifically related to their mental health. It may be useful in future data collection to elicit more detail on respondents' reasons for leaving the military, as this may offer further insight into the impact of mental health difficulties on willingness and ability to continue serving within the UK Armed Forces. Similarly, whilst 43.7% of the sample were not currently in employment or retirement, it is unclear why this may be the case, and what proportion of these individuals may be out of employment for reasons related to mental health. Seeking clarity on this in future research may further clarify the mental health impact faced by veterans in multiple aspects of life.

Around two-thirds of respondents (66.5%) described themselves to be in a relationship. This is of interest given that social support has previously been hypothesised as a protective factor with regards to mental health status amongst military personnel. Social support has also been proposed in previous research as a possible moderator in reducing the risk of MI (Hollis et al., 2023; Williamson et al., 2020).

The risk of combat exposure, and subsequently risk of exposure to PMIE, is likely to be high amongst this sample, given that 94.1% of the sample had been employed in combat or combat-support roles whilst serving in the military.

4.1.2 Prevalence of ACEs

The current study found a high prevalence of self-reported ACE exposure within this sample of treatment-seeking UK veterans. Exposure to ACEs was reported by 74.5% of respondents, with 35% of this group meeting criteria for 'high' exposure to ACEs (i.e., four or more). This corroborates previous research which has reported 76% of a sample of UK military personnel have been exposed to at least two childhood vulnerability factors (Iversen et al., 2007). In addition, the current findings are in line with research which has indicated an increased prevalence of ACEs reported by military personnel when compared to the general population (Blosnich et al., 2014). In comparison, research estimating ACE exposure amongst the general population within the UK indicates a prevalence of around 46.1%. Within this proportion of the general population disclosing exposure to ACEs, 23% of this group go on to report exposure to two or more ACEs (Hughes et al., 2021). Currently, it remains unclear from the research why there is an elevated prevalence of ACEs amongst military personnel, a pattern which has been observed internationally across military research from the US, Canada, and UK (Blosnich et al., 2014; Katon et al., 2015; McGlinchey & Armour, 2023). Associations have been found between increased exposure to ACEs and lower socioeconomic status, as well as between lower socioeconomic status

and military service (Bellis et al., 2014a; Lutz, 2008). It has been hypothesised that a possible motivation for enlisting in the military is the opportunity to escape difficult life circumstances, however this has not been evidenced within the research as yet. It is also important to consider that within the current sample, there is the possibility of some inaccuracy and recall bias when measuring exposure to ACEs, as this information is gathered based on retrospective self-reported data. Evidence suggests that individuals who are actively experiencing difficulties with mental health are more likely to report further symptoms of distress (Ferrajão, & Oliveira, 2016; Williamson et al., 2021). This may apply to the current cohort of participating veterans who have been sampled given their recent contact with the military mental health service, Combat Stress. It is important to hold in mind the clinical nature of the sample when interpreting results from the current study as it is possible that there may be some recall bias in identifying experiences of previous adversity.

Of the high proportion of survey respondents reporting exposure to ACEs, 57.8% reported exposure to Personal Abuse ACEs and 62.1% reported exposure to Family Disruption ACEs. As with the overall exposure to ACEs, this indicates a high prevalence of exposure to each domain of ACEs amongst this sample, with slightly greater self-reported exposure to familial disruption during childhood. There is little evidence amongst the general population, or amongst clinical populations, within the UK relating to prevalence of types of ACEs experienced. However, data from a national survey in England identifies the most frequently reported ACE to be parental separation, which may contribute to overall increased rates of Family Disruption ACEs (Bellis et al., 2014). The prevalence of type of ACE experienced in the current study differs slightly from previous research of a sample of female UK veterans who indicated greater exposure to Personal Abuse ACEs (Williamson, Baumann & Murphy, 2022a). However, the sample used within the current study was predominantly male, which may influence the type of ACE experienced and reported. Previously, strong associations have been found between symptom severity for PTSD and depression amongst military personnel who have had prior exposure to Personal Abuse ACEs (Gottschall et al., 2022). Therefore, it is important to understand the prevalence of this type of ACE exposure as this may be considered a marker of increased vulnerability within military and veteran populations. It is interesting to note that exposure to each of the domains of childhood adversity is still reported at a greater proportion amongst this veteran sample than the proportion reporting total ACEs within the general population in the UK, as reported above to be 46.1% (Hughes et al., 2021).

4.1.3 Prevalence of PMIE and MI Symptoms

As previously mentioned, the risk of combat exposure is likely to be high amongst this sample as over 90% of survey respondents had been employed in combat or combat-support roles during military service. Combat exposure has previously been associated with increased risk of exposure to PMIE and subsequently the development of MI (Frankfurt & Frazier, 2016; Koenig & Zaben, 2021). Over half the sample (57%) reported exposure to PMIE. Differing forms of PMIE were often reported to be experienced by the same respondents, indicating that many respondents were exposed to multiple PMIEs during military service. This finding corroborates previous international research indicating a high prevalence of exposure to PMIE amongst military personnel and veterans (Battaglia et al., 2019; Ferrajão, & Oliveira, 2016; Hodgson et al., 2021; Levi-Belz et al., 2020). One previous study has also indicated an even higher prevalence of exposure to PMIE (Volk & Koenig, 2019); however, that data had been collected from US active-duty personnel presenting with symptoms of PTSD. Therefore, it is possible that service status and active symptoms of PTSD may have created a bias within the sample, and the prevalence rate may not be generalisable to the wider veteran community. The current study reflects the experiences of veterans, rather than active-duty personnel, and is in line with observations reported by clinicians offering specialist treatment to UK-based veteran populations. These clinicians have estimated a minimum of 50% of veterans to have been exposed to PMIE (Williamson et al., 2019).

Three types of PMIE were specified in the current study: (i) PMIE related to the self and one's own action or inaction, (ii) PMIE related to observing others' action or failure to act, and (iii) PMIE related to betrayal, whereby one has been directly impacted by the action or inaction of others. Many respondents reported exposure to multiple forms of PMIE. Of those reporting exposure to PMIEs, 60.7% reported PMIE related to the self, 58.2% reported PMIE related to others, and 57.8% reported PMIE related to betrayal. There is limited research on the role and impact of differing types of PMIE, although a recent review of the literature by Fleming (2022) identified four key themes associated with PMIEs which may precede the development of symptoms of MI: value conflict, feeling morally overwhelmed and detaching to cope, senselessness, and the surrealness of the circumstance. It may be the case that the type of PMIE is less relevant, but instead the way in which the event transgresses one's moral code and values may be a more useful way of understanding and measuring the impact of a PMIE. This is an area for further development within the research as current understanding of the prevalence of PMIE

exposure and type of PMIE experienced is limited and inconsistently measured and reported across differing studies.

Respondents who identified exposure to a PMIE went on to complete the MIOS measure. A mean MIOS score of 33.48 was observed amongst the sample, with closely corresponding mean scores observed on both the Shame-based symptom and Trust-based symptom subscales, 16.37 and 16.67 respectively, out of a possible 28. Higher scores on the MIOS measure reflect greater MI symptom severity and as such, the mean total score observed in the current study indicates substantial symptoms of MI amongst this sample of respondents. For context, research into a non-clinical US sample, who did not report exposure to PMIEs, scored markedly lower on the MIOS, with a mean total score of 20.90, and mean scores on the each of the subscales between 9-11 (Litz et al., 2022).

Recent international research by Litz et al., (2022) explored MIOS scores across veteran samples from Canada, US, Australia, and the UK. Notably, the UK sample reported the highest total MIOS score, with mean scores comparable to that observed in the current research. In Litz and colleagues' research, there was a broader difference between subscale scores with samples from the US, Canada and Australia indicating higher symptom severity for the Trust-based subscales. Interestingly, amongst the current sample, there is a negligible difference between each subscale, suggesting that for the current sample, there are similar rates of Trust-based and Shame-based symptoms of MI.

At present, there is a paucity of research into the prevalence of PMIE and MI symptoms amongst UK Armed Forces personnel and veterans. The current study serves to add to the growing evidence base, offering further information on the frequency and type of PMIE members of the UK Armed Forces might be subject to. Future research may consider further investigation of the association between PMIE and MI; exploring the potentially variable impact of differing types of PMIE and seeking to understand the mechanisms by which PMIE may lead to the development of MI in some cases, but not all.

4.1.4 Wider Health and Wellbeing Outcomes

Findings from the current study correspond with previous large-scale research indicating that amongst UK veterans, there is an increased prevalence of CMD, problematic alcohol use, and PTSD when compared with socio-demographically matched counterparts from the general population (Rhead et al., 2022). The current study found approximately 80% of respondents met criteria for CMD. It is important to hold in mind that the current study was undertaken with a sample of treatment-seeking veterans, therefore prevalence of CMD and other difficulties may not be representative of the wider veteran community.

The prevalence of CMD observed in the current study of treatment-seeking veterans is markedly higher than that reported amongst veterans in the large-scale King's Centre for Military Health Research cohort study which observed around 23% of veterans met criteria for CMD, compared to around 16% of the general population (Rhead et al., 2022). The differences in prevalence of CMD between previous research and the current study may be reflective of the clinical nature of the sample, as a cohort of veterans who have accessed a specialist veteran mental health service. Previous research has compared a clinical sample of treatment-seeking veterans with a socio-demographically matched clinical sample of treatment seeking civilians and observed increased rates of CMD, with higher diagnoses of Depressive disorder (26.2% of veterans vs 15.5% of civilians) and Anxiety disorder (9.2% of veterans vs 5.3% of civilians) observed consistently amongst the veteran samples (Williamson et al., 2023).

