University of Southampton

Faculty of Environment and Life Sciences

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A Compassionate Mind Training for Moral Injury, Trauma and Psychological Distress in Frontline Healthcare Staff

By

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Thesis for the degree of Doctorate in Clinical Psychology

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Abstract

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The first chapter details a meta-analysis exploring the relationship between moral injury (MI) and adverse childhood experiences (ACEs) among people who work in occupations that are at an increased risk of MI. Searches were conducted using PsychINFO, PubMed, Web of Science, SCOPUS, COCHRANE, EMBASE and Google Scholar. Eleven studies were included in the review. A three level meta-analyses investigated the associations between MI and ACEs. The results revealed a significant positive relationship between MI and ACEs (r =.17, p <.0001). Exploratory moderator analysis indicated that the relationship between MI and ACEs was stronger when studies measured Moral injury outcomes only, compared with studies that included measurements of both exposure and outcomes. Overall, the meta-analysis supports a tentative relationship between MI and ACEs, however as most studies examined MI and ACEs in military samples, future high-quality research is needed in nonmilitary occupations that are at an increased risk of MI e.g., Healthcare workers.

The second chapter is an empirical paper investigating the relationship between moral injury. (MI), psychological distress, post-traumatic stress disorder (PTSD), adverse childhood experiences (ACEs) and the three flows of compassion in healthcare professionals (HCPs) who worked during the COVID-19 pandemic. Since the COVID-19 pandemic, HCPs faced several potentially morally injurious events (PMIEs) which can result in MI and psychological distress. Research suggests those who have

experienced ACEs are at an increased risk of MI (Battaglia et al., 2019). Theoretically, increases in psychological distress during this period, may have led to activation the threat system thus increasing MI, PTSD and psychological distress and reducing the three flows of compassion in HCPs. The study also explored the effectiveness of a Compassionate Mind Training (CMT; Gilbert, 2000).

In Part A, 157 HCPs completed an online survey. Results revealed that psychological distress, PTSD, SC, emotional and sexual abuse in childhood, were significantly related to MI in HCPs.

Part B consisted of a randomised, waitlist-controlled study with 33 HCPs (training group, n = 21; waitlist group, n = 12). Results revealed no significant differences in the flows of compassion, psychological distress, PTSD, or MI from pre to post timepoints, in neither the training nor waitlist group. Overall, the results provide further insight into important predictors and potential resilience factors associated with MI in HCPs. Additionally, the relationship between MI, PTSD and SC is promising and warrants further consideration through future research which may help to inform potential service provisions and prevention and intervention efforts.

Keywords: Healthcare Professionals, Moral Injury, Compassionate Mind Training, Adverse Childhood Experiences, Flows of Compassion, Self-Compassion, Compassion towards Others, Compassion from others.

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Research Thesis: Declaration of Authorship

Print name: Kathryn Mc Aree

Title of thesis: An Investigation into Moral Injury, Trauma, Adverse Childhood Experiences, Psychological Distress and Compassion in Healthcare Professionals

I declare that this thesis and the work presented in it are my own and has been generated by me as the result of my own original research.

I confirm that:

1. This work was done wholly or mainly while in candidature for a research degree at this University.
2. Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated.
3. Where I have consulted the published work of others, this is always clearly attributed.
4. Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work.
5. I have acknowledged all main sources of help.
6. Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself.
7. None of this work has been published before.

Signature: Kathryn McAree ..... Date: 17/05/2024

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Definitions and Abbreviations

ACEs ..... Adverse childhood experience

AIC ..... Akaike Information Criterion

BCYS ..... Building and Cultivating Your Compassionate Self

BIC..... Bayesian Information Criterion

CCP..... Compassion for a Close Person

CD ..... Cooks Distance

CEAS ..... Compassionate Engagement and Action Scales

CEV ..... Childhood Experiences of Violence

CfO ..... Compassion *from* others

CFT ..... Compassion Focused Therapy

CFTS ..... Compassion for the Self

CMT ..... Compassionate Mind Training

CORE-10 ..... The Clinical Outcomes in Routine Evaluation

CtO ..... Compassion *to* others

CTQ ..... Childhood Trauma Questionnaire

E.g. ..... Example

EMIS ..... Expression of Moral Injury Scale

ERGO ..... Ethics and Research Governance Online

IRAS..... Integrated Research Approval System

LEC ..... Life Events Checklist

LSC-R ..... Life Stressors Checklist Revised

MANOVA ..... Multivariate Analysis of Variance

MI ..... Moral Injury

MIA-PSP ..... Moral Injury Assessment for Public Safety Personnel (MIA-PSP)

MIOS ..... Moral Injury Outcome Scale

PCL – 5 ..... PTSD Checklist for DSM-5

PMIE ..... Potentially Morally Injurious Event

PRISMA ..... Preferred Reporting Items for Systematic Review

PROSPERO ..... Prospective Register of Systematic Reviews

PTSD..... Post Traumatic Stress Disorder

SC ..... Self-Compassion

SD..... Standard Deviation

Sig ..... Significant

SQAC ..... Standard Quality Assessment Criteria

SRB ..... Soothing Rhythm Breathing

UK ..... United Kingdom

USA ..... United States of America

Chapter 1 Impact of Adverse Childhood Experiences in Occupations at Risk of Moral injury: A Systematic Review and Meta-analysis.

Journal Specification: 'Traumatology' was selected to guide preparation on the paper. The author guidance states that manuscripts must not exceed 30 double-spaced pages (excluding figures, tables, references, and appendices). This equates to approximately 10,000 words.

1.1 Abstract

Background: Adverse Childhood Experiences (ACEs) are emerging as potential predisposing factors for the impact of Moral Injury (MI) following exposure to occupational related potentially morally injurious events (PMIEs).

Objectives: This meta-analysis aimed to quantify the association between ACEs and MI in staff who work in occupations that are at an increased risk of MI, while exploring moderators that may impact the association.

Methods: Seven electronic databases were systematically searched and included eleven studies from both published and unpublished papers. Risk of bias was assessed by two reviewers using a standardised quality assessment tool. Effect sizes were not independent, so a three-level-meta-analytic model was used to estimate pooled effect sizes, and meta-regression used to examine moderator effects.

Results: Meta-analytic results support small positive reliable associations between MI and ACEs (r = .17, 95% CI = .11 to .23). Moderation analyses revealed the association between MI and ACEs was statistically significantly stronger when studies used questionnaires that measured MI outcomes only (*r* = .257) compared to measures combining MI outcomes and PMIE (*r* = 0.149). There were no moderating effects of occupation, location, ACE-measure, treatment-seeking status, age or gender.

Conclusions: MI is associated with ACEs irrespective of occupation, age, gender, study location, ACE measurement or treatment-seeking status. Given the small number of studies included in the review, only tentative conclusions about the associations can be made. As most studies examined MI and ACEs in military samples, future high-quality research is needed in non-military occupations that are at an increased risk of MI e.g., Healthcare workers.

Keywords: Moral injury, adverse childhood experiences, abuse, occupation, meta-analysis

Key Practitioner Message:

- Individuals with a history of ACEs disproportionately have poor physical and mental health outcomes and are more likely to work in high-risk jobs.
- Given the likelihood of working in high-risk jobs, those with increased ACEs are at risk for revictimization, continued exposure to traumatic events, poor work productivity and ill health.
- Increasing evidence demonstrates that some people are disproportionately exposed to PMIEs as a result of their occupation.
- Understanding the relationship between PMIEs, MI and ACEs among those working in high-risk occupations, can inform organisational decisions about prevention, training, and supervision requirements in order to ensure staff feel supported and to prevent adverse consequence.
- This review highlights that considerably more research is required in this field including the development of valid assessments delineating the impact of exposure and outcomes associated with PMIEs.
- Future research should consider high quality investigation of the association between ACEs and MI in non-military populations who are at an increased risk of MI.

1.2 Introduction

1.2.1 Adverse Childhood Experiences

Adverse childhood experiences (ACEs) refer to highly stressful or traumatic situations that occur before a child reaches 18 years of age (Felitti et al., 1998). For example, Felitti et al. (1998) defined ACEs as incorporating 'direct child maltreatment' including exposure to abuse (e.g., psychological, physical, sexual and emotional) and a wider set of 'indirect experiences' related to family and household dysfunction including witnessing domestic abuse, mental illness, substance abuse, experiencing parental separation, divorce and having a family member in prison (Anda et al, 2010; Dong et al, 2004; Felitti et al., 1998).

In consideration of the prevalence of ACEs in the general population, Bellis et al. (2019) estimated that just under half of the population of England have experienced at least one ACE with one in four having experienced two or more. Furthermore, different ACEs are highly correlated with one another, with people who report one ACE at risk of exposure to others (Dong et al., 2004; Finkelhor, 2018), with the risk of poorer outcomes such as substance use, mental ill-health, obesity, cancer, and unemployment increasing with the cumulation of ACEs experienced (Bellis et al., 2014; Chartier et al., 2010). Notably, there is a dose–response relationship between ACEs and the risk of experiencing further victimization in adulthood (Tiwari et al., 2021) which can also have negative consequences across generations (Berlin et al., 2011; Myhre et al., 2014).

The negative impact that these experiences have on the health and social determinants of health in adulthood are extensively documented (Anda et al., 2010; Bellis et al., 2014; Bellis et al., 2019; Dube et al., 2001; Felitti et al., 1998; Kalmakis & Chandler, 2015). A systematic review revealed that those with 4 or more ACEs were at an increased risk of cancer, heart disease, respiratory disease, mental illness, self-harm and premature mortality, compared to those without any exposure to ACE's (Hughes et al., 2017; Kelly-Irving et al.,2013). However, the impact of ACEs can depend on several circumstances such as age at onset, duration of exposure and access to support or resources and not

all young people who experience ACEs will be impacted in similar ways in adulthood (KellyIrving & Delpierre, 2019; Lester et al., 2020).

Research has begun to examine the prevalence of ACEs in human service occupations. Those who work in 'human service occupations' refer to professionals who respond to the welfare of others, in occupations including but not limited to healthcare, childcare, military and education. Research has found typically higher rates of ACEs than the general population in several occupations including social service providers (Esaki & Larkin, 2013), child welfare providers (25.1% v. 12.5%) (Howard et al., 2015), teachers (22% v 16%) (Hubel et al., 2020), mental health professionals (25% v 12%) and military service personnel (27.3% vs 12.9%) (Blosnich et al., 2014). Studies have also found a relationship between ACE exposure and job-related problems (Anda et al., 2004), particularly amongst workers in helping professions (healthcare, human services, child welfare, etc.) (Keesler et al., 2018; McKee-Lopez). For example, employees who report higher exposure to ACES (4 or more) are twice as likely to report job problems, financial difficulties, and absenteeism than those with no exposure to ACEs (Keesler et al., 2018).

Some employees, e.g., childcare workers (Esaki & Larkin, 2013), military personnel (Schry et al., 2016) and disability workers (Keesler et al., 2018) may be at-risk of witnessing re-enactments of their own traumatic histories and for their work environments to trigger, retraumatize, or maintain traumatic responses (Leo, 1999). Past ACE exposure also increases the risk of secondary traumatic stress and burnout at work (Mercer et al, 2023). Interestingly, research conducted by Howard et al. (2015) who asked 192 child welfare professionals to complete an ACE scale, reported that those with higher ACEs reported less burnout and greater levels of compassion satisfaction than those with low ACEs. The authors argued that the reason for this may be because the participants with a personal traumatic history may demonstrate higher levels of empathy and concern for others due to their ability to connect and identify with the traumatic situations their clients have encountered. While previous research has established that those in the aforementioned occupations may experience higher prevalence of ACEs compared to the general population (Steen et al., 2021), and that ACEs may (Schalinski et al., 2016; Monnat & Chandler, 2015) or may not (Howard et al, 2015) negatively

impact on adult mental and physical health, studies exploring the mechanisms through which ACEs exert their effect remain limited (Cloitre et al., 2019). With this in mind, Moral Injury (MI) has been proposed as one potential mechanism (Jinkerson, 2016).

1.2.2 Moral Injury

MI is a term originally used to describe the experiences of military personnel who felt betrayed, let down, or abandoned by their leaders in combat (Shay, 1991, 2014). MI refers to the lasting psychological distress of engaging in or witnessing an event which transgresses one's moral code and values (Shay, 1994). This definition recognises the enduring psychological impact of a "betrayal of what's right by someone in legitimate authority in a high stakes situation" (Shay, 2014, p.183)". This definition was expanded to acknowledge the strong emotional, behavioural, cognitive, and spiritual responses to "perpetrating, failing to prevent, bearing witness to, or learning about acts that transgress deeply held moral beliefs and expectations (Litz et al., 2009, p. 696)." MI refers to a distinct symptom profile characterised by guilt, shame, intrusive thoughts and self-loathing (Jones et al., 2020). MI is proposed to have negative effects on mental health with research in combat veterans revealing significant associations with Post Traumatic Stress Disorder (PTSD) (Bryan at al., 2014), suicidal ideation (Hamrick et al., 2019) and depression (Farnsworth et al., 2014). Potentially morally injurious events (PMIEs), refers to specific types of traumatic events which are incongruent with one's moral beliefs which can result in MI (Drescher et al., 2011). Research conducted with UK military veterans found that PMIEs were associated with familial breakdown and unemployment due to levels of distress and maladaptive coping responses (Williamson et al., 2020[b]).

It is important to note that other occupations may also be at greater risk of exposure to workrelated MI events. A recent meta-analysis has reported that 67% of people across several occupations including healthcare, first responders, educators, journalists, and child protection have been exposed to at least one PMIE in their job roles (Brennan et al., 2024). Despite this, there is no clear evidence for how widespread occupational PMIEs are.

When an individual experiences a PMIE, such as decision making which resulted in injury or death (Best, 2021), or witnessing unethical behaviours by colleagues, this may lead to difficulties with how the person then views themselves, others and the world and contribute to feelings of shame and guilt (Bonson et al., 2023). Litz and Kerig (2019) emphasised the importance of distinguishing the difference between PMIEs and MI outcomes. PMIEs relate to the *event only*, whereas MI outcomes refer to the psychological, emotional, social, or spiritual effects following directly experiencing, witnessing, or learning about PMIEs (Frankfurt & Frazier, 2016). In the PTSD literature, it is argued that experiencing a traumatic event does not inevitably lead to PTSD symptoms (van der Kolk, 2000). Similarly, experiencing a PMIE although necessary, the event itself is not sufficient to result in MI outcomes (Hall et al., 2022) which in turn, can be associated with poorer mental health (Yeterian et al., 2019). While MI is not currently categorised as a mental health disorder, experiencing a PMIE has been found to increase the risk for the development of a range of psychological consequences including substance use, PTSD, depression, anxiety and suicidality (Griffin et al., 2019; Williamson et al., 2018). According to Frankfurt and Frazier (2016), it is the interpretation and appraisal of the PMIEs which violate and cause dissonance in an individual's moral framework that results in MI outcomes.

The phenomenon of MI, has gained increasing attention in the scientific literature over the past decade, including outside of a military context (McEwen et al., 2021). MI can be considered a psychological work-related injury, meaning occupational groups that experience PMIEs regularly as part of their jobs, may develop MI (Williamson et al., 2023; Hines et al., 2021; Rabin et al., 2023). In support, a meta-analysis found that exposure to PMIEs across a range of professions (e.g., teachers, military personnel, journalists), was significantly associated with PTSD, depression, and suicidal ideation (Williamson et al., 2018, Williamson et al., 2020). As is the case with military personnel and veterans, public service personnel (PSP) must routinely make morally difficult decisions in stressful, unpredictable and at times life-threatening conditions in order to protect themselves, others and their colleagues (Lentz et al., 2021) which may result in PMIEs. Exposure to work based PMIEs not only results in significant psychological issues, sleep disturbances and social withdrawal (Hall et al., 2021),

but can also bear impact beyond the staff member to also affecting those within their care (Mantri et al., 2021) e.g., through poor patient care provision in healthcare, decision making with limited resources and commission of errors (Nelson et al., 2022). PMIEs can lead to feelings of guilt, shame, worthlessness, and pervasive interpersonal and intrapersonal difficulties (Bonson et al, 2023). These negative impacts have been found in both military and civilian samples, including police, healthcare workers and journalists (Backholm & Idås, 2015; Čartolovni et al., 2018; Komarovskaya et al.,2011; Williamson, Lamb, et al.,2022).

1.2.3 MI, ACEs, and At-Risk Occupations

While previous research has demonstrated that both ACEs exposure and PMIEs are separately associated with a range of adverse psychological consequences (Bellis et al., 2014; Koeing et al., 2021), there has been little research examining the relationship between the two. Emerging evidence has proposed that predisposing risk factors may influence later development of MI outcomes following PMIE exposure (Bonson et al., 2023). Thompson et al. (2019) postulates that early life experiences have been found to shape moral development. However, as ACE exposure can disrupt typical moral development, this can lead to the development of maladaptive beliefs about the self, world, and others (Tezel et al., 2015). Subsequently, these early ACEs exposures may predispose individuals to be more vulnerable to the negative consequences of MI following a PMIE exposure, such as adverse mental health outcomes (Koenig et al., 2019), suicidal ideation (Hamrick et al., 2019), and substance misuse (Davies et al., 2019). According to Keesler (2018), the consequences of ACEs may be partially triggered or exacerbated by exposure to stress, such as PMIEs, during adulthood. Furthermore, people who have experienced ACEs are more likely to experience greater distress levels in response to stress during adulthood when compared to those who have not experienced ACEs (Manyema et al. 2018, Keesler, 2018).

It has been proposed that exposure to childhood trauma may be a factor in a person's decision to pursue a career in health and social care and other human services (Bryce et al., 2021; Aykanian & Mammah., 2022). PSPs may be motivated by a desire to make meaning of early life

adversity or trauma (e.g., ACEs) and the need to make that adversity matter by supporting and caring for others who have experienced similar adversities (Bryce et al., 2021). This may therefore provide evidence explaining why there is higher prevalence of ACEs among PSP than the general population (Aykanian et al., 2022). While some individuals who experienced ACEs believed that the adversity afforded some benefits e.g., using their history to help others, others found that this created tension and impacted negatively on their overall work performance (Bernhardt et al., 2018). Additionally, Simons et al. (2019) found that PSP may be particularly more sensitive to stressful adult experiences which are reminiscent to those experienced in childhood. Subsequently, there may be potential for the working environment to perpetuate PSPs trauma responses (Keesler, 2020).

Afifi et al. (2016) examined the rates of ACES in military populations which demonstrated that military personnel have higher rates of ACEs than the general population (47.7% vs 33.1%) (Afifi et al., 2016). Additionally, enlistment in the military has been proposed as an instrumental act to escape adverse household environments (Blosnich et al., 2014). In a veteran sample, Battaglia et al. (2019) examined the relationship between ACEs and MI among members of the Canadian Armed Forces (CAF). CAF members who experienced ACEs, particularly emotional abuse, and household violence, were at an increased risk of developing MI symptomology in adulthood.

As a result of their disproportionate exposure to work-related PMIEs, PSP may also be, as found in Military populations (Williamson et al., 2020), particularly vulnerable to the consequences of having experienced ACEs (Roth et al, 2022). Roth and colleagues (2022) demonstrated that exposure to PMIEs in police officers', firefighters, and paramedics with a history of ACEs was associated with MI and trauma symptomology. Although this group have unique vulnerability to negative psychological consequences due to their chronic work-related exposure to PMIEs, its impact was buffered by emotional regulation skills (Roth et al., 2022). These findings provide preliminary evidence that exposure to a higher number of ACEs in childhood, may be predictive of higher MI symptoms following PMIE exposure later in life in both military and non-military populations.

1.2.4 The current study

Emerging research reveals that MI is associated with both ACEs, and mental health outcomes in adulthood (e.g., McEwan et al., 2023). Within military samples, ACEs have been proposed as a predisposing factor associated with the development of MI in adulthood (Battaglia et al., 2019; Williamson et al., 2021). Exploring the potential relationship between ACEs and MI may be particularly relevant in occupations for whom exposure to work-related traumatic and morally conflicting experiences is widespread (e.g., chronic exposure to death, failing to save a life, etc.). As childhood adversity may contribute to the development of MI (Bonson et al., 2023), and later PMIEs may exacerbate its effects, especially in high-risk occupations (Roth et al., 2022), further examination of the relationship between MI and ACEs is warranted. Subsequently, this meta-analysis aims to explore the relationships, and moderators, between MI and ACEs in occupations that are at an increased risk of MI.

The review aims to answer two questions:

RQ1) Are ACEs associated with MI in occupations at risk of MI?

RQ2) Does the occupation, age, gender, country, measurement tool used, or treatment-seeking status moderate this association?

1.3 Methodology

1.3.1 Protocol

The current systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement (Page et al., 2021). The methods, inclusions and exclusion criteria and analyses were specified in advance and registered with the International Prospective Register of Systematic Reviews (PROSPERO) on 21/09/2023 (CRD42023375059).

1.3.2 Eligibility Criteria

Please see Table 1 for the inclusion and exclusion criteria. To be included into this review, both published or unpublished literature studies had to adopt a quantitative design, be written in English and include occupation/s that is considered at an increased risk of MI (e.g., PSP, healthcare workers and military personnel) (Osifeo et al., 2023). Studies must also include a measure of MI and ACE and report a statistical association between MI and ACEs.

Papers were excluded if the population was not specific to occupations at an increased risk of MI (Osifeo et al., 2023), if the papers were books, book chapters, commentaries, not written in English or were qualitative in design. Studies were also excluded if they did not use a measure of MI and ACE or if the analysis of the relationship between MI and ACEs was not included (or if authors were unable to provide the data via email).

In line with the Cochrane Handbook (Li et al., 2022) authors were contacted if an effect size could not be calculated to request data required for inclusion in the meta-analysis. Where no response was received, a reminder email was sent 2 weeks after the initial request.

Table 1.
Inclusion criteria used in screening process.

Inclusion	Exclusion
Include occupations that are at an increased MI based on Osifeso et al. (2023) scoping review which specifies that Healthcare workers (HCWs), public safety personnel (PSP), and military members are "high-risk" occupation workers (HROWs) who are exposed to psychologically and physically hazardous work environments that frequently involve PMIE exposure.	Exclude papers that do not comment on the risk of occupation of the sample or are not a sample at an increased risk of MI (Osifeso et al, 2023)
Participants must be 18 and over.	Participants under 18
Empirical design of published and unpublished literature.	Books, book chapters, articles, commentaries, letters, editorials, guidelines, reviews and conference or meeting abstracts.
Written in English (or have an English language version)	Not written in English language (or does not have accessible English language version)
A direct measure of MI measure (e.g., MIES, MIOS) incurred as a result of the participants occupation.	Does not include a MI measure. Combat Experiences Questionnaire will be excluded if there is no validated MI measure used alongside them.
Includes a measure of Adverse Childhood Experiences measure (e.g., ACE-Q)	Does not include a measure of Adverse Childhood Experiences
Quantitative (e.g., cross-sectional or intervention studies)	Qualitative design
Explicit statistical testing of the association between MI and adverse childhood experiences	The analysis of the relationship between MI and adverse childhood experiences is missing, not commented on, or not explicitly discussed

1.3.3 Information Sources and Search Terms

Preliminary scoping searches were conducted on PROSPERO and PsycINFO on 01/09/2023

prior to finalising the research question. Following this, seven electronic bibliographic databases were searched for literature relevant for the current review: (PsycINFO, PubMed, Web of Science (accessed via EBSCO and included all databases), SCOPUS, EMBASE (via Ovid), and the Cochrane Library. Google scholar (first 10 pages) was also searched to increase coverage. Grey literature specific databases were not searched, however unpublished articles identified via the search strategy were eligible for inclusion.

No time limits were placed on publication dates or methodological search filters applied. All searches were conducted between the 11th and 13th of October 2023 and the search was repeated on the 15th of December 2023 to ensure that any new articles which met the inclusion criteria were included in the review.

1.3.4 Search Strategy

The final search strategy was devised and independently reviewed and piloted by an Expert Librarian. Where suitable, truncation symbols were applied (see Table 2 for search terms). Key words used to search the phenomena of interest included “Adverse Childhood experience*” OR “ACE*”. Key words used to search outcomes of interest included “Moral Injury” OR “Moral Distress” OR “Spiritual Distress” OR “Ethical Distress”. Boolean Operators ‘OR’ and ‘AND’ were used to combine search terms and provide a final set of results. See Appendix A for individual search strategies and syntax used for each database. The search strategy was informed by the key terms within the review questions and terms identified during the initial scoping searches. In addition, citation mining from eligible studies and hand reference searching was conducted.

Table 2.

Table of Search Terms Used in Systematic Review

Area	Search terms
Moral Injury	"Moral injury" or "moral distress" or "spiritual injury" or "ethical distress"
Adverse Childhood Experiences	“Adverse Childhood experience*” OR “ACE*”.

1.3.5 Selection Process

The screening and selection process was completed in accordance with the PRISMA guidelines (Page et al., 2021). Study titles and abstracts were screened initially against the inclusion criteria, then full texts according to the eligibility criteria (see Table 1). Studies that did not meet the inclusion criteria were excluded. To reduce bias, a second reviewer (DS) independently screened 10% of titles and abstracts of randomly selected studies to reach a consensus regarding the study eligibility (Boland et al., 2017). No discrepancies arose. The final sample consisted of 11 studies that met the inclusion criteria.

1.3.6 Data Collection Process

The study characteristics and key findings relevant to the current research questions were extracted from all included studies (see Table 3 & 4). The final table extracted information relating to the study design, setting, occupation, sample size, measures used and main findings.

1.3.7 Quality Assessment for Risk of Bias

The methodological quality of all included studies was assessed for the risk of bias according to ‘The Standard Assessment Criteria for Evaluating Primary Research from a Variety of Fields’ (SQAC; Kmet et al., 2004). The SQAC (Kmet et al, 2004), consists of 14 questions covering areas such as study design, subject characteristics, and suitability of statistical analysis. Each item is rated on a threepoint

scale (‘yes’ = 2, ‘partial’ = 1, ‘no’ = 0) to indicate the degree to which the criterion for each item is met. Any items not applicable (N/A) are excluded from the total sum calculation. A total score for each study is calculated by summing the ‘yes’ and ‘partial’ scores. The maximum total score is dependent on the number of items applicable to the study design (i.e., if 5 items are eligible, the maximum total score would be 10). A summary quality score between 0 and 1 is then calculated by dividing the total score by the maximum score possible for that study. Higher scores indicate higher methodological quality (0.80> ‘strong’, 0.70-0.79 ‘good’, 0.50-0.69 ‘adequate’, 0.50< ‘limited’ methodological quality (Kmet et al., 2004).

To reduce potential bias, two reviewers independently assessed the quality of all included studies against the SQAC (Kmet et al. 2004), calculated a total quality assessment score, and convened to discuss and compare scores. The inter-rater reliability was calculated via Cohen’s kappa. Results were classified in accordance with McHugh (2012) as weak (0.40 - 0.59), moderate (0.60 – 0.79), strong (0.80 – 0.90) and perfect (0.90 and above) there was ‘strong’ agreement between the two reviewers (K=.814). Please see Appendix B for more detailed quality assessment criteria and breakdown of scoring for each included study. To account for any risk of publication bias, both published (*n=9*) and unpublished studies (*n=2*) were included.

1.3.8 Analyses

A narrative synthesis was conducted to describe and summarise the characteristics and quality of the studies included in the meta-analysis. The relationship between MI and ACEs were examined with meta-analytic methods using RStudio version 4.1.2 (R-Core-Team, 2018) with the Metafor package (Viechtbauer, 2010).

Many of the retrieved studies provided multiple effect sizes. Easterbrook et al. (2022), reported two sub-samples (deployed and non-deployed veterans) and two studies (Zerach, 2023; Zerach & Levi-Belz, 2022) utilised the same sample, and thus the assumption of independence underlying traditional meta-analytic strategies was violated (Lipsey & Wilson, 2001). To account for this dependency, a three-level meta-analysis was conducted instead of traditional two-level methods (Van

den Noortgat et al., 2013). A three-level meta-analysis models three sources of variance between the observed effect sizes: sampling variance of the effect sizes (level 1), variance between effect sizes from the same sample (level 2), and variance between studies (level 3). It differs from a traditional meta-analysis in that level 2 is not modelled in the latter. Therefore, a three-level metaanalysis is an improvement on a traditional approach as it does not require the independency of effect sizes (Marsh et al., 2009). The three-level approach accounts for the overlap in information contributed by the effect sizes within the same study, and therefore avoids inflated Type I error rates (Shi et al., 2021; Marsh et al., 2009).

1.3.8.1 Effect size calculation

Effect sizes for each association of interest within each study were extracted. Where several effect sizes regarding the relationship between MI and ACE exposure was reported, an average effect size was generated via the RStudio software, to contribute one independent summary effect size to the multi-level meta-analysis (Card, 2015; Williamson et al., 2018). Each study effect sizes can be found in Table 4. Pearson's product-moment correlation (*r)* was used as the effect size indicator because *r* is more readily interpretable in comparison to other effect sizes and is easily computed from *t, F* and *d*. Cohen's (1992) guidelines were used to interpret the effect sizes (small effect *r* = 0.10, moderate effect *r* = 0.30, and large effect *r* = 0.50). Pearson's r correlations were transformed to Fisher's z scores using the formula: z = 0.5[ln(1+r) – ln(1-r)] for analysis and are reported in the forest plots as z-scores. These are converted back to Pearson's *r* in the text. Where appropriate, studies using metrics other than Pearsons *r*, were transformed for analysis. Meta-regressions were conducted to examine moderating effects if the effect sizes were available for a minimum of 10 studies (Higgins & Green, 2011).

I^2 statistics, and its confidence intervals, were computed to determine the proportion of variance across articles that are attributable to heterogeneity (Higgins & Thompson, 2002). The I^2 statistic was interpreted in relation to identified thresholds (low = 25%, moderate = 50% and high =

75%). For three-level meta-analyses, the I^2 is broken into components one attributable to the true effect size differences *within* studies, the other to *between*-study variation.

The restricted maximum likelihood estimator (Viechtbauer, 2005) was used to calculate the heterogeneity variance τ^2. We used the Akaike information Criterion (AIC), Bayesian Information Criterion (BIC) and Likelihood ration test to assess whether a three-level model was superior (i.e., explained significantly more variance) to a 'reduced' two-level model).

1.3.8.2 Moderator Analyses

In the moderator analyses, moderators were only examined when each sub-category contained at least two studies (Driessen et al., 2022). The following variables were examined as potential moderators of the association between MI and ACEs: ACE and MI measurement tools used, participant age, working in a military or non-military context, participant gender, whether the sample was treatment seeking or non-treatment seeking and study location. Meta-regression was used when moderators were continuous variables (e.g., participant age, gender).

1.3.8.3 Publication Bias

To evaluate possible publication bias, an approach from the extant literature using a threelevel meta-analysis (e.g., van Eldik et al., 2020; Vu et al., 2016) was followed using a proxy Egger's test. Publication bias was assessed via visual inspection of funnel plots. In performing the proxy Egger's test, effect sizes are regressed on the estimate's standard errors in the three-level metaanalytic model (Shi et al., 2021).

1.3.8.4 Outlier and influence analyses

Outlier and influence analyses were also performed within the Metafor package (Viechtbauer, 2010). Influential cases were assessed via Cook's Distance (CD; Cook & Weisberg, 1982. An effect size was considered to be influential on the mean effect of the CD value was above 0.45 (Cook & Weisberg, 1982).

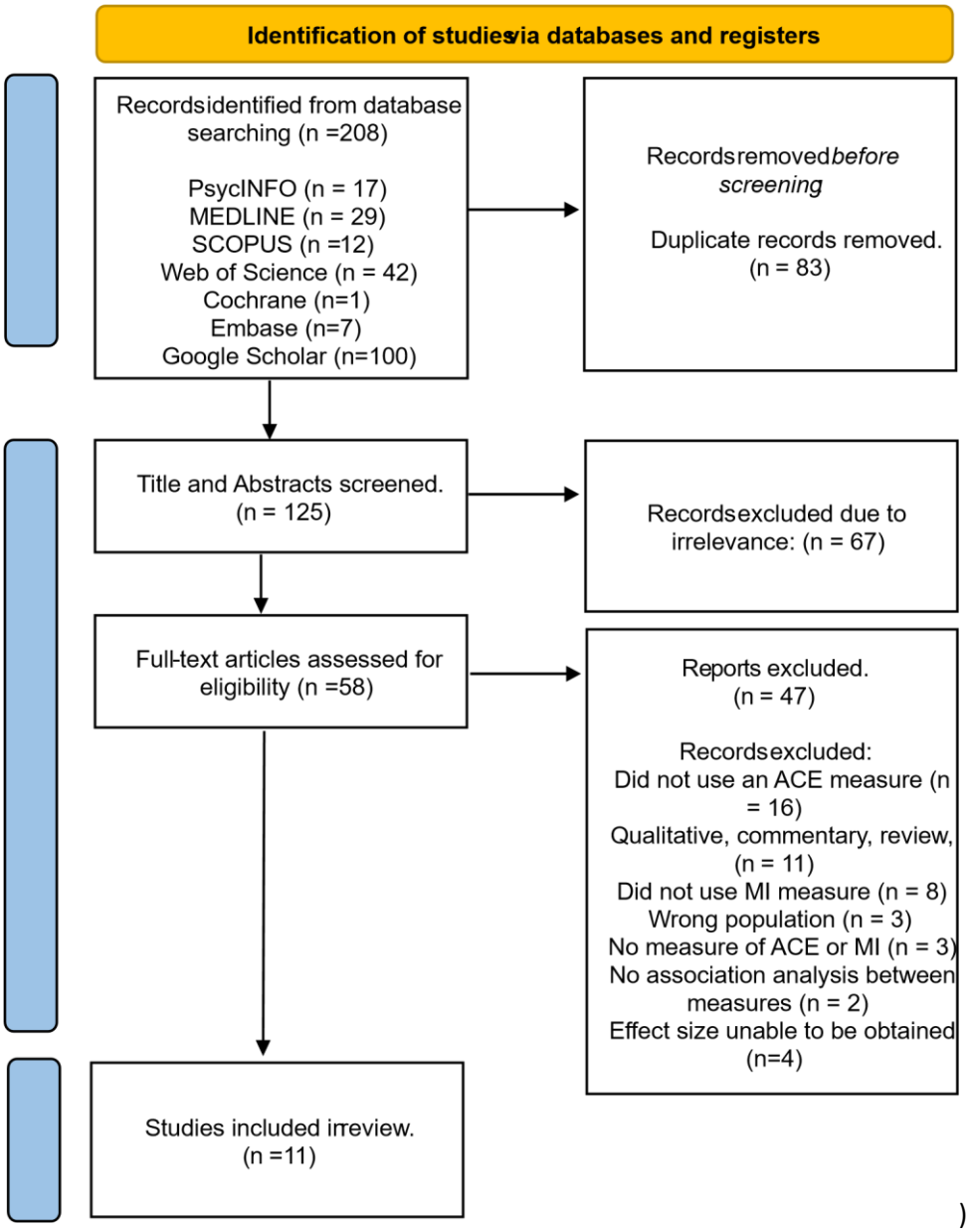
1.4 Results

1.4.1 Study Selection

The database search yielded a total of 208 studies (see Figure 1) and all citations were exported to Endnote; a reference management software. No additional studies were identified through citation mining or hand searching of reference list of relevant key papers and reviews. A total of 93 duplicates were identified and removed, resulting in 125 studies to screen. Screening of the titles and abstracts resulted in exclusion of 67 studies due not meeting the inclusion criteria. The full texts of the remaining 58 studies were screened against the inclusion and exclusion criteria and were excluded due to the following reasons: no ACE measure (n =16), qualitative (n =11), no MI measure (n =8), no measure of either ACE or MI (n =3), used the wrong population (n = 3), no association analysis between measures (n=1), effect size unable to be obtained (n=4). Where data required for inclusion in the meta-analyses was missing, or analysis not reported on, the main author was contacted for the relevant data. A total of 4 requests were sent. Of the requests sent, 3 responses were received with 1 author providing the required data.

Figure 1

PRISMA Flow Diagram (Moher, 2009



)

1.4.2 Study Characteristics

Key data from each of the 11 eligible studies was extracted and is presented in Table 3. Studies were conducted between 2019 and 2023. Nine were peer-reviewed published studies (Battaglia et al., 2019; Boscarino et al.,2022; Easterbrook et al., 2022; Plouffe et al., 2023; Ranney et al., 2022; Roth et al., 2021; Williamson et al., 2021; Zerach, 2023; Zerach & Levi-Belz, 2022) and two were unpublished theses (Beckwith. 2023; Burkett et al., 2023). Plouffe et al.'s (2023) paper consisted of two studies, with only the quantitative analysis from the first study meeting the inclusion/exclusion criteria. Two studies used the same participants, but completed different and relevant analysis in each, therefore it was decided to retain both studies (Zerach, 2023; Zerach & LeviBelz, 2022).

Most studies were conducted with military personnel (Battaglia et al.,2019; Beckwith, 2023; Boscarino et al., 2022; Easterbrook et al., 2022; Ranney et al., 2022; 2022; Williamson et al., 2020; Zerach, 2023; Zerach & Levi-Belz e al., 2022). In non-military samples, exposure to PMIEs and outcomes of MI were investigated in public service personnel (PSP) including firefighters, paramedics, police officers, dispatchers, security guards, correctional workers (Roth et al., 2022) and in law enforcement personnel and child welfare officers (Burkett et al., 2023). Studies were mostly correlational and cross-sectional (n=10), or psychometric test development (n=1). Four studies were conducted in Canada (Battaglia et al., 2019; Easterbrook et al., 2022; Plouffe et al, 2023, Roth et al., 2021), two in the United States of America (Boscarino et al., 2022; Burkett et al., 2023), two in the United Kingdom (Beckwith, 2023; Williamson et al., 2021) and two in Israel (Zerach, 2023; Zerach & Levi-Belz., 2022).

Studies included a total of 57,951 participants, with sample sizes ranging from 33 (Roth et al., 2021) to 43,800 (Ranney et al., 2022). Population weights were used in two studies (Easterbrook et al., 2022; Ranney et al., 2022). The average age of participants was 47.3 years (range 18-76) with 69.87% of all samples identifying as male. Six samples within the studies were treatment seeking (Battaglia et al., 2019; Bekwith,2023; Burkett et al., 2023; Boscarino et al., 2022; Plouffe et al., 2023;

Williamson et al., 2020), three were not treatment seeking (Roth et al., 2022; Zerach, 2023; Zerach & Levi-Belz, 2022), and two studies did not report whether their sample was treatment seeking or not (Easterbrook et al., 2022; Ranney et al., 2022). Only two studies reported on ethnicity (Ranney et al., 2022; Roth et al., 2022). Ranney et al. (2022) provided a breakdown of ethnicity as White (nonHispanic), Black, Hispanic, Multi-Racial, Other, while Roth et al. (2022) provided the following breakdown of ethnicity, White, Black, Hispanic, Asian, Middle Eastern, or Other with the majority of participants in both studies described as White. Two studies (Beckwith et al., 2022; Boscarino et al., 2022) referenced ethnicity in the participant characteristics, but did not report the ethnicity breakdown in the results.

1.4.3 Measures

All 11 studies used self-report questionnaires to measure ACEs and MI.

1.4.3.1 Moral Injury Measures

Moral Injury Event Scale

The MIES (Nash et al., 2013) is a nine item self-report measure of PMIEs developed for use in military populations. Items are grouped into three subscales: a) transgressions by the self –four items assessing exposure to commitment of acts, failing to act, or making decisions perceived to be moral violations, b) transgressions by others - two items that assess exposure resulting from witnessing or learning about others' actions perceived to be moral violations, and c) betrayal - three items that assess perception of deception or betrayal by others (Bryan et al., 2016; Nash et al., 2013). The MIES (Nash et al., 2013) is a validated scale with high reported internal consistency (Cronbach's alpha = 0.90), concurrent validity and discriminant validity (Nash et al., 2013) with subscale scores showing acceptable-to-excellent internal consistency y (α = 0.91, 0.85 0.78 respectively), (Maguen et al., 2021). This measure has been criticised by some researchers for confounding exposure and outcomes (Frankfurt & Frazier, 2016).

Seven studies used the MIES (Nash et al., 2013) to measure MI: (Battaglia et al., 2019;

Boscarino et al.,2022; Easterbrook et al., 2022; Plouffe et al., 2023; Ranney et al., 2022; Zerach, 2022; Zerach & Levi-Belz, 202). Specifically, three studies used MIES subscale scores (Battaglia et al., 2019; Ranney et al., 2022; Zerach, 2023), while the remainder used a total MI score (k=4). One study combined 'MIES-self' and 'MIES-others' to form the subscale 'MIES-transgression' (Battaglia et al., 2019).

Moral Injury Assessment for Public Safety Personnel (MIA-PSP)

Two studies (Burkett et al., 2023; Roth et al., 2022) used the Moral Injury Assessment for Public Safety Personnel (MIA-PSP; Roth 2023) which is a 17-item assessment developed specifically for PSP. The MIA-PSP is considered to have strong internal consistency. Cronbach's alpha (α = .93). Similarly, to the MIES (Nash et al.,2013), items measure both exposure to PMIEs and its emotional sequalae.

Moral Injury Outcome Scale (MIOS)

Beckwith et al. (2023) used the Moral Injury Outcome Scale (MIOS; Litz et al., 2022) to measure MI outcomes This scale begins with a question exploring the presence of a PMIE, followed by a 14-item measure of symptoms associated with MI, rated on a five-point Likert scale of 0 (strongly disagree) to 4 (strongly agree). This measure can be split into two subscales: 'shame' (sevenitems) and 'trust' (seven-items). Total scores range from 0 – 56, with higher scores indicative of greater severity of symptoms of MI. The Cronbach's alpha for the MIOS total score is (α=.89) with shame related (SR) subscale = (α = .86), and the Trust violation (TV) subscale (α =.81). Similarly, to the MIES (Nash et al., 2013), and the MIA-PSP (Roth et al., 2022), the MIOS (Litz et al., 2022) has been criticised for assessing both PMIEs and outcomes associated with those events (Coady et al., 2021), however the PMIE exposure is not calculated in the total score.

Expressions of Moral Injury Scale (EMIS)

Two studies used measures to specifically detect outcomes associated with MI rather than exposure alone (Williamson et al., 2021; Zerach & Levi-Belz 2022). Williamson et al. (2021) used the Expressions of Moral Injury Scale (EMIS; Currier et al., 2018) to assess MI. The EMIS is a 17-item selfreport measure that assesses 'self-directed' and 'other-directed' MI. Items tap into expressions of guilt, shame, low self-esteem, loss of trust in others and institutions, social withdrawal, and anger. There is no clinical cut-off for the EMIS, although higher scores are taken to indicate worse outcomes reflective of maladaptive responses associated with moral challenges (possible range of scores 17–85). The EMIS has demonstrated strong internal consistency, Cronbach α = .95 (Currier et al., 2017).

Zerach and Levi-Bel (2022) used the EMIS—Military—Short Form (EMIS- M-SF; Currier et al., 2020). The EMIS-M-SF is a 4-item self-report measure designed to assess MI-related outcomes (e.g., shame, guilt) in military populations. Higher total scores indicate the number and severity of MI symptoms. EMIS-M-SF has been psychometrically validated in a military sample (Currier et al., 2020). Unlike the previous MI measures, the EMIS and EMIS-M-SF do not include items assessing PMIE exposure alone.

1.4.3.2 *Adverse Childhood Experience Measures*

Eight studies used the Adverse Childhood Experiences Questionnaire – ACE-Q (ACE-Q; Felitti et al., 1998; Merrick et al., 2017) (Battaglia et al., 2019; Beckwith, 2023; Boscarino et al.,2022; Burkett et al., 2023; Plouffe et al., 2023; Roth et al., 2021; Zerach & Levi-Belz, 2022; Zerach, 2023). The ACE-Q consists of 10 questions assessing exposure or absence of events before age 18 (e.g., verbal and physical abuse, emotional neglect) (Felitti et al., 1998). All items are answered on a "Yes" or "No" basis. The number of experiences reported by each participant are summed for a total ACEs score. The measure is widely used and produces reliable and valid scale scores (e.g., Afifi et al., 2020). The ACE questionnaire has good test-retest reliability, internal consistency (α =. 88; Murphy et al.,

2014) While most studies used a cumulative ACE score, Boscarino et al., (2022) coded responses into high/low childhood adversity using the 75th percentile to define higher exposure to childhood adversity.

Life Stressors Checklist – Revised (LSC-R) and the Life Events Checklist (LEC)

Ranney et al. (2022) measured ACEs using items from the Life Stressors Checklist–Revised (LSC-R; Wolfe et al., 1997) and the Life Events Checklist (LEC) for DSM–5—Extended (Weathers et al., 2013). The measure consisted of 23 items measuring adversity that occurred before the age of 18 (yes = 1 or no = 0). Additional items reflected experiences that have been identified as additional ACEs (e.g., food insecurity, homelessness) (Mersky et al., 2017). The 23 variables were transformed into a 5-category ordinal variable representing the cumulative frequency of ACEs (0, 1–2, 3–4, 5– 6, >6 ACEs allowing for comparative analysis (Blosnich et al., 2021). Internally consistency was not calculated for the scale, although the LEC is not necessarily expected to be internally consistent (Crowe et al., 2024; Gray et al., 2004)

Childhood Trauma Questionnaire (CTQ)

Williamson et al. (2021) used the Childhood Trauma Questionnaire (CTQ; Bernstein et al., 1998) to assess the experience of ACEs. The CTQ is a 28-item self-report questionnaire that assesses exposure to a range of different childhood traumas with five subscales: physical abuse, emotional abuse, sexual abuse, physical neglect, and emotional neglect. Total scale score (range 0–112) is calculated, with higher scores suggesting more severe maltreatment. The Childhood Trauma Questionnaire demonstrates excellent reliability ($\alpha = 0.88$; Bernstein et al., 1994).

Childhood Experiences of Violence Questionnaire (CEV)

Easterbrook et al. (2022) measured ACEs including childhood emotional, physical, and sexual abuse, exposure to intimate partner violence, and neglect using items adapted from the Childhood Experiences of Violence Questionnaire (Walsh et al., 2008).

Table 3.

Summary of Study Characteristics Included in the Meta-Analysis.