It is well documented in the literature that increased risk of alcohol misuse is widespread within both serving and ex-serving military populations, although motivations for drinking have been reported to differ depending on military status, with veterans at increased risk of using alcohol as a coping strategy (Irizar et al., 2020). The current findings reflect high levels of hazardous and harmful alcohol use amongst this cohort, identifying this as a possible area for intervention. However, this study did not explore motives for alcohol use, which may be an area for further investigation. Understanding motives for alcohol use may help to guide clinical practice and development of appropriate psychosocial interventions. Prevalence of problematic drinking reported in the current study is markedly higher than that observed within other non-clinical veteran research, with the King's cohort study reporting problem drinking to be prevalent for around 11% of the veteran sample, and around 6% amongst the general population (Rhead et al., 2022). The current study identified approximately 81% of the sample to meet criteria for problematic alcohol use. Once again, this discrepancy between prevalence rates may be a reflection of the increased psychosocial and mental health support needs amongst the treatment-seeking sample used in the current study.

Similarly, a high proportion of the sample, around 68%, met criteria for probable PTSD, with 62.5% of these individuals reporting symptoms indicative of C-PTSD. Reports on military mental health indicate very low rates of PTSD amongst serving personnel with the MOD citing this to be around 0.1% (2022). However, previous research within the veteran population has estimated a higher prevalence of PTSD symptoms, with around 8% of veterans meeting criteria for PTSD, compared to around 5% of the general, non-clinical, population (Rhead et al., 2022). Notably, combat deployment has been identified as a

possible risk factor in the development of PTSD symptoms, with the MOD indicating an increased risk of 70% for PTSD for service personnel that have been previously deployed (MOD, 2022). The current findings correspond well with this estimated risk identified by the MOD and given the high proportion of respondents in the current study who were employed in combat or combat support roles, it is perhaps expected that higher rates of PTSD symptoms may be observed amongst this sample. It may be of value in future research and in routine veteran surveys carried out by Combat Stress, to explore combat experience further to better understand the relationship between combat roles, experiences, and the prevalence of PTSD and C-PTSD symptoms.

A reduced sense of perceived social support was reported by 72.2% of respondents. Currently, there is an absence of data reflecting perceptions of social support amongst other populations and therefore it is difficult to contextualise the severity of this finding within the existing literature. However, despite difficulties drawing comparisons with other populations, developing an understanding of the impact and availability of social support within the veteran community remains important given the potentially protective role implicated for social support in the context of CMD and PTSD symptoms (Hatch et al., 2013). The current finding that a low sense of social support has been reported by this sample is of particular relevance when considering the broader research questions and the relationship between ACEs and MI. Improved social support has also been implicated as a moderator of the adverse mental health impact following ACE exposure, most notably amongst those who have been exposed to Personal Abuse ACEs (Cheong et al., 2017; McCutchen et al., 2023). In addition, emerging research has also proposed social support to be a potential moderator in reducing the risk of development of MI symptoms following exposure to a PMIE (Hollis et al., 2023; Williamson et al., 2020).

4.1.5 ACEs and MI

Significant correlations were found between total ACE scores and total MIOS scores, reflecting the presence of a positive association between these two variables within the current sample of treatment-seeking veterans. Further regression analysis also highlighted that ACE scores not only correlated with MIOS scores, but were in fact significantly associated with MI. This finding suggests that as exposure to ACEs increased amongst the sample, symptoms of MI were likely to be higher as a consequence. This finding is in line with previous research which proposes that exposure to ACEs may result in a childhood vulnerability to development of MI later in life (Battaglia et al., 2019; Williamson et al., 2020).

Given the military population's increased exposure to PMIEs as an occupational hazard, it is important to explore the factors which may determine why some individuals go on to develop symptoms of MI following exposure to a PMIE and why some do not (Blosnich et al., 2014; Koenig & Zaben, 2021). Understanding variables which may increase vulnerability to the development of MI symptoms following exposure to PMIE has important implications both within research and clinical practice. Identifying exposure to childhood adversity as a vulnerability factor is pertinent given the increased prevalence of ACEs amongst the military personnel as found in the current study and previous research (Blosnich et al., 2014). It appears that within the military, there is a substantial proportion of individuals who are already at increased risk of MI and other mental health difficulties, as a result of exposure to childhood adversity *prior* to military service. This existing risk is then further increased by the subsequent risk of experiencing a PMIE *during* military service. Understanding ACEs as a factor which increases vulnerability to the development of MI symptoms further adds to the growing evidence base seeking to understand the development and impact of MI amongst military and veteran populations and raises questions for further research around possible mediators in the relationship between ACEs and MI. This finding also has important clinical utility in considering how best to target psychological interventions to service personnel presenting with symptoms of MI. Currently, in the absence of a clear and universally accepted definition of MI, no treatment protocol or guidance exists for this. As such, other treatment interventions, such as Prolonged Exposure and Cognitive Processing Therapy, have been adapted to try and meet the needs of individuals presenting with difficulties associated with MI (Griffin et al., 2019). These interventions focus on the current symptom presentation and minimising the detrimental impact on daily functioning and psychological wellbeing. The current findings offer some clinical rationale to consider interventions or screening processes which explore vulnerability factors, such as childhood experiences and the subsequent beliefs developed as a result of these, as well as the current symptom presentation. It's possible that therapeutic consideration of childhood experiences as a vulnerability to developing MI in adulthood may offer a more holistic and comprehensive approach to psychological interventions for this population.

4.1.6 Personal Abuse ACEs and MI

Following identification of the association between ACEs and MI, additional analysis was undertaken to explore the nature of this relationship between Personal Abuse ACEs and MI. This was guided by previous research indicating a role specifically for

Personal Abuse ACEs in predicting MI symptoms (Battaglia et al., 2019). Significant associations were found between Personal Abuse ACEs and MI and significant, albeit weaker, positive correlations were also found between Family Disruption ACEs and MI, indicating this association may not be as substantial as the relationship observed between Personal Abuse ACEs and MI.

Further regression analysis indicated that Personal Abuse ACEs were significantly associated with MI, at a value comparable to that observed for overall ACEs and MI. This raises questions for future research around how much of the overall ACE scores' explanatory value, in the context of MI, 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 (Negriff, 2020). The finding that Personal Abuse ACEs holds explanatory power in increasing risk of MI symptom presentation following exposure to PMIEs later in life corroborates the previous research by Battaglia and colleagues (2019), from which the current research questions were initially developed. In addition, previous research within the ACEs literature has proposed that understanding the type and timing of ACE exposure is important as different outcomes may be observed following exposure to differing types of ACEs (Bevilacqua et al., 2021). Although the current study did not compare and contrast associated outcomes dependent on the domain of ACEs reported, the finding that Personal Abuse ACEs were associated with symptoms of MI correspond with previous research indicating that Personal Abuse ACEs are likely to be associated with emotional disturbances and trauma responses in later life (De Venter et al., 2013; Negriff, 2020). The current findings add to the growing body of literature exploring the impact of differing types of ACEs and provides 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 to gain more in-depth understanding of the mechanisms by which this vulnerability develops and is maintained, it can be concluded from both the current findings and prior research that exposure to ACEs in the domain of Personal Abuse is a risk factor for mental health difficulties later in life. This risk may be further compounded for military and veteran populations by the increased likelihood of exposure to PMIEs as part of military service. 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.

The association observed between Personal Abuse ACEs and MI was investigated further by exploring the relationship between Personal Abuse ACEs and each of the

domains of MI as measured and delineated by the MIOS: Trust and Shame. Significant correlations were observed between Personal Abuse ACEs and both the Trust- and Shame-related symptoms of MI, independently. This is perhaps unsurprising, given the significant positive correlation previously observed between Personal Abuse ACEs and overall symptoms of MI. It is interesting to observe that there is very little difference evident in the strength of associative relationships between Personal Abuse ACEs and Trust- or Shame-based symptoms of MI, respectively. In line with associations noted above with overall MI, Family Disruption ACEs were also positively correlated with Trust-related symptoms and Shame-related symptoms of MI, but again a markedly weaker relationship was observed, indicating that Family Disruption ACEs may be less influential in understanding the vulnerability to developing symptoms of MI.

Linear regression analysis indicated that Personal Abuse ACEs accounted for small but significant proportions of the variance observed with both Trust-related and Shame-related domains of MI. This was notably higher for the Shame-related symptoms, with analysis indicating that 3.4% of the variance to the scores reported by this sample could be explained by Personal Abuse ACEs. From this analysis, conclusions can be drawn indicating that as exposure to Personal Abuse ACEs increases, the risk of experiencing Shame-related symptoms of MI may be increased. From a clinical perspective, this symptom profile may be unsurprising. Evidence suggests that exposure to early maltreatment alters individuals' view of the self, world, and others with an increased risk of developing a negative cognitive style, self-critical narrative, viewing others as threatening, and conceptualising themselves as unacceptable (Briere, 2002; Sachs-Ericsson et al., 2006). Therefore, it can be considered that exposure to Personal Abuse ACEs may increase an individual's vulnerability to experiencing low self-esteem, self-blame, and shame. Given this predisposition, it is unsurprising that those with higher prevalence of Personal Abuse ACEs are at increased risk of experiencing Shame-related symptoms of MI which on the MIOS measure is reflected by questions relating to one's own internalised sense of goodness, self-worth, and self-blame. Understanding the lasting psychological impact of Personal Abuse ACEs and how this may be further perpetuated by exposure to PMIE is important when considering how best to support individuals presenting to services and seeking support for the psychological distress associated with MI. As noted above, this research advocates for consideration of childhood experiences as a vulnerability to developing MI as an important feature of therapeutic work, to offer a comprehensive psychological intervention. Given the stronger associations found between exposure to Personal Abuse ACEs and later development of MI, this may be a particular area of exploration in early therapeutic work.