Study	Location	Design	Publication Type	Occupation	Treatment Seeking	Sample size	Gender (% Males) and Age (mean)		ACE Measure	MI Measure
Battaglia et al. (2019)	Canada	Correlational	Peer reviewed	Armed Forces Veterans	Yes	33	87.9	44.7	ACE-Q	MIES
Beckwith (2023)	UK	Correlational	Dissertation	Armed Forces Personnel	Yes	428	97.4	50.5	ACE-Q	MIOS
Boscarino et al. (2022)	United States	Correlational	Peer reviewed	Military Veterans	Yes	1032	95.5	61.6	ACE-Q	MIES
Burkett et al. (2023)	United States	Correlational	Dissertation	Law Enforcement Personnel + Child Welfare Personnel	Yes	114	68.4	42.7	ACE-Q	MIA-PSP
Easterbrook et al. (2022)	Canada	Correlational	Peer reviewed	Armed Forces Personnel	NR	2941	90.66* 73.86**	51.0 52.3	Adapted - CEV-Q	MIES
Plouffe et al (2023) (Study1)	Canada	Test development	Peer reviewed	Armed Forces Personnel	Yes	192	83.9	44.8	ACE-Q	MIES
Ranney et al. (2022)	United States	Correlational	Peer reviewed	Veterans	NR	11871	81.9	38.6	Adapted LSC-R and LEC	MIES
Roth et al. (2021)	Canada	Correlational	Peer reviewed	Public Safety Personnel	No	249	64.0	35.0	ACE-Q	MIA-PSP
Williamson et al. (2021)	UK	Correlational	Peer reviewed	Veterans	Yes	177	94.9	52.6	CTQ	EMIS
Zerach & Levi-Belz (2022)	Israel	Correlational	Peer reviewed	Veterans	No	1613	0	26.0	ACE-Q	MIES EMIS-M(SF)
Zerach (2023)	Israel	Correlational	Peer reviewed	Veterans	No	1613	0	26.0	ACE-Q	MIES

Note: *=Deployed sample, **=non-deployed sample, ACE-Q = Adverse Childhood Experiences Questionnaire, CEV-Q = Childhood Experiences of Violence Questionnaire, LSC-R = Life Stressors Checklist Revised, LEC=Life Events Checklist, CTQ = Childhood Trauma Questionnaire, MIES= Moral Injury Experiences Scales, MIOS = Moral Injury Symptom Scales, MIA-PSP = Moral Injury Assessment Public Safety Personnel, EMIS= Expressions of Moral Injury.

Table 4.

Findings of relationship between ACEs and MI within included studies

Study	Test to assess	Key Findings	Reported association between ACEs and MI	relationship between multiple ACEs and MI
Battaglia et al. (2019)	Spearman correlations	Positive correlation between ACE and MI-transgression		*ACEs + MI transgression (r* = 0.22)
		Positive correlations between ACE MI and betrayal		*ACEs + MI betrayal (r* = 0.09)
		Positive correlation between ACE and MI total score		*ACEs + MI total score (r* =0.15)
Beckwith (2023)	Pearsons's correlation	Significant positive correlation between ACE and MIOS scores		ACE and MIOS (*r* =.207) ***
Boscarino et al. (2022) [a]	Regression	Those with high ACE, are 1.72 times more likely to report high MI		ACEs and MI (*r* = 0.015) ***
Burkett et al. (2022)	Pearson's correlation	Non-significant negative relationship between ACEs and MI		ACEs and moral injury *(r* = -.06)
Easterbrook et al. (2022) [c]	Simple linear regression Multiple linear regression	Child maltreatment (emotional, physical, and sexual abuse, exposure to IPV and neglect) were significant predictors of MI total scores in deployed sample.		MIEs + physical *(r* = .19) *** MIES + emotional *(r* = -.04) MIES + neglect *(r* = .48) *** MIES + IPV *(r* = .19) *** Deployed total: *(r* = .21)
		Child maltreatment (emotional and sexual abuse) were significant predictors of MI total scores in non-deployed sample. Physical abuse, exposure to IPV, and neglect were positive predictors of MI total scores.		MIES + physical *(r* = .12) MIES +emotional *(r* = -.04) MIES + IPV *(r* = .14) MIES + neglect *(r* = .22) Non-deployed total: (*r* = 0.11)
Plouffe et al (2023)	Bivariate correlations	Non-significant positive relationship between ACEs and MI		ACEs and moral injury (*r*=0.14)
Ranney et al. (2022) [b]	Pearson's correlations	Significant positive correlations between ACEs and all three MI subscales		ACEs +PMIE-witnessing (*r*=0.20) *** ACEs + PMIE-other (*r*=0.15) *** ACEs + PMIE-betrayal (*r*=0.24) ***
Roth et al. (2021)	Spearman correlations	Significant positive associations between ACEs and MI symptoms		ACEs and MI symptoms *(r* =0.49) ***
Williamson et al. (2021)	Pearson's correlations	Significant positive correlations between ACEs and EMIS		EMIS total score (*r*=0.35) ***
		Significant positive correlation between ACES and EMIS – Self		EMIS self (*r* = 0.22) ***
		Significant positive correlation between ACEs and EMIS other		EMIS other (*r*=0.34) ***

Zerach (2022)	Bivariate correlations		
		Significant positive correlations between ACEs and MI self	ACEs + PMIE-self *(r*=0.17) ***,
		Significant positive correlation between ACEs and MI other	ACEs + PMIE -other (*r*= 0.16) ***
		Significant positive correlation between ACEs and MI betrayal	ACEs and PMIE-betrayal (*r*=0.29) ***
Zerach & Levi-Belz et al. (2023)	Bivariate correlations	Significant positive correlation between ACEs and PMIE total	ACEs+ PMIE (R =0.27) ***
		Significant positive correlation between ACEs and MI symptoms	ACEs and MI symptoms r = 0.25) ***

*Note: *** = <0.001, [a] = odds ratio converted to Pearson's r, [b]= data obtained from author. [c] = total score computed in RStudio. IPV=interpersonal violence*

1.4.4 Risk of Bias

Overall, the methodological quality of the included studies as assessed by the SQAC (Kmet et al., 2004) varied between 0.86-1, indicating that all included studies were of 'strong' methodological quality. Please see Appendix B for the complete quality assessment for each study. All studies sufficiently described their research questions, study objectives and reported appropriate study designs. Only Burkett et al. (2023), included a priori power calculation or information relating to how the sample size was determined and Roth et al. (2021) had a small sample size. All studies reported sufficient sample demographics; however, six studies did not report ethnicity (Battaglia et al., 2019; Boscarino et al., 2022; Burkett et al.,2023; Plouffe et al., 2023; Zerach, 2022, Zerach & Levi-Belz., 2023). Most studies reported the male/female gender (Battaglia et al., 2019; Beckwith, 2023; Burkett et al., 2022; Plouffe et al.,2023; Ranney et al.,2022; Williamson et al., 2021). Plouffe et al., 2023, referred to transgender participant identity and counted participants in their identified gender. Two studies reported male gender only (Boscarino et al., 2022; Roth et al.,2021), and two samples purposefully recruited only females (Zerach, 2022; Zerach & Levi-Belz 2023).

Across all studies, sufficient information was provided relating to the measurements used. All studies used a standardised measure of MI. Two studies used an adapted but non-validated questionnaires to measure ACEs based on previous theory or research (Easterbrook et al.,2022; Ranney et al., 2023). Methods of analysis were sufficiently described across most studies, except (Boscarino et al., 2022) who did not fully describe their ACE scoring. Minimum estimates of variance for the main study results (i.e., means and standard deviations) were reported across all studies.

Easterbrook et al. (2022), examined the differences in outcomes of interest between two subsamples; deployed and non-deployed veterans and two studies looked at the differences between combat and non-combat veterans within the same sample (Zerach, 2022; Zerach & Levibelz.,2023). Across most studies, attempts were made to control for confounds was employed (Beckwith et al., 2023;

Boscarino et al.,2022; Easterbrook et al., 2022; Ranney et al.,2022; Roth et al.,2021; Williamson et al., 2020; Zerach, 2022; Zerach & Levi-Belz 2023).

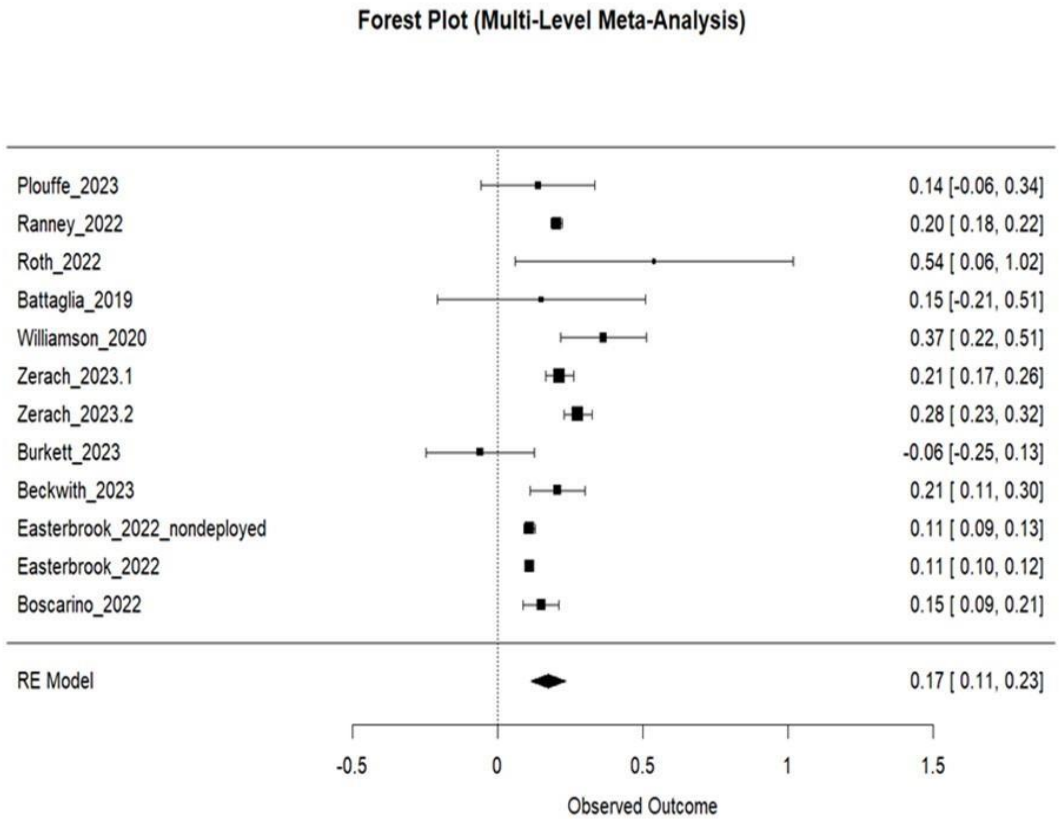
1.4.5 Meta – Analyses

1.4.5.1 Is there a relationship between ACEs and MI?

MI effect sizes were drawn from 11 samples (12 effect sizes, 11 individual studies) and were included in the analysis. The estimated average effect size based on the three-level model with random effects, demonstrated that MI was positively associated with adverse childhood experiences, *r* = .17 (95% CI [.11, .23]; p< .0001. I^2 was 94.82%, with estimated variance components $\tau^2_{\text{Level 3}}$=0.004 and $\tau^2_{\text{Level 2}}$= 0.001. This means the $I^2_{\text{Level 3}}$= 70.41% of the total variation could be attributed to between-cluster heterogeneity, and $I^2_{\text{Level 2}}$= 24.42% to withincluster heterogeneity. The effect size estimate represents a small effect size indicating that adverse childhood experiences are significantly associated with MI (See Forest Plot in Figure 2).

Figure 2.

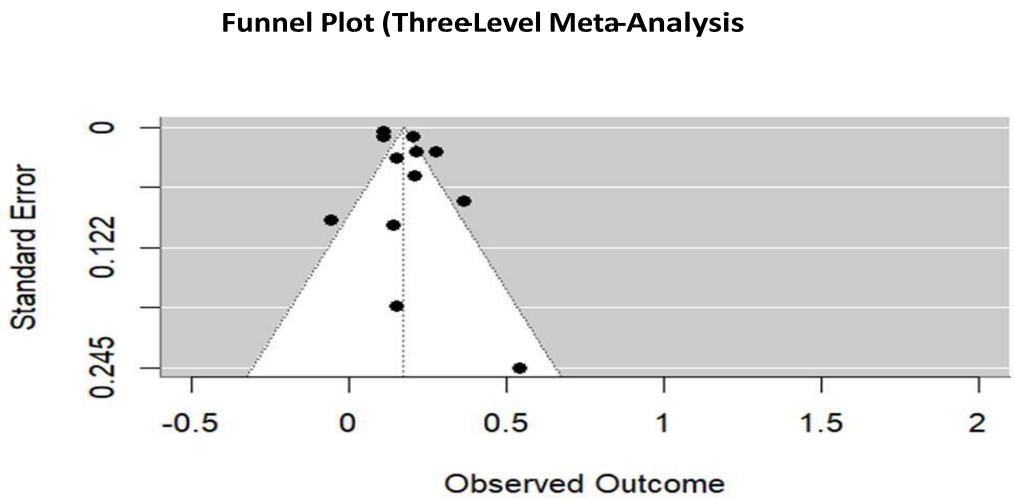
Forest Plot of Effect Size Estimates for Moral Injury and Adverse Childhood Experience



To examine for publication bias, a funnel plot was used to assess whether there was symmetry of effect sizes. Visual inspection of the funnel plot did not indicate possible publication bias (See Figure 3). In addition, a proxy Egger's test was run to evaluate the statistical significance of the asymmetry of the funnel plot by using the squared standard errors of the effect size estimates as a moderator (Sterne & Egger, 2005). The pseudo-Egger tests *F* (1, 10) =0.007, p =0.931 was not significant indicating that the current meta-analytic results were robust.

Figure 3.

Funnel Plot for k=12 Effect Sizes From 11 Studies.

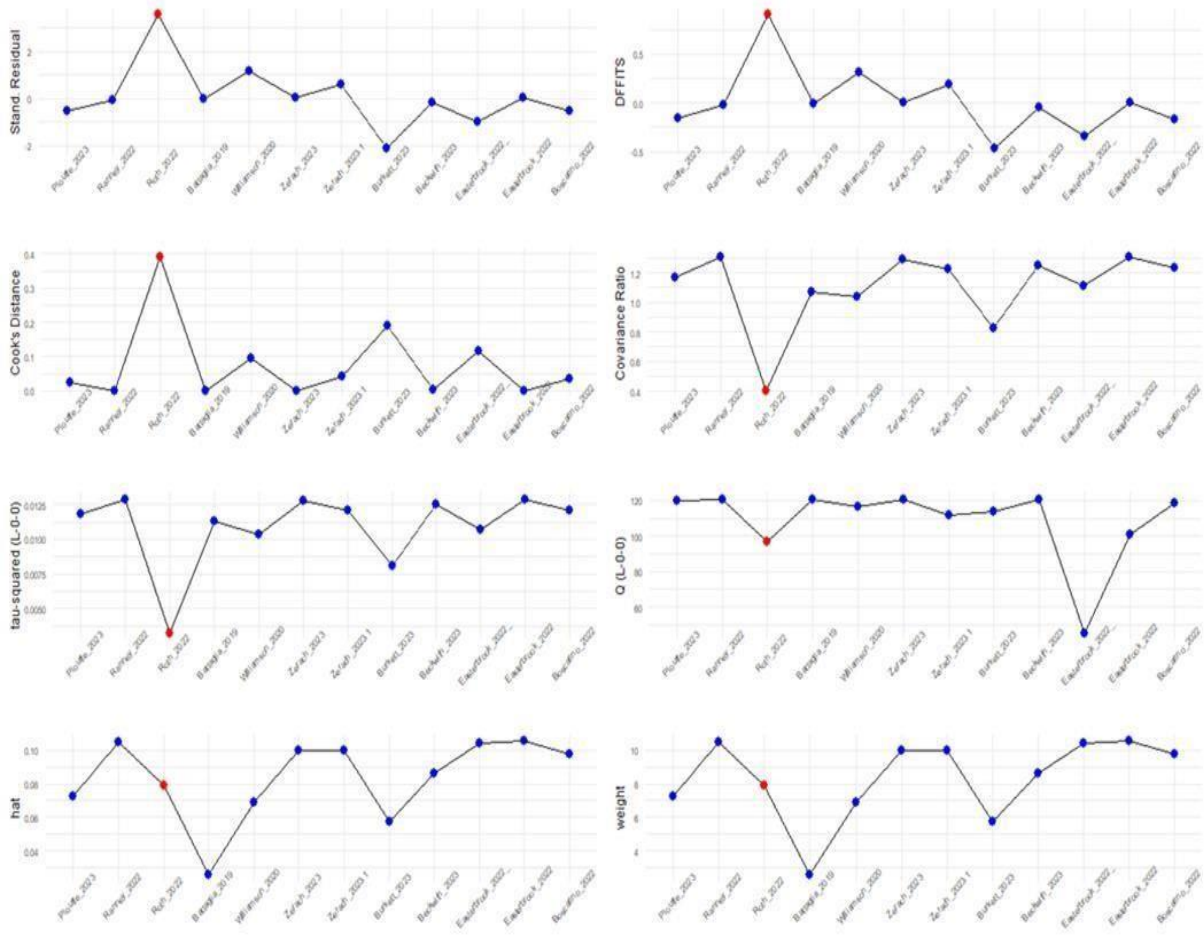


1.4.5.2 *Outlier and Influence Analysis*

Cook's distance (CD) was examined to indicate influential studies with all studies falling below the cut off value. (See Figure 4). A leave-one-out sensitivity analyses was conducted as Roth et al. (2022) approached Cooks' Distance of 0.45 to further assess the potential impacts on the results. Compared to the effect size including the potential outlier (0.17), similar results were obtained without them (.1699). Thus, the results of the previous analyses could be considered as robust against outliers.

Figure 4.

Outlier and Influence Analysis for the Correlation Between MI and ACEs



1.4.5.3 Moderator Analyses for the relation between MI and ACEs

To investigate potential sources of heterogeneity, moderator analyses were conducted. By adding potential moderators as covariates to the random effect model separately, the extent to which country, measurements (ACE and MI), and sample characteristics (gender, age occupation, treatment seeking status) affected the association between MI and ACE were tested.

Country: The study location did not significantly moderate the association between MI and ACEs (F (1,3) = 3.924, p=0.05).

MI measure: Whether MI was measured by an 'outcomes-only measure' or with a combined exposure and outcome measure significantly moderated the association between MI and ACEs (F (1,10)

=7.206 *p*=0.02). The association between MI and ACEs was statistically significantly stronger when studies used measures that measured MI outcomes only (*r* = .257, 95% CI = .119 to .40) compared to those that used measures combining MI outcomes and PMIE (*r*=0.149, 95% CI = .10 to .20).

Treatment Seeking: Whether the sample was treatment seeking or not did not moderate the relationship between MI and ACEs (F (1, 6) = 0.838, *p*=0.40).

ACEs measure: Whether studies utilised an adapted measure to measure ACEs or a validated ACE measure, did not significantly moderate the association between moral injury and ACEs (*F* (1, 10) =0.0709, *p*=0.78.

Occupation: Whether participants belonged to a military or civilian sample, did not moderate the association between MI and ACEs, (F (1, 10) =1.652, *p*=0.23

Age and the Percentage of Females: No significant study moderators were found between mean age (*F* (1, 10) =1.611, p=0.22, and the percentage of females (F (1,10) =0.4413, p=0.52.

1.5 Discussion

1.5.1 Findings in context

This meta-analysis aimed to be the first to quantify the association between ACEs and MI using multi-level meta-analytic techniques in a sample of professionals who are at risk of exposure to MI through their occupation. Potential moderators of the magnitude of the relationships (i.e., country, treatment seeking status, occupation, ACE measure, MI measure, age, and gender) were also examined.

1.5.2 Overall effect

Through systematic review of the literature and meta-analytic techniques, this study explored the relationship between ACEs and MI incurred as a result of occupation. Due to current theoretical positions which posits that violations to moral codes in childhood, can set the foundation for MI to develop (Bonson et al., 2023), and emerging preliminary evidence indicating the association between MI and ACEs (Battaglia et al,2019; Roth et al., 2022), it was hypothesised that MI would be positively associated with ACEs. Results indicate that a small positive relationship between ACEs and MI is evident (r = 0.17). This effect did not appear to be the result of publication bias, suggesting that the impact may be small but reliable. This meta-analysis contributes uniquely to a body of emerging literature demonstrating the potential important role that early adversity has on MI within these populations.

These findings are important as studies have demonstrated that individuals with ACEs who work in occupations that increase the likelihood of PMIE exposure, may be more likely to experience psychopathology (Gallo et al., 2018), unemployment (Bunting et al., 2018) and are more likely to be revictimised in adulthood (Whitfield et al., 2003) and be a risk for perpetrating abuse (Madigan et al., 2019). This review provides preliminary tentative evidence that exposure to ACEs may render individuals vulnerable to MI symptoms in adulthood who are in occupations that increase the likelihood of exposure to PMIEs. However, it is not possible to infer causation (i.e., whether ACEs predicts MI, or

vice versa) as it is based on correlational, cross-sectional data, thus further research is required to explore the nature of this complete relationship (Aldrich, 1995).

From a theoretical perspective, these findings are considered within the proposal that early childhood is a critical time for shaping moral development and it is during this time that expectations regarding interpersonal relationships are formed (Bonson et al., 2023, Haight et al., 2017, Litz et al., 2009). Indeed, establishing secure attachments and engagement with trusting adults help to coconstruct moral frameworks which in turn supports the development of self-regulation, interpersonal effectiveness, and prosocial behaviours (Sroufe et al., 2005; Thompson, 2019). Violations to these early frameworks through ACEs, may impact a person's ability to engage in healthy, trusting interpersonal relationships as their schema for relating to others has been distorted (Babcock Fenerci & DePrince, 2018) which can set the foundation for MI to develop in later life. These schemas may remain internalised until reactivated following moral transgressions or betrayals in later life (Litz et al., 2009; Roth et al., 2022; Yeterian et al., 2019). The samples included in this review face a higher risk of PMIE exposure due to their occupations (e.g., Williamson et al., 2018), alongside an increased risk of MI due to childhood adversity (e.g., Battaglia et al., 2019). Disrupted trust in interpersonal relationships, emotional dysregulation and avoidant coping styles established as a result of violations to these early frameworks, may lead to individuals perceiving their work environments, leaders and colleagues as threatening (Gilbert, 2009).

In addition, it has been proposed that childhood is a critical period for the development of emotional regulation and distress tolerance skills. Disruptions during this period, can lead to adverse coping skills to manage stress in later life, such as PMIEs (Russo et al., 2023). As ACEs are associated with adverse psychological consequences in adulthood (e.g., Merrick et al., 2017), this association may be compounded by occupational based PMIEs due to distorted schema and unhelpful coping strategies developed in childhood.

1.5.3 Moderator effects

As the data showed significant heterogeneity (I^2 >75%), the impact of several potential moderators was investigated. Moderators were examined when each category contained at least two studies (Driessen et al., 2022). However, the minimum number of categories required for moderator analyses is inconsistent within the meta-analytic literature and varies from two (Driessen et al., 2022), to three (Bakermans-Kranenburg et al., 2003), to five (Weisz et al., 2017).