It appears from the associations found between Personal Abuse ACEs and Shame-related symptoms of MI that individuals may also benefit from strengths-based approaches, working to challenge self-critical narratives, build on positive beliefs about the self, and address reduced self-esteem likely to have developed as a predisposition following early maltreatment, and then reinforced as a result of experiencing PMIEs and MI.

4.1.7 Further Analyses of Possible Variables Associated with Both ACEs and MI

A preliminary correlational analysis was carried out to further explore any potential associations between alcohol use, social support, CMD, and PTSD within the relationship between ACEs and MI. There is a notable symptom overlap between C-PTSD, PTSD and MI, and robust evidence of an increased vulnerability to development of CMD and other mental health difficulties in later life following early exposure to adversity. As such, there was deemed to be a clinical and theoretical rationale to explore these variables as potential correlates in the relationship between ACEs and MI.

As previously noted, evidence indicates that veterans who met criteria for CMD or PTSD were more likely to report symptoms of MI (Ferrajão, & Oliveira, 2016; Williamson et al., 2021). Additionally, multiple studies within the ACEs literature have highlighted increased risk of CMDs and PTSD following exposure to emotional and physical neglect in early childhood (De Venter et al., 2013; Schalinski et al., 2016). Whilst it is possible these findings may be influenced by cognitive biases and may be limited by the nature of self-reported data; it is also possible this is reflective of an association between these variables which warrants further investigation. As such, CMD and PTSD were selected for further correlational analysis to explore any associations of these variables within the relationship between ACEs and MI for the current study.

International literature across a range of differing professional disciplines, including military, healthcare, and emergency services personnel, indicates an association between MI and increased risk of problematic substance use, an association which has also been observed within the ACEs literature (De Venter et al., 2013; Griffin et al., 2019). Furthermore, increased risk of harmful alcohol use is a well-reported phenomenon within military populations (Irizar et al., 2020) and this variable may be relevant to consider as a possible correlate between ACEs and MI for the current population.

The final variable selected for further analysis to explore any association in the relationship between ACEs and MI was perceived social support. Previous research has highlighted low social support as a common risk factor for MI and adverse consequences following ACE exposure (Cheong et al., 2017; Hollis et al., 2023; Williamson et al., 2018).

Evidence indicates social withdrawal, reduced social support, and reduced resilience in those who have been exposed to PMIEs (Langberg, 2012), something which the current sample are at high risk of given the proportion who served in combat roles.

Symptoms of PTSD and C-PTSD, as measured by the ITQ, and perceived social support were the only variables which were significantly correlated with both ACEs and MI. A significant negative correlation was observed between perceived social support and both ACEs and MI, indicating that reduced perceived social support may be associated in the relationship between these two variables. Whilst symptoms of PTSD and C-PTSD were moderately positively correlated with symptoms of MI, the positive correlation with ACEs was markedly weaker. This indicates that if symptoms of PTSD and C-PTSD are to be identified as a possible correlate between ACEs and MI, this association may be weaker than that of perceived social support. This preliminary correlational analysis does not indicate an association of CMD or Alcohol use in the relationship between ACEs and MI, suggesting that these variables may not be influential in the developmental context of this relationship, and may instead simply be an outcome variable. These findings corroborate previous research proposing a protective role for social support amongst military populations and support the hypothesis that social support reduces the risk of developing symptoms of MI following exposure to a PMIE (Hollis et al., 2023; Williamson et al., 2020). However, the current findings also add another dimension to this hypothesis by indicating that social support may have a protective role in the risk of developing of MI, even in the context of early exposure to childhood adversity. Further mediation analysis would be beneficial for a more comprehensive investigation of the weak correlation observed for symptoms of PTSD and C-PTSD in the association between ACEs and MI, and recommendations have been made for future research accordingly.

4.2 Strengths & limitations

4.2.1 Strengths

At the time of writing, this is the first study to have explored the relationship between Personal Abuse ACEs and MI in a sample of UK veterans. The relationship between MI and ACEs had previously been researched amongst a sample of Canadian Armed Forces veterans (Battaglia et al., 2019) and the current study serves to add to initial findings from this prior research and expand previous findings to reflect the experiences of UK veterans.

A strength of this study was the use of an online survey, encouraging inclusive participation and enabling participation from individuals based across different locations within the UK. This patient experience survey is an established process, routinely administered within Combat Stress, and as such has previously undergone pilot testing and refinement. The survey consists of well-considered, broad-ranging, clinically relevant measures. In addition, for those who were unable to complete the online version, a paper copy of the survey was also sent, reducing the barriers to participation that may arise in relation to access to or confidence with using technology. All measures included in the survey have been standardised and validated, demonstrating good reliability, and therefore can be generalised and compared to other samples accordingly.

As recruitment was carried out through Combat Stress, this study accessed large-scale data from a nationally representative sample of treatment-seeking UK veterans. The large sample size and nationally representative nature of the sample are further strengths of this research, allowing for a broad range of individuals' experiences to be included in reporting. Furthermore, using a nationally representative sample reduces the risk of geographically biased findings which may reflect areas of a particular socio-demographic status. Instead, the current findings could potentially be generalised throughout the UK. Selecting a secondary data analysis approach was another strength of this research. This approach enabled further use to be made from an existing data set to maximise the efficacy of this large-scale, detailed data which had been collected as part of a previous research project, prior to this information becoming outdated. Additionally, one of the benefits of a secondary data analysis approach has been the opportunity to access and consider the data from the perspective of an independent researcher, external to the Combat Stress service. This has enabled a novel perspective on the data, unrelated to service demands or funding limitations, and reflections have been made for further refinements to the routine patient experience survey.

4.2.2 Limitations

There are several limitations to the current study, which are important to acknowledge and hold in mind when contextualising the findings and when making considerations for further research.

Whilst secondary data analysis has its practical benefits and can be applied flexibly, cost-effectively, and efficiently, there are some limitations to this methodological approach. One of the obvious limitations is absence of input into the data collection process, including into the type of data collected and measures used. This results in

reduced familiarity with the data at the point of analysis and some potentially missed opportunities to include specific details in the data collection process which may help to address the research questions more comprehensively (Johnston, 2014). For example, with the current study, whilst the survey is a well-established, routine measure of patient experiences within Combat Stress, it may have been useful to include questions in the survey to expand on participants' reasons for leaving the military to better understand what proportion, if any, left military service for reasons relating to their mental health. This may help to broaden understanding of the impact of mental health difficulties on military personnel and provide more clarity around individuals' decisions to leave the UK Armed Forces.

A further limitation of this study is the use of self-reported, cross-sectional data. The disadvantages of a cross-sectional design are well known including the inability to confidently identify causation when exploring the relationship between two variables (Taris et al., 2021). The current study has demonstrated some significant associations between ACEs and MI, with analysis indicating an explanatory linear relationship between exposure to ACEs and experiencing MI in adulthood. However, it should be noted that no other variables were adjusted for in the regression models. 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. Given the nature of the variables explored it is conceivable that exposure to ACEs will precede the onset of MI amongst this population, however it is important to note that given the type of data, it cannot be assumed that ACEs are a causal factor in the onset of symptoms of MI. Furthermore, as is often noted in much of the ACE literature, the retrospective, self-report nature of this data is highlighted as a limitation, and it must be considered that respondents to the survey may be subject to a recall or other cognitive bias. Self-report data relies on accurate recall of historical events, which may not always be the case. Research has indicated that potentially traumatic events may be considered more salient and therefore recalled at a higher rate than non-traumatic events, indicating a bias towards recalling distressing events over neutral or positive experiences (Lalande & Bonanno, 2011). Additionally, as noted above, there is evidence that individuals actively suffering with mental health difficulties may be more likely to report symptoms of distress, therefore it is possible that given the sample are from a treatment-seeking group, this may have impacted the self-reported historical and current experiences of adversity and distress (Ferrajão, & Oliveira, 2016; Williamson et al., 2021).

Another limitation to acknowledge is the survey itself. To gather such a comprehensive set of data, the survey comprised of a broad range of measures, which whilst a strength required participants to answer many varied questions. It is possible that respondents may have been susceptible to respondent fatigue, whereby effort and recall are reduced as further time is spent completing the survey and respondents become tired (Jeong et al., 2023). As well as considering fatigue effects, it is also important to consider any possible priming effects, as a result of the order in which measures were presented within the survey. Multiple physical health, mental health, and wellbeing measures were used with questions relating to symptoms of C-PTSD, MI and ACEs being included as the last three items on the survey, respectively.

Whilst this study was able to recruit from a nationally representative sample, many other characteristics of the sample are only representative of a smaller, specific group of individuals, for example, in line with the demographic distribution of the UK Armed Forces, the current study reflects a sample of largely male participants who have served in the Army. This may limit the generalisability of the findings from the current study beyond this population, for example to actively serving military personnel. It would also not be appropriate to generalise these findings to the general population, whose occupational experiences and risk of exposure to PMIEs may be quite different. However, it must be acknowledged that it was not the intention of the current study to establish findings generalisable beyond the veteran community. Furthermore, the current study recruited from a sample of treatment-seeking UK veterans. Therefore, it is possible that the symptom profile indicated on health and wellbeing measures as well as prevalence of ACEs reported may only be generalisable to treatment-seeking individuals, and it may not be possible to apply these to a non-treatment-seeking sample of military personnel who may otherwise respond quite differently on the same health and wellbeing measures. Further research would be required to understand the comparative experiences between treatment-seeking veterans and non-treatment seeking veterans. Whilst these findings are useful and add to the growing evidence base around military mental health, it must be acknowledged that they remain in the context of a specialist area of research and clinical practice.

4.3 Implications for Clinical Practice

Several implications for clinical practice can be considered following the findings from the current study. It may be beneficial - and certainly relevant to the military

population, and other emergency service personnel - to develop, measure, and refine a targeted treatment intervention specifically for MI. However, it is acknowledged that further research and clarity around defining and understanding the concept of MI is required for this, and recommendations for research have been made below in reference to this.

In the absence of a specialist treatment model for MI, findings from the current study indicate there may be some value in adopting a holistic and comprehensive approach to psychological interventions offered to those presenting to services with symptoms associated with MI. Current interventions used in the treatment of MI include Prolonged Exposure and Cognitive Processing Therapy which focus on current experience and reducing the behavioural symptoms which may present as part of MI, such as avoidance (Griffin et al., 2019). Findings from the current study provide a rationale to consider the role and impact of childhood experiences as a possible vulnerability factor to the development of MI amongst the military and veteran population given the association observed in the current findings between ACEs and MI. There may be clinical benefit to holding in mind the potential impact of ACEs at all stages of psychological therapy: assessment, formulation, and intervention. Exploring the type and timing of ACEs would contribute to a thorough and complete assessment and can be considered part of evidence-based practice given the robust evidence identifying differences in health and wellbeing outcomes later in life associated with exposure to differing domains of ACEs (Bevilacqua et al., 2021). This is also reinforced by the current research, indicating stronger associations between the Personal Abuse domain of ACEs and MI. A thorough assessment will then serve to inform the formulation offering a shared understanding of previous experiences which may influence development of an individual's cognitive profile, and the way in which early experiences may have shaped beliefs about the world, self, and others. Given the explanatory association observed in the current research between Personal Abuse ACEs and Trust- and Shame-related symptoms of MI, it may be of value to hold current cognitions in the context of early experiences with evidence indicating an increased vulnerability to the development of self-critical thinking, viewing others and the world as dangerous and unreliable, and the self as unacceptable (Briere, 2002; Sachs-Ericsson et al., 2006). In turn, any further interventions, as informed by the formulation, may consider adapting therapeutic approaches to not only address the current behavioural symptoms, but also to work on addressing beliefs which may serve to maintain or reinforce feelings of shame and mistrust. Given the symptoms of MI associated with self-criticism, self-blaming, and reduced sense of self-worth, which in the current study have been

indicated to be positively associated with exposure to Personal Abuse ACEs, it may be of benefit to include strengths-based and compassion-focused approaches, where self-critical narratives are challenged and positive beliefs about the self are strengthened.

Another clinical implication of the current research is to consider preventative strategies, given the evidence indicating the additional vulnerabilities present amongst military populations, which are often further compounded by the psychological impact of combat exposure. There is a consensus amongst the evidence that military and veteran populations are at increased risk of predisposed vulnerability to poorer mental health outcomes given the high proportion of those entering the military with an existing history of childhood adversity (Blosnich et al., 2014; Katon et al., 2015). As such, clinicians and service providers may choose to consider routinely offering preventative interventions, in addition to the primary care and specialist interventions currently offered to those struggling with mental health difficulties. Preventative interventions could be offered universally and include psychoeducation around mental health, CMDs, and general wellbeing strategies related to fundamental psychological self-care. Additionally, it is important to ensure that all support services commissioned are well promoted and offering clear, consistent, and robust pathways for support throughout all levels of the military organisation and across the vast number of veterans charities and support services available.

As current findings identify an association between ACEs, MI, and reduced perceived social support, this may be an area of clinical development, supported by previous research indicating social support may be a potential protective factor against the development of MI (Hollis et al., 2023; Williamson et al., 2020). Psychological interventions offered to this population may benefit from including social skills development, and support with the development and maintenance of meaningful, reciprocal social connections; this could be considered both at the preventative and responsive level of service delivery. Social skills development may include engagement in therapeutic communities, mentoring programmes, peer support groups, as well as more directive and skills-based learning such as assertiveness and communication training.

4.4 Implications for Future Research

Several suggestions can be made for future research following the findings from the current study. As noted above, perhaps the most pertinent is the need for a clear,

universally accepted definition and measure of MI which will then enable further research to understand the mechanisms underpinning this phenomenon.

The survey from which the current data was obtained has been developed and disseminated by Combat Stress as a routine service-wide data collection and evaluation tool. Given the target population, and the nature of the service as a specialist military mental health service, some of the questions are framed in line with the MOD's labels and categories such as identifying reason for leaving as 'voluntary or non-voluntary/medical'. Whilst this has been designed to provide familiar, consistent language of that used within the military, only limited information can be gleaned from these response options. Further research may wish to explore some of these demographic factors in more depth. It may be useful in future surveys to elicit more detail on respondents' reasons for leaving the military, as this may offer further insight into the impact of mental health difficulties on personnel's willingness and ability to continue serving within the UK Armed Forces. Similarly seeking more detail related to other demographic information, such as respondents' employment status may provide more depth around the broader mental health impact faced by veterans in multiple aspects of day-to-day life. Previous research has indicated a possible protective role of spirituality (Koenig et al., 2018; Volk & Koenig, 2019). It is possible that for some UK veterans, this is an important factor to consider in their experience and as such, the survey could be adapted to include collection of data related to spirituality which will enable further analysis of the role or importance of religion amongst treatment-seeking UK veterans.

Previous research theorising the association between exposure to PMIE, and later development of MI has suggested that it is not necessarily the type of PMIE which is important in MI, but instead the way in which it transgresses an individual's moral code and values (Fleming, 2022). Future research may consider further investigation of the association between PMIE and MI. It may be of value to explore the potentially varying impact of differing types of PMIE to understand the relationship between type of PMIE and the later development of MI. For example, exploring whether a PMIE related to the self, others or betrayal may increase the risk of developing symptoms of MI, and whether the type of PMIE experienced increases the risk of developing either Trust-based or Shame-based symptoms of MI. It may be the case, as posed by previous research that all PMIEs are not equal, and exploring the impact of differing types of PMIE exposure may support a greater understanding of the mechanisms by which exposure to PMIE may increase risk of the development of MI.

Continuing to build on previous research in the field, this study has identified an associative relationship between ACEs and MI. More specifically, in line with Battaglia et al.'s (2019) findings, the current research has identified Personal Abuse ACEs to be associated with the later risk of developing symptoms of MI, following exposure to PMIEs. Future research could further explore the role and implication of Family Disruption ACEs on symptoms of MI, as this was not explored in any depth in the current research. It may be of both clinical and theoretical value to understand the relationship between Family Disruption ACEs and symptoms of MI, in both the trust- and shame-based domains of MI, and whether this differs from the impact of Personal Abuse ACEs. This may then serve to inform clinical practice and further build understanding around the implication of exposure to differing types of ACEs.

Future research may also explore the role of social support and PTSD and C-PTSD as possible mediators in the relationship between ACEs and MI. Whilst a correlational analysis was carried out as part of the current study, further research could explore this in more depth and carry out a more comprehensive, full mediation analysis. Baron and Kenny (1986) offer a detailed procedural guideline for analysing potential mediators, including explicit criteria for establishing mediation effects and categorising the extent of this effect. Completion of a mediation analysis may provide further insights into the role social support and PTSD and C-PTSD may play in the development, prevention, or maintenance of MI in the context of prior ACE exposure. Gaining further understanding of the variables which may mediate the impact of ACEs on later development of MI, may support development of preventative interventions. Additionally, further understanding the potential role of a factor such as social support may also have some generalisability to other mental health difficulties and beyond military populations. Exposure to ACEs has been identified as a risk factor in a wide range of difficulties, including emotional dysregulation, CMD, PTSD, and C-PTSD, and evidence suggests many of these same difficulties have been associated with reduced social support (Cheong et al., 2017; McCutchen et al., 2023). It appears that social support may have a widely protective quality and expanding the literature and further developing the evidence-base to better understand the potentially protective nature of this variable may have important implications, not only at an individual or specific population level, but at a public health level.