Moderator analyses revealed that cognitive and emotional reactions to PMIEs were more strongly associated with ACEs compared to studies that used measurements combining PMIE exposure and outcomes. This builds upon McEwen et al.'s, (2021) findings which demonstrated stronger relationship between MI-outcomes and mental health outcomes when studies measured MI-outcomes only, compared to studies that included measurements of both PMIE exposure and MIoutcomes. For example, Williamson et al.'s (2018) review found moderate associations between PMIE and PTSD (r = .30), whereas McEwan et al.'s (2021) review found larger associations between MIoutcomes and PTSD (r =.64), compared to PMIE and PTSD (r = .51). Additionally, this provides further support for Litz and Kerig's (2019) assertion that researchers in the MI field should separate measures of exposure to PMIEs only from MI outcomes, as not doing so, may inflate the consequences of MI. However, the majority of included studies were from treatment-seeking samples (Battaglia et al., 2019; Beckwith et al., 2023; Boscarino et al., 2022; Burkett et al., 2023; Plouffe et al., 2023; Williamson et al., 2021). Evidence suggests that individuals who are actively experiencing mental health difficulties, may be more likely to report greater symptoms of distress (Ferrajão & Oliveira, 2016). As previous research has demonstrated that veterans who are seeking help for their mental health are more likely to report higher levels of childhood adversity and poorer psychological outcomes (Murphy et al., 2022), it is possible that mental health severity may account for the stronger associations observed between ACEs and MI-outcomes only (Beckwith, 2023; Williamson et al., 2021). However, mental health severity may also prevent individuals seeking and engaging with support. Therefore, those with more complex presentations may be underrepresented in this review

(Williamson et al., 2021) and variations may exist in respect to individuals' willingness to disclose potentially stigmatising experiences (Steele et al., 2017). Future research is needed to examine whether those with both ACEs and PMIEs experience unique psychological consequences and MIoutcomes compared to those without ACEs or PMIEs. It should also consider whether current mental health difficulties may moderate this relationship.

Although study location was not a significant moderator, it's important to note that only two studies were not conducted in a western country (Zerach, 2022; Zerach & Levi-Belz 2023). This may have led to poor parameter estimates due to the small number of studies (Weisz et al., 2017). Future research in non-Western contexts may help improve our understanding of cross-cultural differences in relation to both ACEs and MI. It is interesting to note that age was also not a moderator, despite previous research suggesting that younger participants were at higher risk of moral injury (Mantri et al., 2021; Song et al., 2021.

This review found that female gender did not significantly moderate the strength of the association between MI and ACEs. Interestingly, previous research suggests that females may be differentially impacted by MI and ACEs. For example, female combat veterans were at an increased risk of exposure to interpersonal ACEs, including emotional and sexual abuse and were more likely to report greater distress compared to males (Lahovot et al., 2018, Vogt et al., 2011). In contrast, Aronson et al. (2020) found ACEs were more consistently associated with mental health problems for male veterans than females. In consideration of MI, Maguen et al. (2020) found gender differences, in that MI as a result of a self-perpetuated transgression was most consistently associated with males leading to greater functional impairment, whereas MI as a result of a betrayal was most consistently associated with females leading to greater psychological distress. Given the complex relationship between MI, ACEs, mental health and occupational functioning, enhancing understanding of potential gender difference in ACEs and MI is important and likely to have important mental health ramifications (Maguen et al., 2020).

Whether studies examined MI and ACEs in a military context or non-military contexts did not moderate the relationship between MI and ACEs, however, it is important for future research to be conducted to explore this further. It has been proposed that other occupational groups such as firefighters, relief workers, journalists and healthcare professionals are regularly exposed to PMIEs at work (Williamson et al., 2018; Williamson et al., 2020). Exploration of ACEs and MI, therefore, in other occupations will enhance understanding in this area which feels crucial for the development of workplace prevention strategies, enhancing treatment provision, and informing service improvement and policy development.

It is important to note that the detected heterogeneity may be explained by important variables other than the ones attended to in this review. Thus, exploration of additional moderators that may influence findings should be investigated in future. For example, Williamson et al. (2023b) put forward that ACEs and MI may result in additional occupational and functional impairments e.g., sick leave or utilising 'over-working' as an avoidance strategy. Further, in some studies, ACE exposure has been found to build rather than dimmish one's capacity to cope with difficult circumstances in later life resulting in post-traumatic growth (Aronson et al., 2020; Seery, 2011). Other research suggests that positive childhood experiences may counter the effect of ACEs, whilst engaging in meaning-making activities also may support coping following PMIEs (Nieuwsma et al., 2015). It would be important for future research to consider whether these factors may act as potential moderators of the relationship between ACEs and MI.

1.5.4 Strengths

A meta-analytical design, with good quality publications (Kmet et al., 2004), allowed for a critical and quantifiable integration of the relevant evidence to investigate the relationship between ACEs and MI is a strength of this review. Furthermore, the review was conducted in line with PRISMA guidelines (Liberati et al., 2009) which enhances the transparency and replicability of the review.

Additionally, this review was pre-registered on PROSPERO which ensured that methods were robust (Munn et al., 2015). Furthermore, this research adds to the literature by comparing the relationship between ACEs and MI-outcomes (e.g., Beckwith et al., 2023; Williamson et al., 2020, Zerach, 2023) with ACEs and PMIEs separately (e.g., Battaglia et al., 2019; Boscarino et al., 2022; Burkett et al., 2023; Easterbrook et al., 2022; Plouffe et al., 2023; Ranney et al., 2022; Roth et al., 2022, Zerach & Levi Belz et al., 2022). This nuanced understanding may account for the variation in effect sizes observed in studies included in this review which varied depending on measurement tool used. Finally, this research extends the literature by examining ACEs and MI in a sample of participant's who are high risk of exposure to PMIEs.

1.5.5 Limitations and Future Directions

When interpreting these findings, it is important to acknowledge that whilst the search strategy sought to extend beyond military populations, and despite the COVID—19 pandemic resulting in increased recognition of the application of MI to other occupations (Greenberg et al., 2020; Coimbra et al., 2024), only two studies examined MI in a military non-military context. This is consistent with previous meta-analyses (e.g., Williamson et al, 2019; McEwen et al., 2021), thus highlighting how the majority of the research in this area is within a military context. Future research beyond a military population will help to improve our understanding of any differences between civilians and military personnel. Contextually, there are nuanced differences in moral injurious experiences both within and between certain occupations (e.g., enlisted vs. officer status in a military context or physician vs. administrative staff in healthcare) (Nieuwsma et al., 2022). Furthermore, it can be argued that MI which occurs in military service personnel is substantially different to MI experienced by HCPs. For example, exposure to violence and killing may be an expected reality among military service personnel, whereas in other occupations such as those who work in healthcare, HCPs main objective is to preserve life that they did not endanger in the first instance (Abolghasem Shirazi et al., 2023). Subsequently, direct comparisons of MI across different occupations, may impact the conclusions drawn and generalisability of the current study's findings.

Future research should endeavour to improve our understanding of occupation specific PMIEs that staff may be exposed to, establish greater conceptual clarity and understanding of MI both within and between different occupations, and ascertain whether specific ACEs may render staff as more vulnerable to MI following PMIE exposure.

In consideration of the studies included in this review, it is important to note that none of them specified when the ACE occurred or indeed when the MI occurred. Additionally, it is unclear what specific PMIEs that participants were considering when scoring measures of MI. It would be important for future research to consider cause and effect and ascertain the timing of the ACE event, the timing of the PMIE and the length of time between exposure to PMIE and effects. This is important as different outcomes may be observed following exposure to different types of ACEs (Battaglia et al., 2019; Bevilacqua et al., 2021; Beckwith, 2023) which may have important implications for treatment.

In terms of measurements used to assess childhood adversity, most studies within the review (Battaglia et al., 2019; Beckwith, 2023; Boscarino et al.,2022; Burkett et al., 2023; Plouffe et al., 2023; Roth et al., 2021; Zerach & Levi-Belz, 2022; Zerach, 2023) utilised the ACE-Q (Fetilini et al, 2010). The ACE-Q continues to be subject to ongoing debate, with researchers criticising the measure for failing to capture a range of important adversities, giving each item equal weighting, and providing respondents with limited response options (McLennan, MacMillan, & Afifi, 2020; Roth et al., 2022). Nonetheless, these criticisms are not unique to this measure (Roth et al., 2022) and reflect the inherent limitations of using self-report measures to capture childhood adversity.

In a similar vein, there are significant limitations associated with various MI measures (Frankfurt & Frazier et al., 2016). Most studies (Battaglia et al., 2019; Boscarino et al.,2022; Easterbrook et al., 2022; Plouffe et al., 2023; Ranney et al., 2022; Zerach, 2022; Zerach & Levi-Belz, 2023) utilised the MIES which has been criticised for inflating levels of MI by coupling the *exposure* to PMIEs with the *effects* of this exposure into one score (Frankfurt & Frazier et al, 2016). These measures continue to be utilised within the literature despite ongoing calls from researchers in the field for future research to utilise measures which disaggregate exposure to PMIEs and outcomes (Litz

& Kerrig, 2019; McEwen et al., 2023). However, it is recognised that this is reflective of the current developmental stage of the evidence base, as tools to measure MI outcomes are only emerging resulting in an understandable delay in uptake in published literature (McEwen et al, 2023). Additionally, as MI research moves beyond military populations, occupational specific measures are needed. Although it was not the aim of the current study, future research could examine the relationship between MI, ACEs, broader mental health outcomes and occupational functioning. ACE exposure has been found in some research, to strengthen rather than reduce an individual's capacity to cope with difficult circumstances (Aronson et al., 2020; Seery, 2011). It would be important for future research to consider whether some professionals may be more adversely affected by ACEs and MI than others. Development of high-quality measurement tools would allow researchers to reliably investigate MI across populations. This may prevent 'bracket creep' which proposes that many features of human life could be considered stressful but that does not necessarily mean that researchers should consider them as a PMIE or 'traumatic'.

1.5.6 Clinical Implications

Findings from this review provide a rationale to consider the role and impact of childhood experiences as a possible vulnerability factor to the development of MI amongst a population of people working in occupations at risk of MI. Clinicians supporting staff for the consequences of MI should consider facilitating the reinterpretation of childhood events from the perspective of a competent adult, as opposed to the vulnerable child's perspective (Battaglia et al., 2019), as this may be helpful in assigning appropriate moral responsibility (Békés et al., 2023). Additionally, clinicians should consider routinely offering preventative interventions, involving psychoeducation regarding the impact of ACEs and MI, in addition to specialist interventions that may be currently offered to those struggling with mental health difficulties following PMIE exposure. This may help to normalise these experiences as previous research in military populations suggests that patients with MI had difficulty trusting and disclosing their PMIE experiences during therapy (Williamson et al., 2021). In addition, equipping staff with coping skills and strategies, from clinicians familiar with MI and ACEs (Williamson et al., 2023),

could enable staff to effectively manage their prior traumatic experiences as well as any further traumatic events to which they might be exposed during their job role. Exploring the relationship between MI and ACEs beyond military contexts will also help ascertain whether people with both a history of childhood adversity and PMIE exposure may have unique treatment needs. In addition, the provision of psychoeducation regarding the realities and psychological risks associated with their roles, may help individuals to make informed career decisions or to seek support more readily from their organisation (Williamson et al, 2021).

1.5.7 Conclusion

This meta-analysis provides a comprehensive review of the relationship between MI and ACEs in military and non-military personnel. This study found a small yet significant relationship between MI and ACEs, thus emphasising the importance of considering ACEs, and MI, in occupations at risk of exposure to PMIEs. Additionally, results of the moderator analysis suggest that there is a significantly stronger relationship between ACEs and MI outcomes than ACEs and PMIEs, whereas study location, ACE measurement, age, gender and treatment-seeking status did not moderate the relationship. Despite the limitations, there are several important clinical implications from the findings including the need for organisations and clinicians working with staff following PMIE exposure, to consider the impact of ACEs during assessment and treatment. In conclusion, this the first review to highlight an association between ACEs and MI in occupations that are at an increased risk of PMIE exposure. This review highlights that considerable further research is needed in the field of MI, including beyond military contexts and with further development and validation of valid assessment measures.

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Chapter 2 A Compassionate Mind Training for Moral Injury, Trauma and Psychological Distress for Healthcare Staff who worked during COVID-19

Journal Specification: 'Child abuse and Neglect' was selected to guide preparation on the paper. The author guidance states that manuscripts must not exceed 35 double-spaced pages (excluding figures, tables, references, and appendices). This equates to approximately 10,000 words.

2.1 Abstract

Background: COVID-19 resulted in healthcare professionals (HCPs) having to make ethically and morally challenging decisions which can result in moral injury (MI) and exacerbate psychological distress. Research suggests that people who experience adverse childhood experiences (ACEs) may be particularly vulnerable to the consequences of MI. To better inform prevention and treatment efforts among HCPs who worked during COVID-19, the current study explored the relationship between MI, ACEs, psychological distress, post-traumatic stress disorder (PTSD) and the three flows of compassion: self-compassion (SC), compassion to others (CtO), and compassion from others (CfO). In addition, the impact of a two-week, brief-online compassionate mind training (CMT) was investigated.

Method: Participants could opt into Part A or both Parts A and B. In Part A, 157 HCPs completed an online survey measuring MI, PTSD, psychological distress ACEs and the flows of compassion. In part B, 33 HCPs took part in a randomised, waitlist controlled, 2-week online CMT and completed pre and post outcome measure.

Results: Psychological distress, PTSD, SC, emotional and sexual abuse in childhood, were significantly related to MI in HCPs. The brief CMT, did not reveal significant differences in the flows of compassion, psychological distress, PTSD, or MI from pre to post timepoints, in both the training and waitlist group.

Conclusion: Overall, the results provide further insight into important predictors and potential resilience factors associated with MI in HCPs. Additionally, the relationship between MI, PTSD and SC is promising but warrants further consideration through future research which may inform potential service provisions and prevention and intervention efforts.

Keywords: Healthcare professionals, COVID-19, Moral Injury, Psychological distress, PTSD ACEs Compassion

2.2 Introduction

2.2.1 Moral Injury

Moral Injury (MI), coined by Shay (1994), describes the intense feelings of guilt and shame experienced by military personnel following combat exposure (Frankfurt & Frazier, 2016). Shay's (1994; 2014) definition recognises the enduring psychological impact of a "betrayal of what's right" by oneself or by "a legitimate authority" in a "high stake's" situation (p.700). Litz et al. (2009), expanded on Shay's understanding acknowledging the strong emotional responses to potentially morally injurious events (PMIEs) which include "perpetrating, failing to prevent, bearing witness to, or learning about acts that transgress deeply held moral beliefs and expectations" (p.400). Within the literature, three types of PMIEs have been empirically derived (Bryan et al., 2016). These include transgressing one's own moral values (MI-self): e.g. I acted in ways that violated my own moral code", observing transgressions made by others (MI-other): e.g. "I saw things that were morally wrong", and being wronged by others' transgressions (betrayal): e.g. "I felt betrayed by leaders who I once trusted (Litz et al., 2009; Nash et al., 2013; Shay, 2014). Exposure to PMIEs can lead to the development of MI (Battles et al., 2018). Williamson et al. (2022) suggested that situations involving making ethical judgements in complex circumstances where someone's moral or ethical code has been broken, can contribute towards the development of MI.

There remains poor consensus on the definition of MI within the literature (Hodgson & Carey, 2017), and research has not yet achieved a unified consensus on the symptom profile associated with MI (Griffin et al., 2019). MI research conducted to date has been limited by existing measures which have focused on 'exposure' to PMIEs rather than measuring the 'outcomes' associated with PMIE exposure (e.g., McEwen et al., 2023; Norman et al., 2024). Some measures have been criticised for conflating the consequences of MI by not distinguishing between PMIEs and MI-outcomes (Frankfurt &

Frazier, 2016). Despite this lack of consensus, research in this area has expanded beyond military contexts

(Jones, 2020) to a range of occupational contexts including first responders (Lentz et al., 2021), journalists (Backholm et al, 2015), armed forces personnel (Papazoglou & Chopko, 2017), and those working in healthcare settings during the COVID-19 pandemic (Hines et al., 2021; Griffin et al., 2019).

2.2.2 Moral Injury, COVID-19 and HCPs

As a result of the COVID-19 pandemic, healthcare professionals (HCPs) worldwide faced exceptional challenges resulting in detrimental consequences to their physical and mental health (Chew et al., 2020; Greenberg et al., 2020; Smith et al., 2021; Wright et al., 2021, Weber at al., 2023). A recent meta-analysis estimated symptom rates of PTSD to be 20.2% and 31.1% for depression in HCPs following COVID-19 (Marvaldi et al., 2021). Mortality, sickness, absences, increased job turnover, poor productivity, poor mental health, and poor patient outcomes, have led governments and health organisations to recognise COVID-19 as an occupational disease (Carlsten et al., 2021).
The pandemic has highlighted that HCPs are at an increased risk of MI (Greenberg et al., 2020; Mantelakis et al., 2021; Williamson et al., 2023).

Furthermore, the COVID-19 pandemic has led to increased recognition that the physical and mental wellbeing of HCPs is imperative to the sustainability of the health care system and ensuring safe, empathetic healthcare (Holmes et al., 2020). The prevalence rates of MI in HCPs vary ranging between 32% and 59% (Khan et al., 2021; Maftei and Holman, 2021; Nelson et al., 2022; Rushton et al., 2022; Wang et al., 2022). A study exploring MI in 480 HCPs who worked during the pandemic (Weber et al., 2023), found that 41% experienced a PMIE due to witnessing a perceived transgression (MI-other), 21% due to transgressing one's own values (MI-self) and 82% due to a betrayal by government, and their healthcare organisation (MI-betrayal). In contrast, prevalence of PMIEs among returning 9/11 veterans were 28% due to MI-other, 19% due to MI-self and 41% due to MI-betrayal (Maguen et al., 2020). However, the prevalence estimates by Weber and colleagues (2023) may have been inflated due to staff currently working in settings facing ongoing COVID-19 stressors.

2.2.3 Risk Factors for Moral Injury in HCPs

Factors which increase the risk of MI in HCPs are emerging in the literature (Rabin et al., 2023). These include feeling psychologically, emotionally, or practically unprepared for dealing with PMIEs such as increased exposure to loss of life, and a perceived lack of support from senior management (Williamson et al., 2018). HCPs, experience frequent PMIE exposure during their day-to-day work (Rabin et al., 2023). Moreover, Zerach and Levi-Belz. (2021) found that high self-criticism was a psychological risk factor for MI among HCPs. Experiencing cumulative stresses when exposed to a PMIE such as bereavement or a perceived lack of support from leadership, family, friends, or society can also increase risk (Williamson et al., 2020; Bonson 2023). While military professionals are trained in how to mitigate and respond to highly stressful situations, evidence suggests HCPs are not equipped with the same skills or training (Williamson et al., 2023). Hines et al. (2021) examined organizational factors that may increase or decrease the likelihood of MI and found greater perceived supervisor and organisational support was associated with reduced MI.

Having a previous traumatic history may also confer risk for MI. Exposure to adverse childhood experiences (ACEs) have been suggested as a potential risk factor for MI related distress (Litz et al., 2009). ACEs and MI may similarly impact on individuals' appraisals of themselves, others, and the world (Flipse Vargas et al, 2013). ACEs may render individuals more vulnerable to MI in later life due to ACE-related shame and guilt that one is 'bad' or that 'others can't be trusted', low self-worth, or problematic coping (Williamson et al., 2020). In support, Battaglia et al. (2019), found that emotional abuse in childhood was significantly associated with MI during adult military service. It is important to note when drawing conclusion from this study that it included a relatively small military sample, so it is unknown whether the same associations exist for HCPs. Preliminary work however, exploring ACEs and mental health outcomes in public safety personnel, found that police officers and firefighters who reported higher levels of ACEs were more likely than those without ACEs, to report symptoms of posttraumatic stress disorder (PTSD), dissociation, depression and sleep problems following PMIEs (Komarovskaya et al., 2014; Wang et al., 2010).

2.2.4 Impact of Moral Injury

Exposure to PMIEs has been associated with several adverse mental health and behavioural health outcomes across a range of occupations (Williamson et al., 2018), including PTSD, depression, anxiety, suicidal ideation, substance use and pain, burnout, sleep disturbance and spiritual/existential conflict (e.g., Coimbra et al, 2024; Hall et al., 2022; McEwen et al., 2023). In a veteran sample, MI-self was associated with worsening relationships, health, and work functioning but not PTSD over an 18month period (Maguen et al., 2020). This suggests that different PMIEs may result in unique outcomes distinct from PTSD (Norman et al., 2023). In support, in a sample of US veterans, MI-self was the least frequently endorsed type of PMIE but uniquely linked to worse mental health outcomes whereas MI-betrayal was linked to increased risk of attempted suicide (Wisco et al., 2017). Moreover, veterans who were exposed to PMIEs were at an increased risk of worse psychiatric symptoms and twice as likely to attempt suicide, compared to those who were not, after controlling for trauma history, psychiatric history and demographic characteristics (Maguen et al., 2023; Wisco et al.,2017). Experiencing PMIEs has been associated with a decline in selfcompassion (SC), self-care practices, and pervasive negative consequences for familial and occupational functioning In military samples (Williamson et al., 2020; Williamson et al., 2023). PMIEs have also been associated with changes in beliefs about others in authority, leading to adverse interpersonal difficulties at work (Bronson et al., 2023; Farnsworth et al, 2014; Williamson et al., 2021).

In consideration of HCPs, Ehman et al. (2023) examined the association between exposure to PMIEs and mental health outcomes among 473 emergency responders and 854 hospital staff and found that PMIE exposure was moderately positively associated with stress, anxiety, and depression. Several cross-sectional studies examining MI in HCPs in China (Wang et al., 2022), Spain (Mortier et al., 2021), and the US (Litam & Balkin, 2021), found a relationship between exposure to PMIEs and greater risk for anxiety, depression, PTSD, burnout, sleep difficulties, suicidal ideation, and selfdirected violence. The impact of PMIEs may also extend beyond the personal experience for the individual working in healthcare settings, to affecting the quality of care delivered and received by patients (Borges et al., 2021). Additionally, MI can disrupt healthcare systems and access to care, as it can drive

HCPs to leave their clinical jobs or leave the field altogether (Hendrickson et al., 2022)

Although MI is not currently considered a mental health disorder, it shares similarities in symptomology and aetiology with PTSD (Griffin et al., 2019), such as negative attributions about the self and others, and profound feelings of guilt, shame, anger, and worthlessness (Hall et al.,2022). Yet, it is argued that the two are mechanically different (Barnes et al., 2019). For example, PTSD is considered a threat or danger-based disorder, whereas MI is more commonly attributed to shame or guilt (Barnes et al., 2019; Litz et al., 2009; Hall et al., 2022). However, there is general agreement that the two are distinct as one can have PTSD without MI, MI without PTSD or both together as events can be simultaneously morally injurious and life threatening (Bryan et al, 2018; Koeing et al., 2021).