4.5 Conclusions

There are consistent reports within the literature of an increased prevalence of mental health difficulties amongst military veterans. Higher rates of CMD, PTSD, and problematic alcohol use have been indicated in both clinical and non-clinical samples and are further reflected in the current study. Whilst the issue of veteran mental health is receiving increasing recognition, further developing knowledge of the risk and resilience factors experienced by military personnel and veterans is important to ensure their support needs are being appropriately and effectively met. Increased exposure to ACEs is reported amongst military and veteran populations, which is a known risk factor for poorer mental health, physical health, and socio-economic outcomes, suggesting these groups may be at increased risk even prior to military service. Additionally, research over the last decade has drawn attention to the phenomenon of MI amongst military personnel, with high rates of exposure to PMIEs reported, identifying this as a risk factor for further mental health difficulties, most notably PTSD. Further research is required to understand the mechanisms by which these risk factors may impact veteran mental health for the development of both preventative and responsive interventions.

The current study was an opportunity to make further use of data collected as part of a well-established, routine survey of a nationally representative sample of treatment-seeking UK veterans. This study builds on previous research to further explore the relationship between two potential risk factors implicated as possible contributors to the increased prevalence of mental health difficulties observed within veteran populations. To the best of the author's 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.

In line with much of the previous research, the main findings reported from the current study indicate a high prevalence of ACEs, MI, CMD, C-PTSD, problematic alcohol use, and a reduced perception of social support amongst the current sample of treatment-seeking UK veterans. Experiencing ACEs prior to military service was found to explain a small but substantial proportion of the variance to MI scores reported by the current sample. Specifically, experiencing ACEs in the domain of Personal Abuse was found to be associated with MI symptoms, explaining 4.4% of the variance to MI scores. This finding builds upon previous research which has identified a significant association between Personal Abuse ACEs and MI amongst a sample of military personnel and veterans. Furthermore, the current findings expand on previous research by exploring the impact of

Personal Abuse ACEs on the two distinct domains of MI as measured by the MIOS questionnaire: trust and shame. There is evidence from the current research of a slightly stronger explanatory power of Personal Abuse ACEs in the development of Shame-based MI symptoms. Finally, the current study provides preliminary evidence of a possible association for social support in the relationship between ACEs and MI, which corroborates previous research indicating social support as a protective factor in the development of mental health difficulties, including MI and PTSD.

The current findings contribute to the existing ACEs and military mental health literature with further insight into the nature of the relationship between ACEs and MI. As indicated in previous research, the current findings support the notion of a childhood risk factor in the development of MI, specifically identifying ACEs in the form of maltreatment, neglect, and abuse as a factor increasing vulnerability. It is recognised that given higher rates of ACEs experienced by military personnel, this population are at greater risk which may be further compounded by higher risk of exposure to PMIEs as part of military service and combat.

Continuing research in the field may consider further exploration of the relationship between ACEs and MI, specifically more in-depth investigation of possible mediators, with the aim to better understand some of the risk and resilience factors impacting veteran mental health. This may help to inform service development and identify areas for universal, targeted, and specialist intervention within military and veteran support services. Current clinical interventions may benefit from adaptation to include assessment and formulation of the impact of childhood experiences of adversity. This may offer a more holistic and comprehensive approach to therapeutic interventions for those seeking support with MI. Additionally, the current study provides further support for the implementation and promotion of social support initiatives, recognising the potential value in peer support groups, social skills training, and mentoring programmes for veterans.

The current study provides an important contribution to the literature surrounding veteran mental health and reinforces previous findings whilst also exploring a novel aspect of the experiences of treatment-seeking UK veterans. It is recognised that a career in the Armed Forces is not without risk, and engagement in combat is likely to have some psychological impact on the men and women who are serving in the military. However, whilst some of these risks may be unavoidable, the ongoing suffering experienced by serving and ex-serving personnel need not be inevitable. It is important for researchers

and clinicians to continue to learn more about MI and why it is that some people are at greater risk of suffering with chronic, severe, and wide-ranging symptoms of psychological distress following military service. It is hoped that the current research sheds a little more light on the complex concept of MI and supports the journey to a greater understanding of veteran and military mental health in order for meaningful and effective support to be offered to these individuals.

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Appendix A

Data Sharing Agreement with Combat Stress for Purposes of Secondary Analysis

Level 10, Worsley Building
University of Leeds
Clarendon Way
Leeds, LS2 9NL

www.leeds.ac.uk/lihs

UNIVERSITY OF LEEDS

Dear Professor Murphy,

Re: Combat Stress / University of Leeds data sharing agreement

I am writing to request a data sharing agreement between myself at the University of Leeds and Combat Stress for the purposes of writing a research paper exploring the Moral Injury and Adverse Childhood Experiences (ACEs) in veterans. This will be carried out under supervision of Gary Latchford & David Turgoose. As part of this agreement, I agree to:

1. Only use the data for the agreed project - i.e., exploring Moral Injury and ACEs
2. To delete the dataset after the publication of the paper, but to keep any stats SPSS syntax files (or equivalent from other computer packages)
3. Ensure that Professor Murphy is named as an author on all publications resulting from this data extract.
4. That I will store the data extract on the Leeds University server and in accordance with Leeds University data governance rules.
5. That I will not share the dataset with anyone outside of the supervision team.

Yours sincerely,

Marina Beckwith
Trainee Clinical Psychologist
Doctorate in Clinical Psychology Programme

Dr David Turgoose
Clinical Psychologist and Lecturer
Doctorate in Clinical Psychology Programme

Prof Gary Latchford
Joint Programme Director
Doctorate in Clinical Psychology Programme

Appendix B

Full Patient Needs Survey as Disseminated by Combat Stress on Survey Monkey

COMBAT STRESS
FOR VETERANS' MENTAL HEALTH

Exploring the Needs of Veterans

Thank you for offering to take part in this survey.

Your answers are really important to help us understand how best to address these needs and support veterans.

All answers are completely confidential. The survey should take no longer than 20-30 minutes to complete.

Please try to answer every question. Thanks again for taking part.

COMBAT STRESS
FOR VETERANS' MENTAL HEALTH

Taking part in this survey is voluntary. If you do not wish to take please indicate below.

- ○ Yes, I would like to take the survey.
- ○ No, I would like to opt out.

COMBAT STRESS
FOR VETERANS' MENTAL HEALTH

About You

What is your gender?

What is your ethnic background?

- Black
- White
- Asian
- Other

If other, please specify

How old are you?

- 20-30 years old
- 31-40 years old
- 41-50 years old
- 51-60 years old
- 61-70 years old
- 70+ years old

What is your height?
(please specify in feet and inches OR metres)

How much do you weigh?
(please specify in pounds OR kg)

Were you born in any of the Commonwealth countries?

- Yes
- No

Where do you live?

- Scotland
- Northern Ireland
- Wales
- England
- Other

Which best describes the area in which you live?

- Large city
- Suburbs of a large city
- Small city
- Town or village
- Rural area

Which best describes your living arrangements?

- Own home
- Private renting
- Council or supportive living
- Living with family/friends/homeless

What is your highest level of education?

- Left school with no formal qualifications
- O Levels/GCSEs/NVQs Level 1-2
- A Levels and/ or above

Are you currently in employment?

- Full time/ part time
- Not working, seeking employment
- Not working due to ill health
- Retired
- Other

If employed, what is your job title/role?

What is your relationship status?

- In relationship, living together
- In relationship, not living together
- Single
- Separated
- Divorced
- Widowed

Your answers are completely confidential

COMBAT STRESS
FOR VETERANS' MENTAL HEALTH

Your Military History

What service were you in?

- Royal Navy
- British Army
- Royal Air Force
- Royal Marine's

What was your last rank?

- Senior Commissioned Officer
- Commissioned Officer
- Non-Commissioned Officer
- Other Ranks

What was your main role during service?

- Combat
- Combat Support
- Non Combat

What year did you leave service?

How many years did you serve?

Why did you leave the Armed Forces?

- Voluntary release
- Medical
- Non voluntary/admin/redundancy

Which conflicts were you deployed on?
(please select all that apply)

- [ ] Falklands
- [ ] 1991 Gulf War
- [ ] Bosnia
- [ ] Northern Ireland
- [ ] Kosovo
- [ ] Sierra Leone
- [ ] Afghanistan
- [ ] Iraq since 2003
- [ ] Other Conflict(s)

If other, please specify

Some people experience difficulties during their military career, did you experience any of the following:

- [ ] Emotional bullying
- [ ] Physical assault
- [ ] Sexual harassment
- [ ] Sexual assault

Your answers are completely confidential

COMBAT STRESS
FOR VETERANS' MENTAL HEALTH

Questions About Your Health

In the *past 12 months*, how many times have you attended Accident and Emergency (A&E)?

- 0
- 1
- 2
- 3
- 4
- 5+

In the *past 12 months*, how many times have you called NHS 111 for health concerns?

- 0
- 1
- 2
- 3
- 4
- 5+

Your answers are completely confidential

COMBAT STRESS
FOR VETERANS' MENTAL HEALTH

Questions About Your Health

Thinking about a typical night in *the last month*:

How long does it take you to fall asleep?

- 0-15 mins
- 16-30 mins
- 31-45 mins
- 46-60 mins
- 61+ mins

If you then wake up during the night, how long are you awake for in total?

- 0-15 mins
- 16-30 mins
- 31-45 mins
- 46-60 mins
- 61+ mins

How many nights a week do you have a problem with your sleep?

- 0-1
- 2
- 3
- 4
- 5-7

How would you rate your sleep quality?

- Very good
- Good
- Average
- Poor
- Very poor

Affected your mood, energy, or relationships?