2.2.5 Treatment for Moral Injury

There is ongoing debate regarding the treatments for supporting individuals with the symptoms associated with MI (Griffin et al., 2019). Despite international literature suggesting that MI might be an important public health concern, no validated treatment for MI currently exists (Williamson et al., 2021). Previous research in a military context, proposed that prolonged exposure could potentially be harmful in cases of MI by exacerbating patient reactions of shame, disgust and guilt (Maguen & Burkman, 2013). Several interventions for veterans with MI have preliminary support and are undergoing more rigorous testing through randomised controlled trials (RCTs) (e.g., Litz et al., 2024). These include Adaptive Disclosure (Gray et al., 2012), Impact of Killing (Maguen et al., 2017), Trauma Informed Guilt Reduction Therapy (Norman et al., 2022), Acceptance and Commitment Therapy for Moral Injury (Borges, 2021), Building Spiritual Strengths and the Mental Health Clinician and Community Clergy Collaboration (Pyne et al., 2019). However, the nature of PMIEs and resultant shame and guilt following exposure to PMIEs, can make accessing and engagement in treatment for MI challenging (Weiss & Coll, 2011).

Additionally, there is some evidence that certain PTSD treatments can help with MI such as Cognitive Processing Therapy (Held et al., 2021). However, according to Steinmetz and Gray, (2015), commonly used evidence-based treatments for trauma-related mental health problems such as

cognitive restructuring, may not be appropriate when working with individuals whose shame and guilt arise from transgressive acts of perpetration rather than from erroneous appraisal. It's proposed that these techniques may not be effective or appropriate in cases where appraisals of blame and guilt may be accurate and appropriate as these emotions can be helpful and lead to adaptive properties such as motivating positive human behaviour (Steinmetz & Gray, 2015). Within the UK, the Restore and Rebuild treatment has been co-designed as a treatment for MI among UK military veterans in a pilot feasibility study (Williamson et al., 2022). Williamson and colleagues (2022) conducted qualitative interviews with leading professionals in MI which highlighted the potential clinical utility of utilising Compassion Focused Therapy (CFT) (Gilbert, 2014) to support individuals with MI following PMIE exposure. Despite these treatments showing promise for military population, no evidence-based treatments have been developed for HCPs (Maguen et al., 2022).

2.2.6 Compassion: The three flows of compassion

Compassion has been defined as "the sensitivity to suffering in self and others, with a commitment to try to alleviate and prevent it" (Gilbert, 2014, p.19). Gilbert (2014) proposed compassion can flow in three different directions: compassion towards self (SC), compassion *towards* others (CtO), and compassion *from* others (CfO). Each of these flows are required for the regulation of the 'threat', 'drive' and 'soothe' systems. The threat system alerts to danger and activates defences for protection. It is associated with feelings of anxiety and anger. The drive system drives and motivates individuals towards important life goals and is associated with feelings of achievement and pleasure. The soothe system provides information on safeness and enables rest and digest. It is associated with feelings of safeness, social connectedness, and contentment. Gilbert (2005) proposed that that these systems evolved to prompt a distinct response to meet evolutionary and survival needs (Depue & Morrone-Strupinsky, 2005; Gilbert, 2005). In consideration of emotional wellbeing, an over-activation of the threat and drive system, and an underactive soothe system, can give rise to mental health difficulties (Gilbert, 2005; Gilbert & Proctor, 2006). Subsequently, cultivating an individual's ability to engage in self-compassion, receive compassion from others and direct compassion towards

others can help to effectively regulate their threat response though inhibition of the sympathetic nervous system (Gilbert, 2014).

SC is defined as the ability to relate to distressing feelings with common humanity and mindful awareness (Germer & Neff, 2013). SC is emerging as a potential target for intervention following PMIEs to reduce the risk of adverse mental health outcomes and has been proposed as an adaptive emotional regulation strategy (Forkus et al., 2019; Scoglio et al., 2018). ACEs has been associated with lower SC and increased PTSD (Winders et al., 2000). Of particular interest, Kelly et al. (2019) demonstrated that those with low levels of SC, were at increased risk of PMIEs. In the military context, Forkus et al. (2019) found preliminary evidence for the potential clinical utility of targeting SC in treatments aimed at reducing mental and behavioural health outcomes among individuals who report PMIEs. Research exploring the effect of PMIEs on PTSD (mediated by guilt) in 178 military personnel, found that MI was significantly moderated by SC levels (Manalo, 2019).

In support, Zeach and Levi-Belz (2022), suggested that MI interventions for HCPs should focus on mitigating self-criticism and promoting SC. They examined the moderating role of self-criticism in MI, PTSD, and complex PTSD (CPTSD) with 296 HCPs and found that high levels of self-criticism, intensified the relationships between exposure to PMIEs and MI symptoms and between MI symptoms and CPTSD symptoms. In further support, it has been put forward that compassion and mindfulness-based approaches, may have a role in helping HCPs with self-criticism, anger, shame, and guilt through cultivating compassion towards the self, others and the world (Čartolovni et al., 2021). Moreover, previous research demonstrates that self-criticism is strongly related to lower levels of SC (Gilbert et al., 2004) and practicing compassion is associated with a reduction in self-criticism (Beaumount et al., 2016). Although SC interventions have yet to be tested among HCPs exposed to PMIEs, SC has shown to be efficacious in related constructs such as shame (Müller Engelmann et al., 2019) and guilt among veterans (Held & Owens, 2015), both of which as considered important drivers in moral injury (Vermetten & Jetly, 2018).

2.2.7 Compassionate Mind Training

Gilberts' Compassion Focused Therapy (CFT) is grounded in evolutionary psychology (Darwin, 1872), attachment theory (Bowly, 1982) and neurophysiology (Porges, 2007) whilst also drawing upon Buddhist principles (Lama, 1995; Makransky et al., 2012).

Compassionate mind training (CMT) is an element of Compassion Focused Therapy (CFT), developed specifically to help people, many of whom had reported difficult experiences in their childhood and/or adulthood, who experienced high levels of shame and self-criticism (Gilbert, 2010; Gilbert & Irons, 2005; Gilbert & Procter, 2006). CMT focuses on activating the self-soothing system to develop SC using a variety of compassion-focused techniques and practices. These techniques aim to increase awareness and understanding of human reactions to internal and external threats.

CMT has been tailored for use with various formats (length and practices) and involves several somatic and physiological practices (i.e., body posture, breathing, facial expressions and voice tones) and has been utilised in a range of clinical and nonclinical populations. McEwan and Gilbert (2016), in a nonclinical population, found that after 5 minutes of daily practice of CMT exercises over a 2-week period, participants reported significant reductions in self-criticism, depression, anxiety, and stress, and increases in SC and self-reassurance. Previous research has also reported that in trauma-exposed individuals, practicing compassion and SC can improve threat response regulation, reduce high levels of self-criticism and prevent relapse (Gilbert & Procter, 2006; Harman & Lee, 2010). Furthermore, Matos et al. (2017) found that practice of a variety of CMT exercises led an increase in SC, self-reassurance and significant reductions in self-criticism, depression, anxiety, and stress.

2.2.8 The Present Study

Given the potential clinical utility of cultivating compassion (Gilbert, 2014) and previous research in veteran populations demonstrating that SC alleviated the negative consequences of MI (Kelly et al. 2019), this study aimed to explore the complex interplay between MI and the components of the three flows of compassion (SC, CtO, CfO), PTSD, ACEs and psychological distress in HCPs. The current study also aims to draw together and build upon the existing evidence (e.g., Atuk et al., 2020; Matos et

al., 2017; Morgan et al., 2024; Timings et al., 2021) by exploring the impact of a brief-online 2-week CMT on HCPs self-report levels of MI, psychological distress and three flows of compassion (Gilbert et al., 2014).

The main objectives were twofold; to:

1) Explore the associations between the three flows of compassion (SC, CtO CfO), MI, psychological distress, PTSD and ACEs in sample of HCPs.
2) Examine whether a brief online 2 week-CMT increases the three flows of compassion and reduces psychological distress, PTSD, and MI in HCPs.

The study hypothesised that:

1) At baseline, psychological distress, PTSD, and ACEs will be positively related to MI.
2) At baseline, HCPs who report higher levels of MI, will experience lower levels of SC, CtO, CfO
3) The brief CMT, will lead to significant reduction in MI, PTSD and psychological distress post-training compared to the waitlist control group.
4) Following the brief CMT, the training group will score significantly higher in the SC, CtO, CfO post training, compared to the waitlist control group.

In addition, further exploratory analyses will be conducted to broaden the understanding of MI, compassion, and ACEs in HCPs.

2.3 Methodology

2.3.1 Ethical Considerations

Full ethical approval was granted by both the University of Southampton's Ethics and Research Governance Committee (ERGO ID: 80865, see Appendix C) and the NHS Health Research Authority (IRAS ID:326267) (see Appendix D). The trial was pre-registered with the Open Science Framework (OSF) https://osf.io/e4usg.

2.3.2 Design

The current pilot study employed a 2 x 2 mixed design with one between-subjects variable (condition) with two levels (CMT vs waitlist control) and one within-subjects variable (time) with two levels (baseline vs post-training). The dependent variables are the self-reported measures of MI, depression and anxiety, PTSD, and the three flows of compassion, SC, CtO, and CfO. The independent variables will be the CMT (training vs waitlist control) and time (pre and post).

2.3.3 Power Analysis

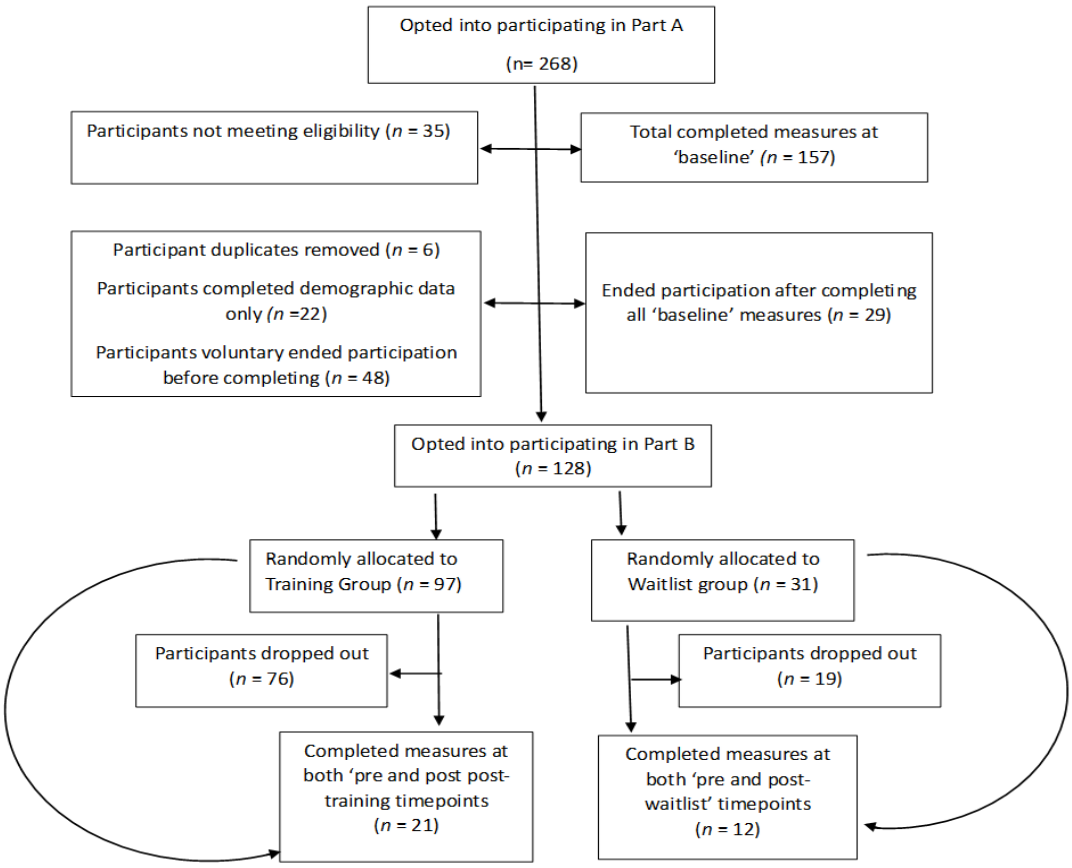
Power analyses were conducted using G*Power (Faul et al., 2009) and assuming a medium effect size and power of 0.80, a minimum of 159 participants was suggested for a multiple regression with 14 predictors and a total of 106 participants was suggested for a repeated measure MANOVA.

2.3.4 Participants

Part A included 157 HCPs with 128 participants opting-in to complete Part B. Part B of the study, comprised of 22 HCPs in the CMT condition and 12 HCPs in the waitlist condition. (See Figure 5 for participant flow through the study).

Figure 5.

Participant flow through the study.



2.3.5 Measures

All participants completed the following measures.

2.3.5.1 Demographic questionnaire

Based on prior healthcare-based research (Rushton et al., 2022), demographic characteristics included age, gender, ethnicity, work setting, employment status and employment status (See Appendix G). Participants were also asked about whether they received previous CPD training on compassion during their role. Risk factors associated with MI were assessed using length of service, whether participants worked in covid ward, access to supervision, and average weekly covid-patient contact.

Primary outcome measures

The two primary outcomes measured moral injury and the three flows of compassion (Gilbert et al., 2017).

2.3.5.2 Moral Injury

The Moral Injury Event Scale (MIES; Nash et al., 2013) is a self-report nine-statement questionnaire tapping exposure to perceived transgressions committed by oneself, committed by others, and perceived deception or betrayal by others. The 6-point Likert-type scale ranged from 1 (strongly disagree) to 6 (strongly agree). Following other studies (Cameron et al., 2021; Williamson et al., 2023) MI total scores were utilised. The internal reliability a of the MIES in a previous healthcare sample was (a = 89). (See Appendix H).

2.3.5.5 Three Flows of Compassion

Gilbert et al's (2017) Compassionate Engagement and Action Scales (CEAS) questionnaire (see appendix L) assessed SC (e.g., "I tolerate the various feelings that are part of my distress"), CtO (e.g., "I notice and am sensitive to distress in others when it arises"), and CfO (e.g., "Others are emotionally moved by my distressed feelings"). The three respective scales comprise of 13 items on a 10-point Likert scale ranging from 1 (never) to 7 (always). A total scale score for each scale is derived from the sum of scale items. Reverse items are not included in the scoring. Higher scores represent higher levels of compassion. The CEAS has demonstrated good internal reliability, (Cronbach α from .67 to .94) (Murfield et al., 2020) (See Appendix L).

Secondary outcome measures

The secondary outcomes measured adverse childhood experiences, post-traumatic stress disorder and psychological distress.

2.3.5.6 Adverse Childhood Experiences

The Adverse Childhood Experiences (ACEs) measure is a series of ten questions that examines cumulative and types of adverse experiences specific to childhood < 18years (Felitti et al., 1998). Participants answered “Yes” or ‘No” to each item examining emotional, physical, and sexual abuse, household challenges, and emotional and physical neglect. A sample question from the ACEs is “Did a parent or other adult in the household often or very often push, grab, slap, or throw something at you?” The ACE-Q has demonstrated excellent reliability (Cronbach α=.84) (Roth et al., 2022) (See Appendix K)

2.3.5.4 Trauma

The PTSD Checklist for DSM-5 (PCL-5) is a 20-item measure that examines the number and severity of posttraumatic stress symptoms (Weathers, Litz, et al., 2013). Participants rated the degree to which they were bothered by symptoms on a 5-point Likert scale (“Not at all bothered” to “Extremely bothered”) in the past month. Scores range from 0-80, and the PCL-5 was scored as a total sum with a cut-off score of 31 and above indicating probable diagnosable PTSD (Wild et al., 2022), though the measure is not a diagnostic tool for PTSD (Blevins et al., 2015). The measure has strong reliability and validity, with Cronbach's alpha coefficient of 0.94 and the retest reliability was 0.82 (Blevins et al., 2015) (See Appendix J).

2.3.5.3 Psychological distress

The Clinical Outcomes in Routine Evaluation scale (CORE-10; Barkham et al., 2013) is a 10item self-report questionnaire screening for psychological distress. An example item is “I have felt unhappy.” Each item is rated on a 5-point Likert scale ranging from 0 (not at all) to 4 (most or all the time). Higher scores indicate greater psychological distress. A clinical cut-off score of 11 is indicative of requiring

mental health support (Barkham et al., 2013). The CORE-10 has demonstrated good psychometric properties and good internal consistency, Cronbach α = .90 (Barkham et al., 2013).

2.3.5.4 Patient and public involvement

Involvement from two ICU nurses who worked in intensive care units during the COVID-19 pandemic provided consultation and informed the development of the study materials. Examples of decisions that were made based on these consultations included suggestions for the order of questionnaires, and the decision to trigger a separate Qualtrics signposting information page for participants who identified that they had suicidal ideation on the CORE-10.

2.3.6 Compassionate Mind Training

The brief CMT training was informed by the two-week CMT intervention delivered in the Matos et al. (2017), Atuk et al. (2020) and Timings et al. (2020) studies. Matos et al. (2017) designed a 2-week CMT intervention which included a psychoeducational booklet and CMT scripts. Atuk et al. (2020) adapted this into a brief online version by converting the CMT scripts into audio recordings. Timings (2022) adapted this further though inclusion of a psychoeducational video based on the booklet by Matos et al (2017).

The CMT scripts included the following practices:

1. Postures & Facial Expressions and Vocal Tones (PFEVT)

2. Mindfulness (M)

3. Soothing Rhythm Breathing (SRB)

4. Building and Cultivating Your Compassionate Self (BCYCS)

5. Compassion for a Close Person (CCP)

6. Compassion for the Self (CFTS)

The schedule of practices over the two weeks is detailed in Table 5. The software Qualtrics was used to deliver the measures and the CMT training online. A daily email reminder containing a link to the corresponding daily CMT practice was automatically emailed to participants via the Qualtrics software. The audio recordings were spread out over two weeks, and the practices did not last longer than 25 minutes each evening; although participants were able to practice for longer if they wished.

Table 5.

Outline of the two-week training informed by Matos et al.'s (2017) scripts.

Week 1	Week 2
Day 1 – Psychoeducation video	Day 8 – CFTS
Day 2 – PFEVT and SRB	Day 9 – BCYCS
Day 3 – M and PFEVT	Day 10 – CCP
Day 4 – SRB and M	Day 11 – CFTS
Day 5 – Psychoeducation	Day 12 – BCYCS
Day 6 – BCYCS	Day 13 – CCP
Day 7 – CCP	Day 14 – CTS

Note. PFEVT = Postures and Facial Expressions and Vocal Tones; SRB = Soothing Rhythm Breathing; M = Mindfulness; BCYCS = Building and Cultivating Your Compassionate Self; CCP = Compassion for a Close Person; CFTS = Compassion for the Self.

2.3.7 Recruitment

Recruitment was conducted in partnership with a local collaborator within each of the five participating NHS Trusts. Local collaborators supported the dissemination of the study advertisement via

a monthly email to their respective Trust, via their social media accounts and/or via word of mouth. In addition, the project was advertised in the Faculty of Health Sciences, University of Southampton, newsletter to target students with patient facing contact in healthcare courses (See Appendix P).

Interested HCPs followed the link within the study advertisement email or via QR code. They were then presented with the online participant information sheet highlighting further details about the study and consent statement to opt in-to participate in Part A of the study (See Appendix E). Following consent, participants answered screening questions to confirm their eligibility to participate (see Appendix F). Those who did not meet the eligibility, were not able to proceed with the study, although were given access a copy of the training (delayed access, without the measures included) via an automatic email. (See Appendix N for Study Flowchart).

2.3.7.1 Part A – Baseline Phase

Once eligibility was confirmed, participants completed the demographic information measures to provide the 'baseline' data. Participants then had the option to either end their participation at that stage or to continue onto Part B of the study by providing consent (see Appendix E). If consent for Part B was not given, participants were debriefed (see appendix M) and they were able to enter an online prize draw, by entering their email address, to win one of 5 £10 Amazon gift vouchers as a 'thank you' for their participation. These participants also had access to a copy of the training materials (via a link contained within the debrief form).

2.3.7.2 Part B –Training Phase

Following consent, participants were randomised into either the 'training' or 'waitlist control' group at a 3:1 ratio by the Qualtrics software. Participants in the training group were asked to engage with the CMT practices daily for two weeks. Participants received automatic daily email reminders to practice and to increase response rate. The waitlist control group were informed that they would have access to the training after completion of the post-measures again in two weeks.

After the two-week training period, all participants received an automatic email via the Qualtrics software with a link to complete the measures again ('post-survey'). Once 'post-survey measures' were completed, all participants were debriefed via the online debriefing statement. Due to the sensitive nature of the questionnaire, participants were provided with online links and telephone numbers to NHS and other support services before and after completion. Upon completion, participants were able to opt-in enter the prize draw chance to win one of ten £25 Amazon vouchers. Winners were contacted via email. Participants in the waitlist control group had access to a version of the training (without measures included) via the link in the debrief form.

2.3.8 Data Analysis

Analyses were performed using SPSS (Version 29) and statistical significance was set at $p = .05$. Pre-analysis for evaluating parametric and multivariate assumptions of normality, missing values, outliers and homogeneity of covariance was carried out in accordance with Tabchnick and Fidell (2013) guidelines. Through visual inspection of the histograms, boxplots, and scatterplots (Field, 2013), data was considered meeting the assumptions for analysis. Outliers were evaluated using a criterion of + – 3.3 standard deviations from the mean. There were two extreme outliers, one on the CtO baseline scale and one on the PCL (> 3 standard deviations from the mean) as assessed by box plots (Field, 2013). Both outliers were replaced with the next highest score that was not an outlier (Field, 2013).

Data was analysed in the following stages. Descriptive statistics and frequencies were conducted to provide an overview of the overall and group sample characteristics. Demographics of those meeting cut-offs for binary constructions of the PCL (above 31 v below 31), CORE (above 11 v below 11) and ACEs (above 4 v below 4) were explored. The associations between PTSD, CORE, ACEs, the three flows of compassion (SC, CtO and CfO), total-MI, were analysed by bivariate correlations. Point biserial correlations were conducted to explore the relationship between individual ACE-Q items and MI (Battaglia et al., 2019; Merrick et al., 2018). Two repeated measures MANOVAs were conducted to explore the impact of a brief-CMT with two conditions (training vs. waitlist control

group) as the between subjects' factors, and time (pre and post) as the within-group factor. Significant MANOVA's were followed up with separate univariate ANOVA's.

2.4 Results

2.4.1 Demographic Characteristics

Participant demographics are shown in Table 6**.** In total, 268 frontline healthcare professionals consented to participate in the study. Following quality checks of the data, 6 duplicate participants were removed, 35 did not meet eligibility criteria, 26 voluntarily ended participation, and 22 completed demographic questionnaire only. The final baseline (Part A) sample consisted of 157 participants. Of the total baseline sample, 128 participants opted-in to complete Part B of the study. Of these, 97 were randomly allocated to the CMT- training group, and 31 were allocated to the waitlist. In total, 21 participants completed baseline and post training data in the training group, and 12 participants completed baseline and post training data in the waitlist control group. Univariate ANOVAs were conducted to assess for differences between groups across all baseline measures. There were no statistically significant differences between the waitlist and training group on baseline measures of SC, CtO, CfO, psychological distress, trauma, or moral injury.

Participants' mean rating for how well they were able to engage with the training ranged between 3 and 4 (1 ='not very well', 5 = 'very well') (See Appendix Q).