- Not at all
- A little
- Somewhat
- Much
- Very much

Affected your concentration, productivity, or ability to stay awake?

- Not at all
- A little
- Somewhat
- Much
- Very much

Troubled you in general?

- Not at all
- A little
- Somewhat
- Much
- Very much

How long have you had a problem with your sleep?

- I don't have a problem
- 1-2 months
- 3-6 months
- 7-12 months
- >1 year

Your answers are completely confidential

COMBAT STRESS
FOR VETERANS' MENTAL HEALTH

Questions About Your Health

During the *past 7 days*, how much have you been bothered by any of the following problems?

	Not Bothered At All	Bothered A Little	Bothered A Lot
Stomach pain	○	○	○
Back pain	○	○	○
Pain in your arms, legs, or joints (knees, hips, etc.)	○	○	○
Headaches	○	○	○
Chest pain	○	○	○
Dizziness	○	○	○
Fainting spells	○	○	○
Feeling your heart pound or race	○	○	○
Shortness of breath	○	○	○
Pain or problems during sexual intercourse	○	○	○
Constipation, loose bowels	○	○	○
Nausea, gas, or indigestion	○	○	○
Feeling tired or having low energy	○	○	○
Trouble sleeping	○	○	○

You may answer N/A if this is not applicable to you:

	Not Bothered At All	Bothered A Little	Bothered A Lot	N/A
Menstrual cramps or other problems with your periods	○	○	○	○

Within the *past month* have you:

	Not at all	No more than usual	Rather more than usual	Much more than usual
Lost much sleep over worry?	○	○	○	○
Felt constantly under strain?	○	○	○	○
Felt you couldn't overcome your difficulties?	○	○	○	○
Been feeling unhappy and depressed?	○	○	○	○
Been losing confidence in yourself?	○	○	○	○
Been thinking of yourself as a worthless person?	○	○	○	○

Within the *past month* have you:

	Much less than usual	Less so than usual	Same as usual	More so than usual
Been able to enjoy your normal day-to-day activities?	○	○	○	○
Been feeling reasonably happy, all things considered?	○	○	○	○
Been able to concentrate on whatever you're doing?	○	○	○	○
Been able to face up to your problems?	○	○	○	○
Felt that you are playing a useful part in things?	○	○	○	○
Felt capable of making decisions about things?	○	○	○	○

Your answers are completely confidential

COMBAT STRESS
FOR VETERANS' MENTAL HEALTH

Questions About Your Health

Below you will find a number of statements.

Please select an answer to indicate how well that statement describes how you are as a person.

	Definitely Not True	Not True	Partially True	True	Definitely True
I have difficulty remembering lengthy instructions	○	○	○	○	○
I sometimes have difficulty remembering what I am doing in the middle of an activity	○	○	○	○	○
I have a tendency to do things without first thinking about what could happen	○	○	○	○	○
I sometimes have difficulty stopping myself from doing something that I like even though someone tells me that it is not allowed.	○	○	○	○	○
When someone asks me to do several things, I sometimes remember only the first or last	○	○	○	○	○
I sometimes have difficulty refraining from smiling or laughing in situations where it is inappropriate	○	○	○	○	○
I have difficulty coming up with a different way of solving a problem when I get stuck	○	○	○	○	○
When someone asks me to fetch something, I sometimes forget what I am supposed to fetch	○	○	○	○	○

	Definitely Not True	Not True	Partially True	True	Definitely True
I have difficulty planning for an activity (e.g., remembering to bring everything necessary when going on a trip/to work/to school)	○	○	○	○	○
I sometimes have difficulty stopping an activity that I like (e.g., I watch TV or sit in front of the computer in the evening even though it is time to go to bed)	○	○	○	○	○
I sometimes have difficulty understanding verbal instructions unless I am also shown how to do something	○	○	○	○	○
I have difficulties with tasks or activities that involve several steps	○	○	○	○	○
I have difficulty thinking ahead or learning from experience	○	○	○	○	○
People that I meet sometimes seem to think that I am more lively/wilder compared to other people my age	○	○	○	○	○

Your answers are completely confidential

COMBAT STRESS
FOR VETERANS' MENTAL HEALTH

Questions About Your Social Network

Please select the answer that best describes how you feel over the *last 2 weeks*.

	None of the Time	Rarely	Some of the Time	Often	All of the Time
I've been feeling optimistic about the future	○	○	○	○	○
I've been feeling useful	○	○	○	○	○
I've been feeling relaxed	○	○	○	○	○
I've been dealing with problems well	○	○	○	○	○
I've been thinking clearly	○	○	○	○	○
I've been feeling close to other people	○	○	○	○	○
I've been able to make up my own mind about things	○	○	○	○	○

Please select the answer that best describes you in the *past month*...

How many people are so close to you that you can count on them if you have great personal problems?

- ○ None
- ○ 1-2
- ○ 3-5
- ○ 5+

How much interest and concern do people show in what you do?

- ○ None
- ○ Little
- ○ Uncertain
- ○ Some
- ○ A Lot

How easy is it to get practical help from neighbours if you should need it?

- ○ Very Difficult
- ○ Difficult
- ○ Possible
- ○ Easy
- ○ Very Easy

Please select the answer that best describes how you have been feeling in the *past month*...

	Hardly Ever or Never	Some of the Time	Often
How often do you feel that you lack companionship?	○	○	○
How often do you feel left out?	○	○	○
How often do you feel isolated from others?	○	○	○

Your answers are completely confidential

COMBAT STRESS
FOR VETERANS' MENTAL HEALTH

Questions About Your Lifestyle

Please select yes or no to each question relating to your gambling habits in the *past month*.

	Yes	No
Have there ever been periods lasting 2 weeks or longer when you spent a lot of time thinking about your gambling experiences or planning out future gambling ventures or bets?	○	○
Have you ever gambled as a way to escape from personal problems?	○	○
Has there ever been a period when, if you lost money gambling one day, you would return another day to get even?	○	○
Has your gambling ever caused serious or repeated problems in your relationships with any of your family members or friends?	○	○

Your answers are completely confidential

COMBAT STRESS
FOR VETERANS' MENTAL HEALTH

Questions About Your Lifestyle

Please select the option that best represents your answer to each question over the *past 6 weeks*.

How often do you have a drink containing alcohol?

- ◯ Never
- ◯ Monthly or less
- ◯ 2-4 times a month
- ◯ 2-3 times a week
- ◯ 4+ times a week

How many drinks containing alcohol do you have on a typical day when you are drinking?

- ◯ 1 or 2
- ◯ 3 or 4
- ◯ 5 or 6
- ◯ 7 or 8
- ◯ 10 or more

How often do you have six or more drinks in once occasion?

- ◯ Never
- ◯ Less than monthly
- ◯ Monthly
- ◯ Weekly
- ◯ Daily or almost daily

How often during *the last year* have you found that you were not able to stop drinking once you had started?

- ◯ Never
- ◯ Less than monthly
- ◯ Monthly
- ◯ Weekly
- ◯ Daily or almost daily

How often in *the last year* have you failed to do what was normally expected of you because of drinking?

- Never
- Less than monthly
- Monthly
- Weekly
- Daily or almost daily

How often in *the last year* have you needed a first drink in the morning to get yourself going after a heavy drinking session?

- Never
- Less than monthly
- Monthly
- Weekly
- Daily or almost daily

How often in *the last year* have you had a feeling of guilt or remorse after drinking?

- Never
- Less than monthly
- Monthly
- Weekly
- Daily or almost daily

How often in *the last year* have you been unable to remember what happened the night before because of your drinking?

- Never
- Less than monthly
- Monthly
- Weekly
- Daily or almost daily

Have you or someone else been injured because of your drinking?

- No
- Yes, but not in the last year
- Yes, in the last year

Has a relative, friend, doctor or other health care worker been concerned about your drinking or suggested you cut down?

- ○ No
- ○ Yes, but not in the last year
- ○ Yes, in the last year

How often do you use drugs (other than alcohol)?

- ○ Never
- ○ Once a month or less
- ○ 2-4 times a month
- ○ 2-3 times per week
- ○ 4+ times per week

Your answers are completely confidential

COMBAT STRESS
FOR VETERANS' MENTAL HEALTH

Questions About Feeling Stressed Or Angry

Please answer each question by selecting the appropriate answer.

A: Obsessions are frequent, unwelcome, and intrusive thoughts

How much time do you spend on obsessive thoughts?

- None
- 0-1 hrs/day
- 1-3 hrs/day
- 3-8 hrs per day
- More than 8 hrs/day

How much do your obsessive thoughts interfere with your personal, social, or work life?

- None
- Mild
- Definite but manageable
- Substantial interference
- Severe

How much do your obsessive thoughts distress you?

- None
- Little
- Moderate but manageable
- Severe
- Nearly constant, disabling

How hard do you try to resist your obsessions?

- Always try
- Try much of the time
- Try some of the time
- Rarely try. Often yield
- Never try. Completely yield

How much control do you have over your obsessive thoughts?

- Complete control
- Much control
- Some control
- Little control
- No control

B: Compulsions are repetitive behaviours or mental acts that you have a strong urge to repeat that are aimed at reducing your anxiety or preventing some dreaded event.

How much time do you spend on compulsive behaviours?

- None
- 0-1 hrs/day
- 1-3 hrs/day
- 3-8 hrs/day
- More than 8 hrs/day

How much do your compulsive behaviours interfere with your personal, social, or work life?

- None
- Mild
- Definite but manageable
- Substantial interference
- Severe

How much do your compulsive behaviours distress you?

- None
- Little
- Moderate but manageable
- Severe
- Almost constant, disabling

How hard do you try to resist your compulsive behaviours?

- Always try
- Try much of the time
- Try some of the time
- Really try, often yield
- Never try. Completely yield

How much control do you have over your compulsive behaviours?

- ◯ Complete control
- ◯ Much control
- ◯ Some control
- ◯ Little control
- ◯ No control

Please select the answer that best describes how your anger over the *last 4 weeks*.

	Not At All	A Little	Moderately	A Lot	Very Much
I often find myself getting angry at people or situations	◯	◯	◯	◯	◯
When I get angry, I get really mad	◯	◯	◯	◯	◯
When I get angry, I stay angry	◯	◯	◯	◯	◯
When I get angry, I stay angry at someone, I want to hit or clobber the person	◯	◯	◯	◯	◯
My anger prevents me from getting along with people as well as I'd like to	◯	◯	◯	◯	◯

Your answers are completely confidential

COMBAT STRESS
FOR VETERANS' MENTAL HEALTH

Questions About Symptoms Related To A Stressful Event

Please identify the experience that troubles you most and answer the questions in relation to this experience.

When did the experience occur?

- ◯ less than 6 months ago
- ◯ 6 to 12 months ago
- ◯ 1 to 5 years ago
- ◯ 5 to 10 years ago
- ◯ 10 to 20 years ago
- ◯ more than 20 years ago

Below are problems that people report in response to traumatic or stressful life events.

How much you have been bothered by that problem in *the past month*?

	Not At All	A Little Bit	Moderately	Quite a Bit	Extremely
Having upsetting dreams that replay part of the experience or are clearly related to the experience?	○	○	○	○	○
Having powerful images or memories that sometimes come into your mind in which you feel the experience is happening again in the here and now?	○	○	○	○	○
Avoiding internal reminders of the experience (for example, thoughts, feelings, or physical sensations)?	○	○	○	○	○
Avoiding external reminders of the experience (for example, people, places, conversations, objects, activities, or situations)?	○	○	○	○	○
Being "super-alert", watchful, or on guard?	○	○	○	○	○
Feeling jumpy or easily startled?	○	○	○	○	○

In *the past month* have the above problems affected...

	Not At All	A Little Bit	Moderately	Quite A Bit	Extremely
Your relationships or social life?	○	○	○	○	○
Your work or ability to work?	○	○	○	○	○
Any other important part of your life such as parenting, or school or college work, or other important activities?	○	○	○	○	○

Your answers are completely confidential

COMBAT STRESS
FOR VETERANS' MENTAL HEALTH

Questions About Symptoms Related To A Stressful Event

Below are problems that people who have had stressful or traumatic events sometimes experience.

The questions refer to ways you feel, think about yourself and relate to others.
How true is each statement of you?

	Not At All	A Little Bit	Moderately	Quite A Bit	Extremely
When I am upset, it takes me a long time to calm down	○	○	○	○	○
I feel numb or emotionally shut down	○	○	○	○	○
I feel like a failure	○	○	○	○	○
I feel worthless	○	○	○	○	○
I feel distant or cut off from people	○	○	○	○	○
I find it hard to stay emotionally close to people	○	○	○	○	○

In *the past month*, have the above problems in emotions, in beliefs about yourself and in relationships:

	Not At All	A Little Bit	Moderatley	Quite A Bit	Extremely
Created concern or distress about your relationships or social life?	○	○	○	○	○
Affected your work or ability to work?	○	○	○	○	○
Affected any other important parts of your life such as parenting, or school or college work, or other important activities?	○	○	○	○	○

Your answers are completely confidential

COMBAT STRESS
FOR VETERANS' MENTAL HEALTH

Questions About Symptoms Relating to a Stressful Event

This question asks about experiences you may have had after a very stressful experience that went against your moral code or values:

Have you had an experience(s) as described above?

- ○ Yes
- ○ No

Your answers are completely confidential

COMBAT STRESS
FOR VETERANS' MENTAL HEALTH

Questions About Symptoms Relating To A Stressful Event

Did the event involve something you did or failed to do?

- ◯ Yes
- ◯ No

Did the event involve observing someone else acting (or failing to act)?

- ◯ Yes
- ◯ No

Did the event involve being directly impacted by someone else acting (or failing to act)?

- ◯ Yes
- ◯ No

What year did this event happen?

Did the event involve actual or threatened death, serious injury, or sexual violence?

- ◯ Yes
- ◯ No

In *the past month*, have you:

a) Had nightmares about the event or thought about the event when you did not want to?

- ◯ Yes
- ◯ No

b) Tried hard not to think about the event or went out of your way to avoid situations that reminded you of the event(s)?

- ◯ Yes
- ◯ No

Your answers are completely confidential

COMBAT STRESS
FOR VETERANS' MENTAL HEALTH

Questions About Symptoms Relating To A Stressful Event

Keeping the worst event in mind, in *the past month*, how strongly would you agree with the following statements:

	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
People need to be held accountable	○	○	○	○	○
I am preoccupied by how things should have gone differently	○	○	○	○	○
I blame myself	○	○	○	○	○
I feel guilty about what happened	○	○	○	○	○
I am angry all the time	○	○	○	○	○
I have lost faith in humanity	○	○	○	○	○
I feel despair	○	○	○	○	○
People would hate me if they really knew me	○	○	○	○	○
People who break the rules should be punished	○	○	○	○	○
I feel like a bad person	○	○	○	○	○
I am disconnected from other people	○	○	○	○	○
I have trouble seeing goodness in others	○	○	○	○	○
I am ashamed about what happened	○	○	○	○	○
People don't deserve second chances	○	○	○	○	○
I am disgusted by what happened	○	○	○	○	○
I feel like I don't deserve a good life	○	○	○	○	○
I worry about what people think about me	○	○	○	○	○

	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
I keep myself from having success	○	○	○	○	○
I am ashamed of my actions	○	○	○	○	○
There is no higher power	○	○	○	○	○
If people really knew me, they would not like me	○	○	○	○	○
I lost trust in others	○	○	○	○	○
I have lost the ability to forgive	○	○	○	○	○
I feel rejected by people	○	○	○	○	○
I feel guilty	○	○	○	○	○
I lost the feeling that I matter	○	○	○	○	○
I am quick to be angry	○	○	○	○	○
I cannot accept myself	○	○	○	○	○
I am not the good person I thought I was	○	○	○	○	○
I do not trust myself to be good	○	○	○	○	○
I lost a sense of meaning in life	○	○	○	○	○
I have lost pride in myself	○	○	○	○	○
My actions don't fit with who I thought I was	○	○	○	○	○
I cannot be honest with other people	○	○	○	○	○

Please use the slider below that represents how much these experiences have made it hard for you in your daily life.

Not Hard At All — Somewhat Hard — Extremely Hard

Your answers are completely confidential

COMBAT STRESS
FOR VETERANS' MENTAL HEALTH

Questions About Life Growing Up

While you were growing up, during your *first 18 years* of life:

	Yes	No
Did a parent or other adult in the household often… Swear at you, insult you, put you down, or humiliate you? **OR** Act in a way that made you afraid that you might be physically hurt?	○	○
Did a parent or other adult in the household often … Push, grab, slap, or throw something at you? **OR** Ever hit you so hard that you had marks or were injured?	○	○
Did an adult or person at least 5 years older than you ever… Touch or fondle you or have you touch their body in a sexual way? **OR** Try to or actually have oral, anal, or vaginal sex with you?	○	○
Did you often feel that … No one in your family loved you or thought you were important or special? **OR** Your family didn't look out for each other, feel close to each other, or support each other?	○	○

	Yes	No
Did you often feel that ... You didn't have enough to eat, had to wear dirty clothes, and had no one to protect you? **OR** Your parents were too drunk or high to take care of you or take you to the doctor if you needed it?	○	○
Were your parents ever separated or divorced?	○	○
Was your mother or stepmother: Often pushed, grabbed, slapped, or had something thrown at her? **OR** Sometimes or often kicked, bitten, hit with a fist, or hit with something hard? **OR** Ever repeatedly hit over at least a few minutes or threatened with a gun or knife?	○	○
Did you live with anyone who was a problem drinker or alcoholic or who used street drugs?	○	○
Was a household member depressed or mentally ill or did a household member attempt suicide?	○	○
Did a household member go to prison?	○	○

Your answers are completely confidential

COMBAT STRESS
FOR VETERANS' MENTAL HEALTH

Thank You!

Your answers are really important to help us understand how best to meet the needs of veterans.

If you are in crisis please contact your local GP for an emergency appointment, visit your local Accident and Emergency Department or contact the Samaritans (National Freephone 116 123) to access the urgent support you require. You can also contact the Combat Stress Helpline for advice and support at any point during or after your treatment with us (National Freephone 0800 138 1619).

If you need any further advice on coping during COVID-19, please see the resources on the Combat Stress website - click here.

Thank you again for taking part in our survey.

Appendix C

Confirmation of Ethical Approval from University of Leeds: SoMREC

MREC 21-053 Amd 3 February 2023 - Study Amendment Approval Confirmation

Dear Marina

MREC 21-053 Amd 3 February 2023 - Exploring Moral Injury and Adverse Childhood Experiences (ACEs) in Veterans (previously Exploring mental health help-seeking experiences of British men and women who have served in the Army, from minority ethnic and/or racial backgrounds)

NB: All approvals/comments are subject to compliance with current University of Leeds and UK Government advice regarding the Covid-19 pandemic.