Table 6 shows that at baseline, the participant sample predominantly identified as female (86%), 14 % identified as male. The age of participants ranged from 18 – 65 years with the majority falling within the 25-34 years of age (45.2%). The HCP role varied with nurses representing the largest group of professionals (26.1%). Most of the sample have over 10 years' experience 40.1% (n=63). The majority of HCPs were of white ethnicity (92%). Means and standard deviations for scores on all measures are presented in Table 7.

2.4.2 Descriptive Statistics

The means and standard deviations of each of the scales are summarized in Table 7, along with the frequencies of each reported ACE-Q item. In the sample (n=157), the mean total scores for the PCL were 19.43 (SD = 15.20), for the MIES was 32.36 (SD = 9.99), for the CEAS was 193.10 (SD = 37.65), and for the CORE-10 was 14.52 (SD = 5.26). A proportion of the sample met case criteria for probable psychological disorders. Just over 20% met clinical cut-off for probable PTSD (n=32), and 60 % (n=94) met criteria for clinical levels of psychological distress.

The mean ACE-Q total score for the sample was 2.24 (SD = 2.04; range 0-8). Several HCPs reported experiencing at least one ACE (77.7%), with 24% (n=37) of the sample reported experiencing a high number of ACEs (< 4). Domestic violence was the most frequently reported ACE 43.3% (n=89) followed by sexual abuse 42% (n=66%). Separation/divorce was the least frequently reported ACE 3.2% (n=5).

Table 6.

Characteristics of study participants for complete sample

Demographics	Whole Sample	Training Group (n=21)	Waitlist Group (n=12)
Gender			
Male	21(14)	4(19)	0
Female	136 (86)	17(81)	12(100)
Job Role			
GP/Doctor	11 (7)	2 (9.5)	0
Healthcare	34(21.7)	0	1(8.3)
Professional practitioner by	2 (1.3)	2(9.5)	5(41.7)
Psychiatrist	1 (.6)	0	0
Psychologist	20 (12.7)	3(14.3)	2 (16.7)
Occupational	5 (3.2)	2(9.5)	0
Nurse	41 (26.1)	6(28.6)	1(8.3)
Social Worker	2 (1.3)	0	0
Support worker	4 (2.5)	0	1(8.3)
Physiotherapist	4(2.5)	0	1(8.3)
Healthcare Assistant	8(5.1)	0	0
Student/Trainee	15(9.6)	1(4.8)	1(8.3)
Ambulance Worker	8(5.1)	3(14.3)	0
Other	2(1.3)	2(9.5)	0
Ethnicity			
White	145(92.4	18(85.7)	11(91,7)
Asian	6(3.8)	3(14.3)	0
Black	5(3.2)	0	0
Mixed Ethnic Group	1(.6)	0	1(8.3)
Age			
18-24	7(4.5)	1(4.8)	0
25-34	71(45.2)	6(28.6)	3(2.5)
35-44	37(23.6)	10(47.6)	5(41.7)
45-54	21(13.4)	1(4.8)	2(16.7)
55-64	21(13.4)	3(14.3)	2(16.7)
Organisation			
NHS	120(76.4)	18(85.7)	10(83.3)
Non-NHS	37(23.6)	3(14.3)	2(16.7)
Covid Patients per week			
None	12(8.3)	1(4.8)	1(8.3)
1-5	63(40.1)	9(42.9)	5(41.7)
6-10	26(16.6)	2(9.5)	0
+10	55 (35)	9(42.9)	4(33.3)
Able to receive supervision			
Yes	100(63.7)	15(71.4)	5(41.7)
No	57(36.3)	6(28.6)	7(58.3)
Worked on a Covid Ward			
Yes	37(23.6)	6(28.6)	3(25)
No	120(76.4)	15(71.4)	9(75)
Hours of Compassion CPD			
None	62(39.5)	5(23.8)	6(50)
Between 1 and 30 hours	95(60.6)	16(76.2)	6(50)

Table 7.

Means and Standard Deviations for Baseline, Training Group and Waitlist.

	Baseline (n=157)		Training (n=21)		Waitlist (n=12)	
Measure	*M (SD)*	Range	*Pre M (SD)*	Post M (SD)	*Pre M (SD)*	Post M (SD)
MI-Total	32.26 (10)	10-53	31.81(7.32)	31.43(9.56)	32.33(11.52)	32.25(12.15)
ACE	2.24 (2.04)	0-8	-	-	-	-
PCL	19.43 (15.20)	0-63	19.00(13.36)	13.86(14.21)	19.33(15.67)	20.75(17.18)
CORE-10	14.52 (5.29)	0-28	13.24(5.60)	12.05(4.06)	16.42(4.93)	16.25(6.0)
CEAS	194.17(34.34)	109-271	210(34)	223(44)	201.8(31.77)	199.33(26.3)
SC	58.01(13.86)	27-95	61.52(13.75)	71.67(17.67)	60.83(9.79)	65.75(12.06)
CtO	79.76(12.55)	42-100	83.14(10.60)	82.10(14.60)	77.33(12.45)	71.42(9.76)
CfO	56.39(19.26)	10-100	65.33(21.04)	69.43(20.18)	64.08(16.32)	62.17(15.30)

Note. M=Mean; SD = Standard Deviation; SC = Self-Compassion; CtO = Compassion *towards* others; CfO = Compassion *from* others; CORE = psychological distress; PCL = Post Traumatic Stress Disorder; ACE = Adverse Childhood Experiences; MI-total = MI total score

2.4.3 Hypothesis one: At baseline, psychological distress, PTSD, and ACEs will be positively related to MI.

All correlations and descriptive statistics are presented in Table 9.

MI, Psychological Distress, PTSD and ACEs

Bivariate analyses indicated there were significant positive correlations between MI and psychological distress (r = .255, p =.001), and PTSD (r = .369, p < .001). The effect sizes are medium and suggests that HCPs who experienced greater levels of MI, experienced significantly higher levels of psychological distress and PTSD. Interestingly, ACEs were not significantly correlated with MI-total score (r = .147; p = .067).

Exploratory Analysis

Exploratory point biserial correlations (r_{pb}) were conducted to explore the relationship between individual ACE-Q items and MI. Analysis revealed significant positive correlations between emotional abuse and MI-total score (r_{pb} = .195, P = .015) and sexual abuse and MI-total score (r_{pb} = .211, p = .008). These effect sizes are all small and suggest that among HCPs, higher MI-total scores are related to emotional abuse and sexual abuse during childhood.

Table 8.

Point Biserial Correlations between ACE-Q items and CORE, PCL, MIES and CEAS.

ACE-Item	Yes n (%)	SC	CtO	CfO	CORE	PCL	MI-total
Emotional abuse	8 (5.1)	-.082	-.148	-.056	.314**	.349**	.195*
Physical abuse	41 (26.1)	.019	.068	-.070	.110	.002	-.075
Sexual abuse	66 (42)	-.101	-.006	-.083	.186*	.191*	.211**
Emotional neglect	38 (24.2)	-.132	.002	-.033	.335**	.275**	.099
Physical neglect	28 (17.8)	-.051	-.018	-.217**	.249**	.244**	.018
Separation/Divorce	5 (3.2)	.026	-.040	-.038	.113	.055	.075
Domestic violence	68 (43.3)	.003	-.026	-.117	.237**	.208**	.129
Substance abuse	38 (19.7)	-.057	-.014	-.178*	.233**	.244**	.057
Mental Illness	31 (19.7)	-.070	.046	-.194*	.247**	.291**	.001
Family Incarceration	28 (17.8)	.012	-.116	-.125	.109	.089	.110

Note. M = Mean*; SD* = Standard Deviation; SC = Self-Compassion; CtO = Compassion *towards* others; CfO = Compassion *from* others; CORE = psychological distress; PCL = Post Traumatic Stress Disorder; ACE = Adverse Childhood Experiences; MI-total = MI total score. *. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed)

Table 9.

Baseline Means, Standard Deviations, and Correlations Matrix for Study Bivariate Correlations

Measure	M (SD)	SC	CtO	CfO	CORE	PCL	ACE	MI-total
SC	58 (13.86)	1						
CtO	79.71 (12.73)	.326**	1					
CfO	56.4 (19.26)	.330**	.351**	1				
CORE	14.52 (5.20)	-.344**	.214**	-.160**	1			
PCL	19.43 (15.20)	-.407**	-.254**	-.220**	.790**	1		
ACE	2.24 (2.04)	-.093	-.036	-.231**	.412**	.376**	1	
MI-Total	32.26 (10)	-.224**	-.020	-.005	.255**	.369**	.147	1

Note. M=Mean; SD = Standard Deviation; SC = Self-Compassion; CtO = Compassion *towards* others; CfO = Compassion *from* others; CORE = psychological distress; PCL = Post Traumatic Stress Disorder; ACE = Adverse Childhood Experiences; MI-total = MI total score. *. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed)

2.4.4 Hypothesis two: At baseline, HCPs who report lower levels of SC, CtO, CfO will experience higher levels of MI, PTSD, psychological distress, and ACEs.

2.4.4.1 Self-Compassion

Bivariate correlations revealed that SC was significantly negatively correlated with MI (*r* = -.224, p = .001), psychological distress (*r* = -.344, p = .001), and PTSD (*r* = -407, p = .001), but not ACEs (r = -.093, p .25). The effect sizes were all small to medium and suggests that HCPs with lower levels of SC, experienced significantly higher levels of MI, psychological distress, and PTSD.

2.4.4.2 Compassion to Others

Bivariate correlations revealed that CtO was significantly negatively correlated with psychological distress (*r* = -.214, p = .007), and PTSD (*r* = -254, p = .001), but not ACEs (*r* = -.026, p = .658). The effect sizes are small and suggests that HCPs with lower levels of CtO, experienced significantly higher levels of psychological distress and PTSD.

2.4.4.3 Compassion from Others

Bivariate correlations revealed that CfO was significantly negatively correlated with psychological distress (*r* = -.160, p = .045), PTSD (*r*=-.220, p =.006), and ACEs (*r* = -.231, p = .004). Effect sizes were small and suggests that HCPs who experience lower levels of CfO, experienced significantly higher level of psychological distress, PTSD, and ACEs.

2.4.5 Hypothesis 3: A brief CMT training will lead to significantly higher levels of the three flows of compassion in the training group compared to the wait-list control group.

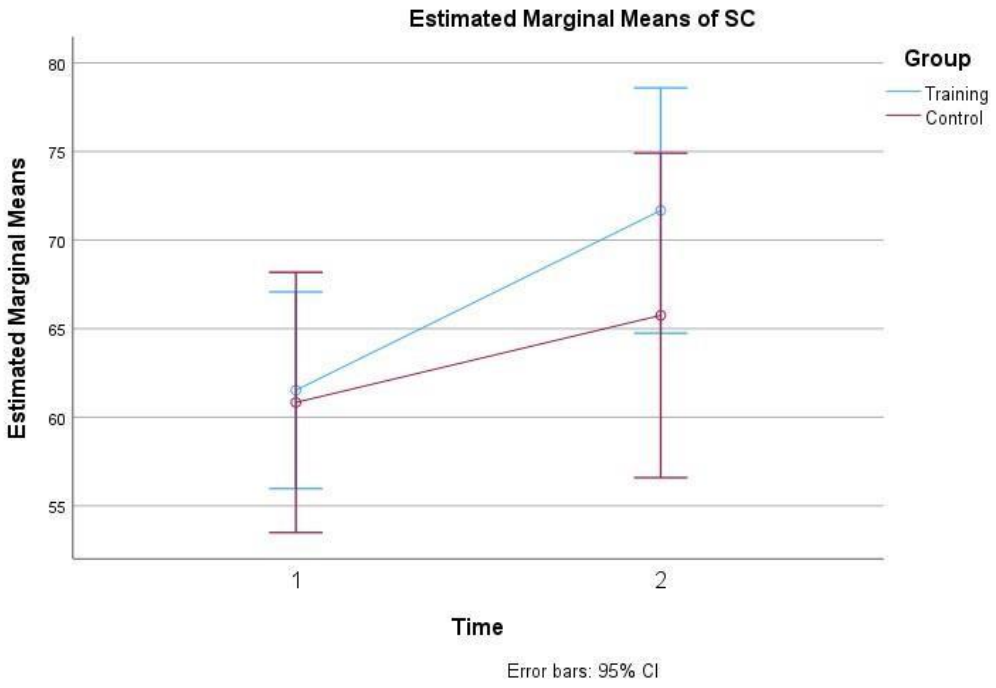
A 2x2 mixed model MANOVA was performed to analyse the change in the three flows of compassion (SC, CtO and CfO), with group type (CMT training vs waitlist control group) as the between-subjects factor and time (pre vs post CMT), as the within-subject factor. Using Pillai's Trace, the MANOVA found that there was no significant main effect of time on compassion to others, and

compassion from others V = .354, F (3, 29) = 5.31, p = .005, ηp2 = .35) indicating participants improved over time. Univariate analysis of Variance (ANOVA) results showed that there was a statistically significant difference between the pre to post time points for SC scores (F (1, 31) = 5.73, p = .001, ηp2 = .283. Inspection of the plots suggests that the mean SC scores of HCPs in the CMT training group were higher post CMT training (M = 71.67, SD 17.17) than pre-training (M = 61.52, SD=13.73). Interestingly, within the Waitlist Control Group, the mean SC scores of HCPs in the *Post-waitlist timepoint* (M=65.75, SD=12.06) were also higher than the *Pre-waitlist timepoint* (M= 60.83, SD = 9.79). However, the MANOVA main effect of group was not significant (V= .132, F (3, 29) = 1.48, p = .242, ηp2 = .13). There was no significant main effect of time for CtO or CfO.

There was no statistically significant interaction effect between group and time on the three flows of compassion (V = .109, F (3, 29) = 1.19 p = .332, ηp2 = .11). This indicated that there was no significant difference between the waitlist and training groups in the change of the three flows of compassion from pre to post time points. There was no significant main effect of group (V = .132, F (3, 29) = 1.19 p = .332, ηp2 = .11). This result therefore does not support the study's third hypothesis.

Figure 6.

Mean Scores on SC From Each Group



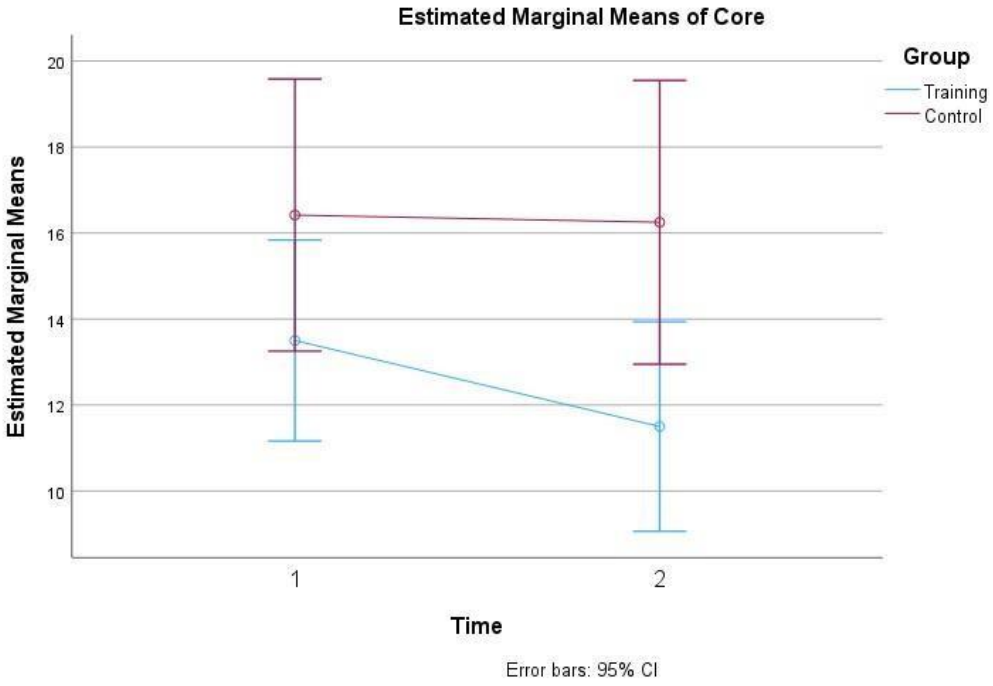
2.4.6 Hypothesis 4: A brief CMT training will lead to significant reduction in MI, trauma, psychological distress post training compared to waitlist control.

A 2x2 mixed model MANOVA was performed to analyse the change in the PCL, CORE and MI in the two groups (training vs waitlist control group) over time (pre vs post CMT). The two independent variables were condition and time, and the dependent variables were PCL, CORE, and MI. The MANOVA showed a significant main effect of group $\Lambda = .564$ $F(7, 26) = 2.877$, $p = .023$, $\eta_p^2 = .13$. Univariate ANOVA results show that there was a statistically significant difference in psychological distress scores $F(1, 31) = 4.71$, $p = .038$, but not PTSD $F(1, 31) = .48$, $p = .493$, η_p^2 .015, or MI $F(1, 31) = .042$, $p = .839$, $\eta_p^2 = .001$, between CMT and waitlist control groups. Inspection of the plots suggests that the mean psychological distress scores of HCPs in the CMT training group were lower post CMT training (M = 12.05, SD 4.06) than pre-training (M = 13.24, SD=5.60). Whereas the mean psychological distress scores of HCPs in the post waitlist group (M=16.25, SD=6.0) remained similar (M= 16.42, SD = 4.93).

The main effect of time and the time X group interaction were not significant. This indicted that there was no significant difference between CMT training and waitlist control groups in the change of MI, trauma, and psychological distress from pre to post time points.

Figure 7

Mean Scores of Psychological Distress from Each Group



2.5 Discussion

2.5.1 Findings in Context

The current study aimed to investigate the complex interplay between psychological distress, PTSD, ACEs, the three flows of compassion and MI in HCPs who worked during the pandemic. It also aimed to investigate the effectiveness of an online-brief CMT training and its impact on the three flows of compassion, psychological distress, PTSD, and MI in HCPs.

2.5.2 Part A - Baseline Phase

2.5.2.1 Psychological Distress, PTSD, ACEs, and MI

It was predicted that psychological distress, PTSD, and ACEs would be positively associated with MI. This hypothesis was partially supported as results revealed significant moderate associations between MI and PTSD and psychological distress. However, contrary to the hypothesis, there was no significant relationship between MI total and ACEs.

These findings provide support for previous research among HCPs during COVID-19 which demonstrated that higher MI was associated with increased PTSD (Currier et al., 2018; Hagerty & Williams, 2022), anxiety, depression, and suicidal ideation (Currier et al., 2018). In the current sample, the majority of HCPs met clinical levels of psychological distress (60%) and 20.4% met clinical cut-off for PTSD. Again, this is consistent with previous research in a large sample of UK HCPs (Lamb et al., 2021). However, Lamb et al.'s (2021) research was conducted during the early months following the COVID-19 pandemic and examined clinical and non-clinical HCPs, so rates then may not be comparable to current estimates.

Debate exists in the literature as to whether MI is distinct from PTSD (Neria & Pickover, 2019) as MI and PTSD can overlap sharing common characteristics, e.g., guilt, shame, and negative changes in cognitions (Koenig et al., 2021). However, the consensus is that the two are distinct (Barnes et al., 2019). Correlations between MI and PTSD have been shown to result in greater symptom severity and

functional outcomes (Bryan et al., 2016). Within the pandemic context, HCPs faced both threats to physical safety and threats to their moral code (Weber et al., 2023) e.g., being exposed to the virus, and PMIEs such as potentially putting others' lives at risk through their job role. Therefore, this may offer explanation for the moderate associations found between MI and PTSD in this sample.

Interestingly, research suggests that levels of PTSD in HCPs may not be directly related to the COVID-19 pandemic (Greene et al., 2023). Even before the onset of COVID-19, HCPs were at an increased risk for PTSD (Mealer et al., 2009). Wild and colleagues (2022) found that 44% of UK HCPs met criteria for PTSD using structured clinical interview, suggesting that rates of PTSD may be lower when obtained by self-report measures. Additionally, while 24% of their sample reported COVID as their index trauma, the majority reported that their trauma predated the pandemic and was split between personal and occupational traumas. This suggests that perhaps pre-COVID trauma's may have accounted for the relationship between MI and PTSD in the current study. Although the present study did not assess for the presence of previous trauma history which may have pre-dated COVID, childhood adversity was examined.

In the current sample, the majority of HCPs reported exposure to at least one ACE (77%), with 24% experiencing high levels of ACEs (> 4). These high-ACE rates are considerably higher than the general population (9%) (Bellis et al., 2015), but are comparable to rates found in the UK Armed Forces population (24%). In consideration of HCPs, Maunder et al. (2010), found that 68% of HCPs experienced at least one ACE. Bernhardt et al. (2018) in a sample of mental health workers, found that higher ACEs created tension and negatively impacted work performance. However, in a sample of social care workers, Steen et al (2021) found that a history of ACEs enabled staff to better support families due to their high ability to empathise with the families they were working with. As the current study did not find a relationship between MI and ACEs, it may be that the HCPs in the current sample represent a biased population who may be more resilient to the effects of PMIEs following childhood adversity (Burkett et al., 2022; Maunder et al., 2010).

Although the present study did not find a relationship between ACEs and MI total score, inspection of the individual ACE-Q items (Merrick et al., 2017) revealed that MI was positively associated with emotional abuse and sexual abuse. This is consistent with previous research in a military sample which did not find a relationship between ACE and MI-total score but demonstrated that MI was significantly associated with emotional abuse (Battaglia et al., 2019). Similarly, Fani et al., (2021) in a civilian population, found that MI had positive, significant associations with various forms of childhood trauma exposure (e.g., sexual, physical, emotional abuse). Early childhood is a critical time when children develop expectations for future interpersonal relationships. Intimate betrayals during this period such as through emotional or sexual abuse, can hinder a person's ability to engage in trusting and healthy interpersonal relationships in adulthood (Andres et al., 2023; Jinkerson, 2016). Violations of trust in childhood can set the foundation for MI to develop (Bonson et al., 2023). The relationship between MI and childhood emotional and sexual abuse in the current study provides important preliminary insights into ACEs within a HCP sample which extends previous research beyond civilian (Fani et al., 2021) and military samples (Battaglia et al., 2019).

2.5.2.2 The three flows of Compassion and MI

In consideration of the three flows of compassion, the prediction that higher MI would be associated with lower levels of the three flows of compassion was partially supported. Bivariate correlations indicated that low levels of SC were correlated with higher levels of MI but not CtO or CfO. If HCPs violated their own moral code or witnessed transgressions or betrayals by others during the COVID-19 pandemic, this may have resulted in shame and guilt (e.g., Williamson et al., 2020). Shame, as a transdiagnostic emotion (Lee, 2009), has been linked to reduced self-compassion, increased PTSD (Winders et al., 2020), and MI among veterans (Vermetten & Jetly, 2018). In addition, lower levels of SC have been linked to ACEs and a range of mental health difficulties in adulthood including emotional dysregulation (Vettese et al., 2011), and PTSD (Barlow et al., 2017). Traumatised individuals with high levels of self-criticism and shame can experience SC as threatening and unfamiliar (Lawrence & Lee, 2014). Therefore, SC may be important to consider when supporting

HCPs following PMIE exposure (Griffin et al., 2021) and may explain the association between low SC and high MI in the current sample.

Although SC was related to MI, CtO and CfO were not. These findings are inconsistent with theoretical positions which suggest that activation of the threat system may result in difficulties in offering CtO, and receiving CfO (Gilbert, 2009). However, Gilbert (2009) suggests that whilst the three flows of compassion operate together, they can also function independently. For example, individuals may be able to offer and receive compassion, but struggle with SC (Lopez et al., 2018). In support, Neff et al. (2020) suggest that while HCPs work to keep people well, their own wellbeing can be adversely affected by the intense demands of their jobs. Many HCPs enter the profession with values of compassion and to care for others (Neff et al., 2020). Gilbert (2017) suggests that the ability to offer and receive compassion has evolved as a survival mechanism. In fact, these evolutionary tendencies (e.g., caring for others) may have informed the current samples career choices (Bryce et al., 2021). Additionally, those with histories of childhood adversity, may have a higher level of empathy and concern for others, thus a career as a helping profession may be driven by the need to make sense of early adversity and by being of service to others (Bryce et al., 2023). During the COVID-19 pandemic, many HCPs made sacrifices for others including isolating from friends and families (Bourgault et al., 2020) and during a period of elevated distress, there may have been more opportunities to be sensitive to and attempt to alleviate the suffering of others. Indeed, neuroimaging studies have shown that showing compassion to others who may be in pain, activates parts of the brain associated with reward and protection from stress (Klimecki et al., 2014). Work has been found to be protective against the consequences of trauma (Blank et al., 2015), and MI has been shown to lead to intense focus at work as a coping mechanism following PMIEs. However, HCPs often disregard their own needs giving precedence to patient and colleagues which may have led to higher CtO and CfO which may have buffered against MI (Egan et al., 2019). Subsequently, this may offer explanation as to why there was no relationship between CtO and CfO and MI in HCPs.

2.5.3 Part B – Training Phase

The study's hypothesis that an online CMT would increase the three flows of compassion and decrease psychological distress, PTSD, and MI in HCPs who worked during COVID-19 was not supported. There are several possible explanations which may explain these findings.

For example, study recruitment commenced in (Jan 2024) which coincided with the reintroduction of increased prevention and control measures across many UK hospitals due to spikes in COVID-19 and other respiratory illnesses. Further, HCPs in the current sample may be experiencing several additional stressors which were not accounted for in this study which may have led to increased distress or MI, for example, pay disputes, strike action, the cost-of-living crisis and recruitment embargos (Sanfey, 2024). The heath care sector has the highest level of stress-related sickness absence in the UK estimated to be approx. 46% above the UK average for all workforces (Ravalier et al., 2020). Subsequently, the instability and uncertainty in the workforce following the pandemic, has led to increasing levels of work-related distress which may have impacted engagement with the CMT (Beato et al., 2021). Furthermore, HCPs often have time-limited schedules (Kotera et al., 2021) and further training demands may result in unintentional increases in stress (Rushfourth et al., 2023). Recommending that HCPs regularly practice the compassionate techniques that they learnt from the training, may have also intensified the time commitment and been overwhelming staff. However, the extent to which HCPs engaged with the training was not measured in the current study and subsequently, it is not clear how often HCPs accessed or practiced the CMT.

Findings from the current study are contrary to previous research which demonstrated that CMT consistently increased all three levels of compassion (Gilbert & Proctor, 2006, Matos et al 2017). In consideration of HCPs, CMT has shown to increase SC (Atuk et al., 2020), and CtO (Timings et al., 2021). However, these studies were conducted prior to the pandemic (Atuk et al., 2020), and at the beginning of the pandemic (Timings et al., 2022). Therefore, the findings from the current study, may not be comparable to previous research, as it was conducted during a period when HCPs were experiencing the reintroduction of COVID prevention measures, alongside experiencing several

additional occupational stressors including pay disputes, strike action (Franks, 2023), the cost-of living crisis and recruitment embargos (Sanfey, 2024). Therefore, the current study may represent HCPs who have experienced 'moral residue' which refers to the long-lasting distress or unresolved feelings that builds up and persists following a number of PMIE events (Rabin et al., 2023).

While self-directed training may better accommodate HCPs busy schedules, Bonson et al. (2023) found in a veteran sample with high MI, that the therapeutic relationship was key to intervention success. Those who have experienced PMIEs, can find engaging in support challenging due to distrust in relationships (Williamson et al., 2022) whereas, therapeutic rapport, where the individual may feel safe to share their PMIE experiences, may in itself be therapeutic (Bonson et al., 2023). However, the CMT training in the current study, did not offer this possibility as it was a self-directed training, accessed online and without therapeutic input, therefore this may have impacted on its effectiveness for this sample. Additionally, research exploring the effectiveness of compassion-based interventions for PTSD, suggests that interventions that are too brief (Galili Weinstock et al., 2019) or are introduced without providing participants with a relational template for compassion e.g., receiving compassion from peers in groups or from individuals' therapists, may impact on the effectiveness of reducing PTSD (Brähler, 2023). Therefore, it is possible that the brief online and self-directed nature of the CMT, may have impacted the non-significant findings in relation to PTSD.

Matos.'s (2017) previous CMT research was conducted with non-clinical community and student samples who may not have been exposed to high-pressured work environments or occupational stressors which limits comparability to findings in the current study. Unlike veterans who may be separated from military service prior to receiving support for MI, HCPs continue to work in these environments after a PMIE occurs. These continuous stressors may have led to the over activation of the threat and drive system which may supress the soothe system and cause difficulties for HCP accessing the flows of compassion (Gilbert, 2009). Furthermore, HCPs may be reluctant or fearful to practice compassion or access support, potentially even more so as their work is focused on extending compassion outward towards others (Gilbert et al., 2011). This has been found in other pandemics where HCPs who showed elevated signs of distress, did not fully voice their needs, or seek

support, until after the peak of the crisis (Billings et al., 2021). HCPs who completed both pre and post follow up measures in the current study, may represent HCPs who were more prone to being compassionate, were less resistant to compassion or may have experienced post traumatic growth following PMIEs, and therefore results may not be reflective of all HCPs. Similarly, the very nature of MI, and its resultant shame and guilt, may make engagement in exercises to increase compassion challenging for HCPs.

2.5.4 Strengths and Limitations

This is the first study to explore MI, ACEs and the three flows of compassion in a sample of HCPs contributing to the novel and emerging evidence base in this area (Kelly et al., 2019; Morgan et al., 2024). A strength of the study was the accessibility and anonymity that the training provided which may prove more accessible to individuals who experience high shame or stigma (Williamson et al., 2022). Additionally, it utilised an experimental, waitlist control design (Burns et al., 2011). Furthermore, the sample included a variety of professional groups including medical doctors, healthcare assistants, psychologists, psychiatrists, occupational therapists, social workers, physiotherapist, ambulance workers and student and trainees. HCPs were recruited across 5 large NHS Hospital trusts. Moreover, the fact that data collection occurred during a difficult time in the health service, provides a richness to the current findings as it has been suggested that the COVID pandemic may cause ripple effects on HCPs for years to come.

Despite the studies strengths, several limitations need to be acknowledged. The current sample were primarily white, female, and self-selecting which limits the generalisability of findings to HCPs outside this demographic. Future research should aim to include a more diverse sample. There are some methodological limitations which must be considered. For example, there was a high level of attrition in the current study. As information relating to who accessed/completed each day of the training was not collected by Qualtrics, it was not possible to determine when participants dropped out of the study at which time point. Subsequently, those who completed the training may represent a group of HCPs who may have been highly motivated or interested in the area which may not be

generalisable to other HCPs. It is unclear whether the high attrition rates were due to the online nature of the training, the research design, the 14-day commitment required by participants, or the timing of recruitment. Future research should explore reason for drop out and whether there may have been differences between those who participated in the training versus though who dropped out. However, online-based interventions have been found to be at high risk of attrition (Eyesenbach, 2005). Future research should include PPI involvement from staff who have experience MI at all stages of the research rather than just at the beginning. A greater focus on the research design with PPI involvement, may help to support how accessible the training is for participants to complete.

Part B of the research was underpowered. Therefore, the findings from the CMT may have been impacted by its small sample size which may have lacked adequate power to detect significant effects. In addition, the current study did not account for current or past mental health diagnosis, whether HCPs were currently receiving therapeutic support or whether they experienced traumatic events outside of the occupational context. These variables may have been confounding factors which may have impacted upon findings. For example, Wild et al. (2022) found that the majority of HCPs who met criteria for PTSD in their sample, reported an index trauma event which predated the COVID-19 pandemic (Wild et al., 2022). Additionally, the demographic questionnaire did not capture what area HCPs worked in. Future research should gather this information to ascertain whether distress and compassion levels may differ depending on area of work. A limitation of the current review is the measure used for MI. The MIES has not yet been validated for use in a HCP population and been criticised due to items measuring both events ("I saw things that were morally wrong") and outcomes ("I am troubled by…") which may have conflated effects of MI outcomes (Frankfurt & Frazier, 2016). However, research McEwan et al. (2023) has suggested that questionnaires which measures MI outcomes only, resulted in stronger relationships between MI and mental health outcomes. Nonetheless, the MIES was chosen as it has been used in previous UK based research with a healthcare population (Williamson et al., 2023) and because it has been utilised internationally (Plouffe et al 2021). It is unclear what specific PMIEs that participants were considering when scoring

measures of MI. It would be important for future research to consider cause and effect and ascertain the timing of the ACE event, the timing of the PMIE and the length of time between exposure to PMIE and effects. This is important as different outcomes may be observed following exposure to different types of ACEs. Further exploration through qualitative methods may offer additional insights and add a richness to the current findings.

2.5.5 Clinical Implications and Future Research

Currently, there are no empirically tested interventions designed to address MI in HCPs. Given the high rates of psychological distress, PTSD, MI, and ACEs observed in the current sample, this highlights the need for future research to continue to develop and test new and adapted interventions or training to ameliorate these adverse consequences for HCPs. As there was a high level of attrition in the present study, PPI could be used in future research to help shape and adapt the CMT training materials in order to make it accessible specifically for HCPs. Furthermore, future research should consider including psychoeducation material relating to MI and compassion specially in HCPs sample. CMT was originally designed to be delivered in a group format, perhaps future research could replicate this research in person group format rather than online and self-directed.

As Complex PTSD (CPTSD) are associated with PMIEs (Greene et al., 2023) and ACEs (Karatzias et al., 2020) and given the rates of high ACEs in the current study, future research could explore the relationship between MI, CPTSD, and compassion. Based on the study's findings, particularly that SC mediated the relationship between MI and PTSD, it seems fair to propose that clinicians working with staff should begin to interweave evidence-based SC skills and techniques within already established evidence-based treatments for psychological distress and PTSD. Furthermore, clinicians should consider the impact of ACEs and additional index traumas which may be considered 'traumatic' in adulthood in the context of occupational PMIEs. As it is suggested that HCPs may be experiencing moral residue due to an accumulation of PMIEs, adequate and timely support following PMIEs at work, may help individuals to re-process any traumatic material which may be maintaining current levels of distress and impacting on occupational and overall functioning. Future research could

examine occupational factors which may be associated with MI such as sickness absences, and performance difficulties. With high levels of the NHS workforce deciding to leave the workforce (Mahase, 2022), investment in training for clinicians, supervisors and line managers in trauma informed approaches should be prioritised. This may help with early identification, appropriate assessment, and treatment for those most impacted by MI.

2.5.6 Conclusions

The current study is the first to examine the relationships between MI, psychological distress, PTSD and the three flows of compassion in HCPs. Result showed that only lower SC was associated with higher MI and not CtO or CfO. Psychological distress, PTSD, SC, emotional and sexual abuse in childhood, were significantly related to MI in HCPs. Additionally, results suggest that SC mediated the relationship between MI and PTSD. Despite the CMT results showing non-significant findings, the training group saw SC scores increase, and psychological distress decrease which warrants further investigation. Nonetheless, it is important to consider that the findings of the CMT may be reflective of uncontrolled variables associated with the current context in which HCPs are working in. Given the prevalence and potential consequences of MI, PTSD, psychological distress and ACEs in HCPs, future research is warranted. Clinicians and services should consider the potential clinical utility of SC, compassion based CPD, and supervision for reducing MI in HCPs.

Appendix A

Appendix A Search Strategy (Syntax) For Each Database

MEDLINE

Search terms used: (Free Text)

Moral Injury	"Moral injury" or "moral distress" or "spiritual injury" or "ethical distress"
Adverse Childhood Experiences	"Adverse childhood experience*" OR "ACE*
Combine search terms and combine with AND	= 29 papers

Results returned: 29

PSYCHINFO:

Search Terms (title or abstract)

Moral Injury	"Moral injury" or "moral distress" or "spiritual injury" or "ethical distress"
Adverse Childhood Experiences	"Adverse childhood experience*" OR "ACE*
Combine search terms and combine with AND	= 17 papers

Results returned: 17

Web of Science (All databases)

Search Terms (TOPI -Separate and then combine with AND)

Moral Injury	"Moral injury" or "moral distress" or "spiritual injury" or "ethical distress"
Adverse Childhood Experiences	"Adverse childhood experience*" OR "ACE*"
Combine topic search terms with AND	= 42 papers

Results returned: 42

SCOPUS

Search Terms (TITLE, ABSTRACT AND KEYWORDS)

Appendix A

Moral Injury	"Moral injury" or "moral distress" or "spiritual injury" or "ethical distress"
Adverse Childhood Experiences	"Adverse childhood experience*" OR "ACE*”
Combine topic search terms with AND	= 12 papers

Results returned: 12.

Cochrane Library

Searched 14/01/2024 title and abstract keyword

Moral Injury	"Moral injury" or "moral distress" or "spiritual injury" or "ethical distress"
Adverse Childhood Experiences	"Adverse childhood experience*" OR "ACE*”
Combine topic search terms with AND	= 1 paper

Results returned: 1.

EMBASE searched 14/01/2024

Title and Abstract Search:

Moral Injury	"Moral injury" or "moral distress" or "spiritual injury" or "ethical distress"
Adverse Childhood Experiences	"Adverse childhood experience*" OR "ACE*”

Combine topic search terms with AND	= 7 papers

Results returned: 7

Appendix A

Google Scholar 20/01/2024

Moral Injury	“Moral injury"
Adverse Childhood Experiences	"Adverse childhood experiences”
Combine with AND	= 100 papers

Search terms = “moral injury” and “adverse childhood experiences” – first 100 results.

Appendix B Quality Assessment

Appendix B – Quality Assessment

Study: Battaglia et al., 2019					
Criteria	**Yes**	**Partially**	**No**	**N/A**	**Comment**
1. Question/objective described?	✓2				Yes. 3
2. Study design evident and appropriate?	✓2				Yes, design identified and appropriate
3.Method of participant selection described and appropriate?	✓2				Yes, the method and setting of recruitment is reported p.3
4. Subject characteristics sufficiently described?	✓2				Yes – Sufficient baseline data provided, but ethnicity not reported p.5
5.Interventional(N/A)				✓	
6. Interventional(N/A)				✓	
7. Interventional(N/A)				✓	
8. Outcome and (if applicable) exposure measure(s) well defined and robust to measurement/misclassification bias? Means of assessment reported?	✓2				Yes – Clear description of measures is provided p.4
9. Sample size appropriate?		✓ 1			Partial - Small sample size. Power referenced in discussion
10. Analytic methods described/justified and appropriate?	✓2				Yes – Analytic methods described p.4
11. Some estimate of variance is reported for the main results?	✓2				Yes – Variance estimates provided (i.e., means, standard deviations)
12. Controlled for confounding	✓2				Yes, considered based on demographics pg.5
13. Results reported in sufficient detail?	✓2				Yes – All major outcomes reported.
14. Conclusions supported by the results?	✓2				Yes – All conclusions supported by the data
Total summary quality score: 21/22 = 0.95 (strong)					

Study: Beckwith (2023)					
Criteria	**Yes**	**Partially**	**No**	**N/A**	**Comment**
1. Question/objective described?	✓2				Yes, p.34
2. Study design evident and appropriate?	✓2				Yes, design identified and appropriate
3.Method of participant selection described and appropriate?	✓2				Yes, the method and setting of recruitment is clearly reported p.35
4. Subject characteristics sufficiently described?	✓2				Yes – Sufficient data provided p.48. Ethnicity referenced but not reported.
5.Interventional(N/A)				✓	
6. Interventional(N/A)				✓	
7. Interventional(N/A)				✓	
8. Outcome and (if applicable) exposure measure(s) well defined and robust to measurement/misclassification bias? Means of assessment reported?	✓2				Yes – Clear description of measures is provided p.39
9. Sample size appropriate?	✓2				Yes, Although no reference to power analysis is made, sample size assumed appropriate due to statistically significant results
10. Analytic methods described/justified and appropriate?	✓2				Yes – Analytic methods are described and appropriate p.44
11. Some estimate of variance is reported for the main results?	✓2				Yes – Variance estimates provided (i.e., means, standard deviations) p.50
12. Controlled for confounding	✓2				Yes, p.42
12. Results reported in sufficient detail?	✓2				Yes – All major outcomes reported
14. Conclusions supported by the results?	✓2				Yes – All conclusions supported by the data
Total summary quality score 22/22 = 1 (Strong)					

Study: Boscarino et al. (2022)					
Criteria	**Yes**	**Partially**	**No**	**N/A**	**Comment**

1. Question/objective described?	✓2				Yes, p.2
2. Study design evident and appropriate?	✓2				Yes, design identified and appropriate
3.Method of participant selection described and appropriate?	✓2				Yes, the method and setting of recruitment is clearly reported p.2
4. Subject characteristics sufficiently described?	✓2				Yes – Sufficient baseline data provided, but ethnicity not reported p.6
5.Interventional(N/A)				✓	
6. Interventional(N/A)				✓	
7. Interventional(N/A)				✓	
8. Outcome and (if applicable) exposure measure(s) well defined and robust to measurement/misclassification bias? Means of assessment reported?		✓1			Partial –some measures not reported in detail, cutoff for ACE measure unclear
9. Sample size appropriate?	✓2				Yes, large sample Although no reference to power analysis sample size assumed appropriate due to statistically significant results
10. Analytic methods described/justified and appropriate?	✓2				Yes – Analytic methods are described and appropriate p.4
11. Some estimate of variance is reported for the main results?	✓2				Yes, variance reported table 1, 2 OR and CI)
12. Controlled for confounding	✓2				Yes, clear consideration on confounding variables p.4
12. Results reported in sufficient detail?	✓2				Yes, All major outcomes reported
14. Conclusions supported by the results?	✓2				Yes – All conclusions supported by the data
Total summary quality score 21/22 =0.95 (strong)					

Study: Burkett et al. (2023)

Criteria	Yes	Partially	No	N/A	Comment
1. Question/objective described?	✓2				Yes, p.31
2. Study design evident and appropriate?	✓2				Yes, design identified and appropriate
3.Method of participant selection described and appropriate?	✓2				Yes, the method and setting of recruitment is reported p.33
4. Subject characteristics sufficiently described?	✓2				Yes – Sufficient baseline data provided, but ethnicity not reported p.40
5.Interventional(N/A)				✓	
6. Interventional(N/A)				✓	
7. Interventional(N/A)				✓	
8. Outcome and (if applicable) exposure measure(s) well defined and robust to measurement/misclassification bias? Means of assessment reported?	✓2				Yes – Clear description of measures is provided p.35
9. Sample size appropriate?	✓2				Yes, sample size appropriate, power analysis p40
10. Analytic methods described/justified and appropriate?	✓2				Yes – Analytic methods are described and appropriate p.37
11. Some estimate of variance is reported for the main results?	✓2				Yes – Variance estimates provided (i.e., means, standard deviations) p.46
12. Controlled for confounding			✓0		No clear consideration of confounding variables.
12. Results reported in sufficient detail?	✓2				All major outcomes reported
14. Conclusions supported by the results?	✓2				Yes – All conclusions supported by the data
Total summary quality score 20/22 = 0.90 (strong)					

Study: Easterbrook et al. (2022)					
Criteria	**Yes**	**Partially**	**No**	**N/A**	**Comment**
1. Question/objective described?	✓2				Yes, p.2

2. Study design evident and appropriate?	✓2				Yes, design identified and appropriate
3.Method of participant selection described and appropriate?	✓2				Yes, the method and setting of recruitment is reported p.2
4. Subject characteristics sufficiently described?	✓2				Yes, sufficient baseline data provided, but ethnicity not reported p4
5.Interventional(N/A)				✓	
6. Interventional(N/A)				✓	
7. Interventional(N/A)				✓	
8. Outcome and (if applicable) exposure measure(s) well defined and robust to measurement/misclassification bias? Means of assessment reported?		✓1			Partial – Brief description of measures provided. Unvalidated/adapted measure used for ACEs p.3
9. Sample size appropriate?	✓2				Yes, sample size appropriate
10. Analytic methods described/justified and appropriate?	✓2				Yes – Analytic methods are described and appropriate p.3
11. Some estimate of variance is reported for the main results?	✓2				Yes – Variance estimates provided (i.e., means, confidence intervals) p.4
12. Controlled for confounding	✓2				Yes – Variance confounding variables considered p.3
12. Results reported in sufficient detail?	✓2				All major outcomes reported
14. Conclusions supported by the results?	✓2				Yes – All conclusions supported by the data
Total summary quality score 22/22 – 1 (strong)					

Study: Plouffe et al (2023) (Study1)					
Criteria	**Yes**	**Partially**	**No**	**N/A**	**Comment**
1. Question/objective described?	✓2				Yes, p112
2. Study design evident and appropriate?	✓2				Yes, design identified and appropriate p.113
3.Method of participant selection described and appropriate?		✓1			Yes – The method and setting of recruitment is reported (p. 113)

4. Subject characteristics sufficiently described?	✓2				Yes, sufficient baseline data provided, but ethnicity not reported p.114
5.Interventional(N/A)				✓	
6. Interventional(N/A)				✓	
7. Interventional(N/A)				✓	
8. Outcome and (if applicable) exposure measure(s) well defined and robust to measurement/misclassification bias? Means of assessment reported?	✓2				Yes – Clear description of measures is provided p.114
9. Sample size appropriate?	✓2				Yes, sample size appropriate
10. Analytic methods described/justified and appropriate?	✓2				Yes, data analytic strategy described p.114
11. Some estimate of variance is reported for the main results?	✓2				Yes – Variance estimates provided (i.e., means, confidence intervals) p.115
12. Controlled for confounding			✓0		No – Confounding not considered.
12. Results reported in sufficient detail?	✓2				Yes (p.114)
14. Conclusions supported by the results?	✓2				Yes (p.118)
Total summary quality score 19/22 = 0.86 (strong)					

Study: Ranney et al. (2022)					
Criteria	**Yes**	**Partially**	**No**	**N/A**	**Comment**
1. Question/objective described?	✓2				Yes p. 105
2. Study design evident and appropriate?	✓2				Yes, design identified and appropriate p.105
3.Method of participant selection described and appropriate?	✓2				Yes – The method and setting of recruitment is clearly reported (p. 105)
4. Subject characteristics sufficiently described?	✓2				Yes, sufficient baseline data provided p.106
5.Interventional(N/A)				✓	
6. Interventional(N/A)				✓	