We are pleased to inform you that your amendment to your research ethics application has been reviewed by the School of Medicine Research Ethics Committee (SoMREC) and we can confirm that ethics approval is granted based on the documentation received at date of this email.

Please retain this email as evidence of approval in your study file.

Please notify the committee if you intend to make any further amendments to the research as submitted and approved to date. This includes recruitment methodology; all changes must receive ethical approval prior to implementation. Please see https://ris.leeds.ac.uk/research-ethics-and-integrity/applying-for-an-amendment/ or contact the Research Ethics & Governance Administrator for further information fmhuniethics@leeds.ac.uk if required.

Ethics approval does not infer you have the right of access to any member of staff or student or documents and the premises of the University of Leeds. Nor does it imply any right of access to the premises of any other organisation, including clinical areas. The committee takes no responsibility for you gaining access to staff, students and/or premises prior to, during or following your research activities.

Please note: You are expected to keep a record of all your approved documentation, as well as documents such as sample consent forms, risk assessments and other documents relating to the study. This should be kept in your study file, which should be readily available for audit purposes. You will be given a two week notice period if your project is to be audited.

It is our policy to remind everyone that it is your responsibility to comply with Health and Safety, Data Protection and any other legal and/or professional guidelines there may be.

I hope the study continues to go well.

Best wishes
Sou Chung
On behalf of Dr Naomi Quinton, CHAIR, SoMREC

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Sou Sit Chung, Research Ethics Administrator, The Secretariat, University of Leeds, LS2 9NL, s.chung@leeds.ac.uk
Please note my working hours are Monday to Friday 9am – 12.30pm
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Appendix D

Descriptive Statistics, Normality Tests & Q-Q Plots to explore Distribution of Data

Descriptive Statistics for Standardised Measures.

Measure	N	Minimum	Maximum	Mean	Std. Deviation
ACE-Q Total	346	0	10	2.72	2.453
ACE-Q Family Factors	346	0	5	1.11	1.223
ACE-Q Personal Factors	346	0	5	1.61	1.596
MIOS Total	244	2	56	33.48	10.110
MIOS Trust Subset	254	0	28	16.67	5.332
MIOS Shame Subset	253	0	28	16.37	6.247
AUDIT Total	286	0	40	10.51	8.414
ITQ Total	355	0	48	32.20	11.048
GHQ-12	373	0	12	7.40	3.994
OSSS-3	360	3	14	7.26	2.467

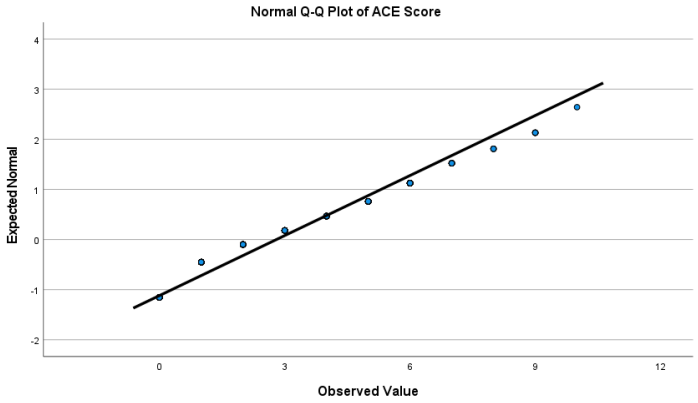
SPSS Output for Normality Testing

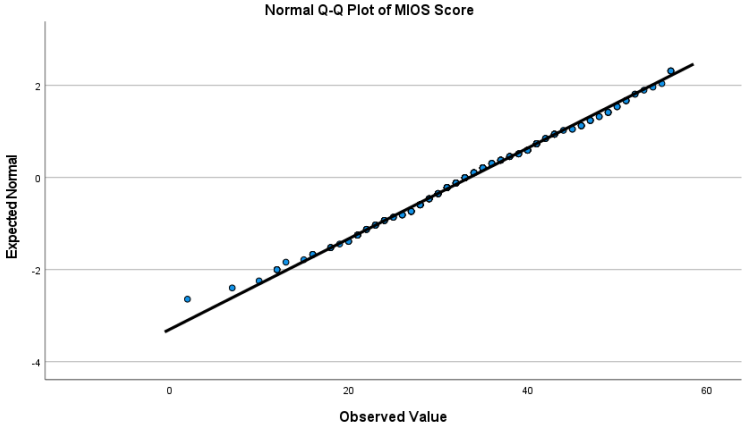
	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	*df*	*Sig.*	*Statistic*	*df*	*Sig*
Gender	.539	428	.000	.143	428	<.001
Age Band	.218	428	<.001	.843	428	<.001
ACE Score	.160	346	<.001	.903	346	<.001
MIOS	.051	244	.200*	.993	244	.313
ITQ	.085	355	<.001	.956	355	<.001
GHQ-12	.134	373	<.001	.898	373	<.001
AUDIT	.113	286	<.001	.920	286	<.001
OSSS-3	.117	360	<.001	.965	360	<.001

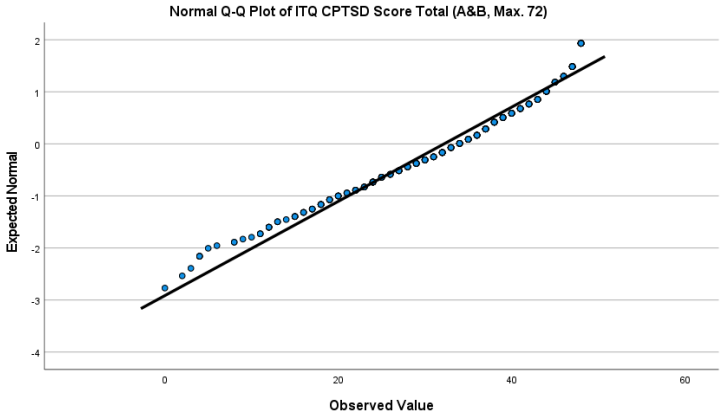
*This is a lower bound of the true significance.

N.B. Non-Significant results indicate normal distribution of the data.

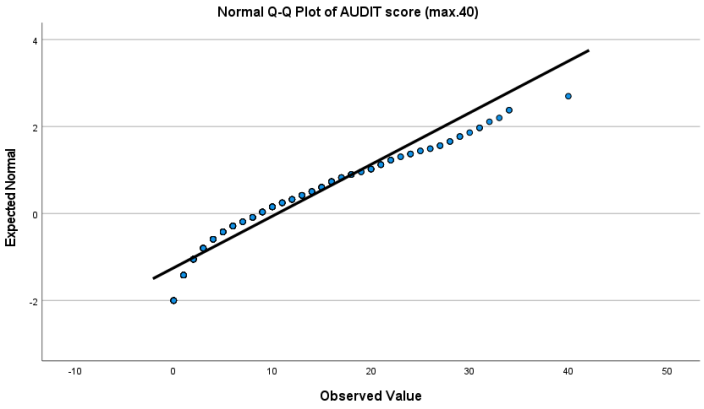
Q-Q Plots as part of Normality Testing

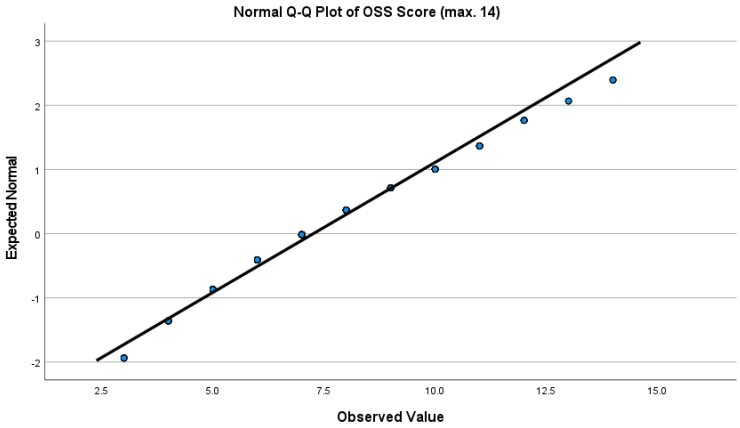

Normal Q-Q Plot of ACE Score
Expected Normal
Observed Value
4
3
2
1
0
-1
-2
0
3
6
9
12


Normal Q-Q Plot of MIOS Score
Expected Normal
Observed Value
2
0
-2
-4
0
20
40
60


Normal Q-Q Plot of ITQ CPTSD Score Total (A&B, Max. 72)
Expected Normal
Observed Value
2
1
0
-1
-2
-3
-4
0
20
40
60


Normal Q-Q Plot of GHQ-12 score (max. 36)
Expected Normal
Observed Value
2
1
0
-1
-2
-3
0
3
6
9
12


Normal Q-Q Plot of AUDIT score (max.40)
Expected Normal
Observed Value
4
2
0
-2
-10
0
10
20
30
40
50


Normal Q-Q Plot of OSS Score (max. 14)
Expected Normal
Observed Value
3
2
1
0
-1
-2
2.5
5.0
7.5
10.0
12.5
15.0