7. Interventional(N/A)				✓	
8. Outcome and (if applicable) exposure measure(s) well defined and robust to measurement/misclassification bias? Means of assessment reported?		✓1			Partial – Unvalidated adapted ACE measure used (p106)
9. Sample size appropriate?	✓2				Yes, large sample size appropriate
10. Analytic methods described/justified and appropriate?	✓2				Yes, data analytic strategy described p.106
11. Some estimate of variance is reported for the main results?	✓2				Yes – Variance estimates provided (i.e., means, SD) p.106
12. Controlled for confounding	✓2				Yes – confounding variables considered p.106
12. Results reported in sufficient detail?	✓2				All major outcomes reported
14. Conclusions supported by the results?	✓2				Yes – All conclusions supported by the data
Total summary quality score 21/22 = 0.95 (strong)					

Study: Roth et al. (2021)					
Criteria	**Yes**	**Partially**	**No**	**N/A**	
1. Question/objective described?	✓2				Yes p. 4
2. Study design evident and appropriate?	✓2				Yes, design identified and appropriate p.4
3.Method of participant selection described and appropriate?	✓2				Yes – The method reported – self-selecting (p. 4)
4. Subject characteristics sufficiently described?	✓2				Yes, described in text, no demographic table p.4
5.Interventional(N/A)				✓	
6. Interventional(N/A)				✓	
7. Interventional(N/A)				✓	
8. Outcome and (if applicable) exposure measure(s) well defined and robust to measurement/misclassification bias? Means of assessment reported?	✓2				Yes – Clear description of measures is provided p.4

9. Sample size appropriate?	✓2				Yes, sample size sufficient
10. Analytic methods described/justified and appropriate?	✓2				Yes p.5
11. Some estimate of variance is reported for the main results?	✓2				Yes – Variance estimates provided (i.e., means, SD) p.6
12. Controlled for confounding	✓2				Confounding variables considered p.5
12. Results reported in sufficient detail?	✓2				All major outcomes reported
14. Conclusions supported by the results?	✓2				Yes – All conclusions supported by the data
Total summary quality score					

Study: Williamson et al. (2021)					
Criteria	Yes	Partially	No	N/A	
1. Question/objective described?	✓2				Yes, p.2
2. Study design evident and appropriate?	✓2				Yes, design identified and appropriate p.4
3.Method of participant selection described and appropriate?	✓2				Yes, design identified and appropriate although directed to another paper for more details p.2
4. Subject characteristics sufficiently described?	✓2				Yes, sufficient baseline data provided, but ethnicity not reported p3
5.Interventional(N/A)				✓	
6. Interventional(N/A)				✓	
7. Interventional(N/A)				✓	
8. Outcome and (if applicable) exposure measure(s) well defined and robust to measurement/misclassification bias? Means of assessment reported?	✓2				Yes – Clear description of measures is provided p.3
9. Sample size appropriate?	✓2				Yes, sample size sufficient
10. Analytic methods described/justified and appropriate?	✓2				Yes, p.4
11. Some estimate of variance is reported for the main results?	✓2				Yes – Variance estimates provided (i.e., means, SD

12. Controlled for confounding	✓2				Yes, confounding adjusted for p.4
12. Results reported in sufficient detail?	✓2				All major outcomes reported
14. Conclusions supported by the results?	✓2				Yes – All conclusions supported by the data

Total summary quality score 22/22 =
1 (Strong)

Study: Zerach and Levi-Belz (2022)					
Criteria	Yes	Partially	No	N/A	
1. Question/objective described?	✓2				Yes. p.653
2. Study design evident and appropriate?	✓2				Design not clearly identified but can be inferred from description of the study (p.653)
3.Method of participant selection described and appropriate?	✓2				Yes – Recruitment is reported in detail p.653
4. Subject characteristics sufficiently described?	✓2				Yes p. 654 although ethnicity not reported
5.Interventional(N/A)				✓	
6. Interventional(N/A)				✓	
7. Interventional(N/A)				✓	
8. Outcome and (if applicable) exposure measure(s) well defined and robust to measurement/misclassification bias? Means of assessment reported?	✓2				Yes – Clear description of measures is provided p.114
9. Sample size appropriate?	✓2				Yes, sample size sufficient
10. Analytic methods described/justified and appropriate?	✓2				Yes, p655
11. Some estimate of variance is reported for the main results?	✓2				Yes, Variance estimates provided (i.e., means, SD) p.656
12. Controlled for confounding	✓2				Yes, confounding variables controlled for p. 653
12. Results reported in sufficient detail?	✓2				All major outcomes reported
14. Conclusions supported by the results?	✓2				Yes – All conclusions supported by the data

Total summary quality score 22/22 = 1 = Strong

Study: Zerach et al. (2023)					
Criteria	**Yes**	**Partially**	**No**	**N/A**	
1. Question/objective described?	✓2				Yes, p3
2. Study design evident and appropriate?	✓2				Yes, design identified and appropriate p.3
3.Method of participant selection described and appropriate?	✓2				Yes – Recruitment is reported in detail p.3
4. Subject characteristics sufficiently described?	✓2				Yes p.4 although ethnicity not reported
5.Interventional(N/A)				✓	
6. Interventional(N/A)				✓	
7. Interventional(N/A)				✓	
8. Outcome and (if applicable) exposure measure(s) well defined and robust to measurement/misclassification bias? Means of assessment reported?	✓2				Yes – Clear description of measures is provided, although some measure not validated (MST)
9. Sample size appropriate?	✓2				Yes, sample size sufficient
10. Analytic methods described/justified and appropriate?	✓2				Yes, p5
11. Some estimate of variance is reported for the main results?	✓2				Yes – Variance estimates provided (i.e., means, SD
12. Controlled for confounding	✓2				Yes, confounding controlled for p.8
12. Results reported in sufficient detail?	✓2				All major outcomes reported
14. Conclusions supported by the results?	✓2				Yes – All conclusions supported by the data
Total summary quality score 22/22 = 1 = strong					

Appendix C Ergo Ethics Approval

On 15 Dec 2023, at 15:46, ergo2@soton.ac.uk wrote:

Approved by Research Integrity and Governance team - ERGO II 80865.A1

University of Southampton

ERGO II – Ethics and Research Governance Online https://www.ergo2.soton.ac.uk

Submission ID: 80865.A1
Submission Title: An investigation of a Compassionate Mind Training for moral injury, trauma and psychological distress in frontline healthcare professionals. (Amendment 1)
Submitter Name: Kathryn Mc Aree

The Research Integrity and Governance team have reviewed and approved your submission.

You may only begin your research once you have received all external approvals (e.g. NRES/HRA/MHRA/HMPPS/MoDREC etc or Health and Safety approval e.g. for a Genetic or Biological Materials Risk Assessment).

Appendix D IRAS Ethical Approval

Miss Kathryn McAree
Trainee Clinical Psychologist

National Health Service
Building 44
University of Southampton
Southampton
SO17 1BJ

Email: approvals@hra.nhs.uk
HCRW.approvals@wales.nhs.uk

20 September 2023

Dear Miss McAree

HRA and Health and Care

Study title:	**A compassionate mind training for moral injury, trauma and psychological distress in frontline healthcare staff**
IRAS project ID:	**326267**
Protocol number:	**N/A**
REC reference:	**23/HRA/2993**
Sponsor	**University of Southampton**

I am pleased to confirm that **HRA and Health and Care Research Wales (HCRW) Approval** has been given for the above referenced study, on the basis described in the application form, protocol, supporting documentation and any clarifications received. You should not expect to receive anything further relating to this application.

Please now work with participating NHS organisations to confirm capacity and capability, in line with the instructions provided in the "Information to support study set up" section towards the end of this letter.

How should I work with participating NHS/HSC organisations in Northern Ireland and Scotland?
HRA and HCRW Approval does not apply to NHS/HSC organisations within Northern Ireland and Scotland.

If you indicated in your IRAS form that you do have participating organisations in either of these devolved administrations, the final document set and the study wide governance report (including this letter) have been sent to the coordinating centre of each participating nation.
The relevant national coordinating function/s will contact you as appropriate.

Appendix E Participant Information Sheet and Consent Form

Online Participant Information Sheet and Consent form

Study Title: An investigation of moral injury, trauma and compassion in frontline healthcare professionals.
Researcher(s): Kathryn McAree
University email: kma1n21@soton.ac.uk
Ethics/ERGO no: 80865 **IRAS no:** 326267 **Version and date: 1.1. 14.11.23**

What is the research about?

My name is Kathryn McAree and I am currently completing the Doctorate in Clinical Psychology (DClinPsych) at the University of Southampton. This research is part of my doctoral thesis investigating moral injury, trauma, psychological distress, and compassion in frontline healthcare professionals.

Moral injury can occur when someone engages in, fails to prevent, or witnesses acts that conflict with their values or beliefs and when they experience betrayal by trusted others especially when this is perceived as avoidable, or they are powerless to change it. Research suggests that compassion for the self and others is a resilience factor to moral injury. This research is interested in the relationship between moral injury, trauma, psychological distress, and compassion in frontline healthcare staff.

This study was approved by the Faculty Research Ethics Committee (FREC) at the University of Southampton (Ethics/ERGO Number: *80865*

Why have I been asked to participate?
This study is hoping to recruit individuals self-identifying as frontline healthcare professionals who are currently working in a patient facing role *and* worked in a patient facing role during the COVID19 pandemic. You have been asked to participate because you responded to an advertisement regarding participation in this study and you may meet the full eligibility criteria outlined below.

Eligibility Criteria
Inclusion Criteria:

You are eligible to participate in this study if you currently work as a frontline healthcare professional and have direct patient contact. You must have worked in a patient facing role during the COVID-19 pandemic. You will need to have been employed for at least six months, be over the age of 18 years and have internet access to access online questionnaires. The online questionnaires are also mobile friendly. You will need to have a good level of English to understand the online questionnaires. If you can read through this information sheet and understand the consent statements below, your English is considered sufficient.

Exclusion Criteria:

Unfortunately, if you are currently participating in a compassion focused intervention for yourself at the time of this study, you will not be eligible to participate in the study as this could affect the conclusions made in the study. You will also not be eligible to participate in this study if you have difficulty understanding or speaking English or do not have internet access. This is because this study is an online-based study and the study materials will be presented in English, without translation or the use of interpreters being possible. However, if you have been able to read to this point, you will be considered to have sufficient English to be eligible to provide informed consent to participate in this study.

What will happen to me if I take part?

There are two parts to this study (Parts A and B). You have the ***option*** to consent to participate in just Part A or both Parts A and B. If you complete Part A, you also have the ***option*** to consent to be entered into a prize draw to win one of 5 £10 Amazon gift vouchers as a thank you for your participation. If you complete Part A and Part B, you have the ***option*** to consent to be entered into a prize draw to win one of 10 £25 Amazon gift vouchers as a thank you for participation.

Part A: If you decide to take part in this part of the study, you will be asked some demographical questions and will complete some questionnaires which will take approximately 25 minutes to complete. We are interested in staff psychological wellbeing and our questionnaires will consist of questions to measure levels of compassion towards yourself, towards others and from others. Questionnaires will also measure depression, anxiety, trauma, and moral injury. We are also interested in whether early childhood experiences may impact on current mental wellbeing and there will be a questionnaire measuring adverse childhood experiences.

You will then be asked whether you would like to consent to participate in Part B of the study. If not, your participation in the study will end here.

Part B: If you decide to participate in this part of the study as well, you will be randomly allocated to either a 2-week Compassionate Mind Training (CMT practices) group or a control group. ***(B) If you are in the Compassionate Mind training group:*** you will be sent a link to an online 20minute psychoeducational recording introducing, you to the Compassionate Mind Training (CMT) Practices. You will then be asked to listen to a brief audio recorded CMT practice each day for two weeks. These will last no longer than 20minutes. An automatic reminder email to complete the CMT practice will be sent to the email address you provide daily. After the 2-week training period you will be sent a link to repeat the questionnaires you completed in Part A again (excluding the Adverse Childhood Experiences Questionnaire). You will then be sent a debrief statement.

(B) If you are in the control group**:** you will be sent an invite to repeat the questionnaires from Part A 2-weeks after the first time you completed them. After you have completed the questionnaires, you will be sent a link to access the online CMT training . You will then be sent a debriefing statement

Are there any benefits in my taking part?

You will have access to a brief training programme that you may find beneficial for your psychological wellbeing. Your participation will help improve our current understanding of moral injury, trauma, early childhood experiences and psychological distress and improve the

interventions aimed at reducing moral injury and psychological distress and increasing compassion for frontline healthcare professionals.

Upon your completion of **Part A** of the study, you have the option to enter a prize draw to win **one of 5 £10 Amazon gift vouchers** to say thank you for participating in this study. Upon completion of both **Part A and Part B** of the study, you have the option to enter a prize draw to win **one of 10 £25 Amazon gift vouchers** to say thank you for participating.

Are there any risks involved?

There are no major risks of participating in this study, although some of the questions in the questionnaires and the training may temporarily increase some temporary emotional discomfort and a heightened awareness of uncomfortable feelings (i.e., moral injury and experiences from childhood and at work). Any discomfort should be temporary, however, if you become too uncomfortable while participating, you are able to withdraw from the study at any point. Also, if you feel any distress at any point in the study and would like some support, you are able to contact the following:

- **Registered GP**

- **Call 111:** If you need help urgently for your mental health, but it's not an emergency

- **Local A&E department:** If you or someone's life is at risk, or you do not feel you can keep yourself or someone else safe

- **Samaritans**:
  Call: 116 123.
  Email: jo@samaritans.org
  Website: https://www.samaritans.org

- **MIND**: Provides advice and support to empower anyone experiencing a mental health problem.
  Call: 0300 123 3393.
  Text: 86463 *(Monday-Friday 9am – 6pm)*
  Email: info@mind.org.uk
  Website: https://www.mind.org.uk/

- **FRONTLINE 19:** A Confidential Psychological Support Service For people working in the NHS & frontline services in the UK
  Email: contact@frontline19.com

- **SHOUT:** A free, confidential, anonymous text support service. You can text from wherever you are in the UK.
  Text: 'SHOUT' to 85258
  Website: https://giveusashout.org/

- **NHS Urgent Mental Health Helpline**: 24-hour advice and support for you, your child, your parent or someone you care for. Click the link below to find the nearest contact:
  Website: https://www.nhs.uk/service-search/mental-health/find-an-urgentmentalhealth-helpline

- **Practitioner Health:** Practitioner Health is a free, confidential NHS primary care mental health and addiction service with expertise in treating health & care professionals.
  Website: https://www.practitionerhealth.nhs.uk/contact

Email: prac.health@nhs.net
Call: 0300 0303 300f

What information will be collected, and will my participation be confidential?

Demographic information such as your age, gender, ethnicity, questions about your professional role, years of clinical experience, whether your role is full-time/part-time/voluntary, will be collected. You will also be asked for your email address, which will be kept separately, and password protected. This will be used to send study reminders, maintain contact during the study and to match you to your data across the time points for the analyses.

Your participation in this study, data, and the information we collect about you during the research will be kept **strictly confidential**. Only members of the research team and responsible members of the University of Southampton may be given access to data about you for monitoring purposes and/or to carry out an audit of the study to ensure that the research is complying with applicable regulations. Individuals from regulatory authorities (people who check that we are carrying out the study correctly) may require access to your data. All of these people have a duty to keep your information, as a research participant, strictly confidential.

All data will be stored securely on a password protected document in line with the General Data Protection Regulation (2018) and the University of Southampton policy and will be destroyed after 10 years. Details provided for the prize draw will be destroyed once the draw has taken place. Signed consent forms will be stored in a form protected by a password and Qualtrics' high-level data security processes and technologies. All participants will be sent a copy of their completed consent form.

Do I have to take part?

No, it is entirely up to you to decide whether to take part.

If you decide you want to take part: you will need to check the consent box at the bottom of this form to show you have agreed to take part. If you consent to take part, a copy of your consent will then be emailed to you. You can decide if you want to do Part A (Questionnaires only) **OR** Parts A and B (Questionnaires and random allocation to compassionate mind training). It is also up to you whether you want to be entered into the prize draw.

What happens if I change my mind?

Your participation is voluntary, and you have the right to change your mind and withdraw at any time without giving a reason during the study. You can withdraw your survey responses up to the submission of the survey by closing the survey window. You will not be able to withdraw your data after submission of your responses. This applies to each section of the study (Parts A and B). If you withdraw from the study, we will keep the demographic information about your professional role to explore in the analyses whether there are any group differences in those participating and those withdrawing.

What will happen to the results of the research?

Your personal details will remain strictly confidential. It is possible that de-identified results of this research will be reported as part of a larger research program, published in a peer-reviewed academic journal and/or published as part of the open science framework, disseminated in staff newsletters/social media accounts of participating Trusts/organisations, and presented at conferences. The research findings made available in any reports, publications or presentations will **not** include any information that can directly identify you. As per the University of Southampton policy, the data will be stored for a period of 10 years, and it will be permanently destroyed after this time.

If you would like to receive a copy of the study results, please check the relevant box below.

What happens if there is a problem?

If you have a concern about any aspect of this study, you should speak to the Chief Investigators or the research team who will do their best to answer your questions. If you remain unhappy or have a complaint about any aspect of this study, please contact the University of Southampton Research Integrity and Governance Manager (023 8059 5058, rgoinfo@soton.ac.uk).

If you remain unhappy about any aspect of this study and would like to make a formal complaint, you can contact the Head of Research Integrity and Governance, University of Southampton, on the following contact details: Email: rgoinfo@soton.ac.uk, phone: + 44 2380 595058.
Please quote the Ethics/ERGO number above. Please note that by making a complaint you might be no longer anonymous.

Where can I get more information?

If you have any questions of require further information after reading this information sheet, please do not hesitate to contact the Chief Investigator:
– Kathryn McAree at Kma1n21@soton.ac.uk

Contact details of the research team

Research Supervisors
Dr David Beattie, d.beattie@soton.ac.uk
Dr Margo Ononaiye, m.s.ononaiye@soton.ac.uk

The University of Southampton is the sponsor for the study and the data controller.

More information on your rights as a study participant is available via this link:
https://www.southampton.ac.uk/about/governance/participant-information.page

Thank you for reading this information sheet and considering taking part in this research.

CONSENT FORM FOR PART A

If you wish to participate in **Part A** of the study, please check the consent box below. A copy of your consent will then be emailed to you. By checking the box, you are consenting that:

- You have read and understood the above information and have had the opportunity to ask questions about the study.
- You agree to take part in this research project and agree for your data to be used for the purpose of this study.

- You understand your participation is voluntary and you may withdraw at any time during the data collection period without your legal rights being affected.
- You understand that should you withdraw from the study then the demographic information collected about you may still be used for the purposes analysing any group differences in those participating and withdrawing from the study.
- You understand you will not be directly identified in any reports of the research

☐ Please check this box to indicate that you consent to participating in Part A of the study (Questionnaires only).

☐ Please check this box to indicate that you consent to be entered into a prize draw to win one of 5 £10 Amazon gift vouchers at the end of your participation in Part A; this is optional.

☐ Please check this box to indicate that you would like to receive the findings of this project; this is optional.

After PART A has been completed

CONSENT FORM FOR PART B

Thank you for your participation in Part A. If you would like take part in compassionate mind training that may help with psychological wellbeing (Part B), please check the consent box below. A copy of your consent will then be emailed to you.

If you decide to participate in this part of the study as well, you will be randomly allocated to either a 2-week Compassionate Mind Training (CMT practices) group or a control group.

By ticking the box, you are consenting that:

1. You have read and understood the above information and have had the opportunity to ask questions about the study.
2. You agree to take part in this research project and agree for your data to be used for the purpose of this study.

- You understand your participation is voluntary and you may withdraw at any time during the data collection period without your legal rights being affected.
- You understand that should you withdraw from the study then the demographic information collected about you may still be used for the purposes analysing any group differences in those participating and withdrawing from the study.
- You understand you will not be directly identified in any reports of the research

☐ Please check this box to indicate that you consent to participating in Part B of the study (compassionate mind training or waitlist control)

☐ Please check this box to indicate that would like to receive the findings of this project; this is optional

☐ Please check this box to indicate that you consent to be entered into a prize draw to win one of 10 £25 Amazon gift vouchers at the end of your participation in Part B; this is optional.

Data Protection Privacy Notice

The University of Southampton conducts research to the highest standards of research integrity. As a publicly-funded organisation, the University has to ensure that it is in the public interest when we use personally-identifiable information about people who have agreed to take part in research. This means that when you agree to take part in a research study, we will use information about you in the ways needed, and for the purposes specified, to conduct and complete the research project. Under data protection law, 'Personal data' means any information that relates to and is capable of identifying a living individual. The University's data protection policy governing the use of personal data by the University can be found on its website (https://www.southampton.ac.uk/legalservices/what-we-do/data-protection-and-foi.page).

This Participant Information Sheet tells you what data will be collected for this project and whether this includes any personal data. Please ask the research team if you have any questions or are unclear what data is being collected about you.

Our privacy notice for research participants provides more information on how the University of Southampton collects and uses your personal data when you take part in one of our research projects and can be found at http://www.southampton.ac.uk/assets/sharepoint/intranet/ls/Public/Research%20and%20Integrity%20Privacy%20Notice/Privacy%20Notice%20for%20Research%20Participants.pdf

Any personal data we collect in this study will be used only for the purposes of carrying out our research and will be handled according to the University's policies in line with data protection law. If any personal data is used from which you can be identified directly, it will not be disclosed to anyone else without your consent unless the University of Southampton is required by law to

Data protection law requires us to have a valid legal reason ('lawful basis') to process and use your Personal data. The lawful basis for processing personal information in this research study is for the performance of a task carried out in the public interest. Personal data collected for research will not be used for any other purpose.

For the purposes of data protection law, the University of Southampton is the 'Data Controller' for this study, which means that we are responsible for looking after your information and using it properly.

The University of Southampton will keep identifiable information about you for 10 years after the study has finished after which time any link between you and your information will be removed.

To safeguard your rights, we will use the minimum personal data necessary to achieve our research study objectives. Your data protection rights – such as to access, change, or transfer such information - may be limited, however, in order for the research output to be reliable and accurate. The University will not do anything with your personal data that you would not reasonably expect.

If you have any questions about how your personal data is used, or wish to exercise any of your rights, please consult the University's data protection webpage (https://www.southampton.ac.uk/legalservices/what-we-do/data-protection-and-foi.page) where you can make a request using our online form. If you need further assistance, please contact the University's Data Protection Officer (data.protection@soton.ac.uk).

****

Appendix F Eligibility Screening Questionnaire

Eligibility Screening Questions

a) I consider myself to be a frontline healthcare worker.

True	
False	

b) I am currently taking part in a compassion focused therapy.

True	
False	

c) I am not currently taking part in a compassion focused therapy.

True	
False	

d) I have not been employed for at least 6 months with direct patient facing contact.

True	
False	

e) I have been employed for at least 6 months with direct patient contact.

True	
False	

f) I worked in a patient facing role during the COVID-19 pandemic.

True	
False	

Appendix G **Demographic and Professional Characteristic Questionnaire**

Participant Professional Details

Thank you for consenting to participate in Part A of the study. The following pages will ask you a few questions about you and will then take you through each of the questionnaires.

Please tick the appropriate box.

Which of the following best describes you:

Male		Female	
Non-binary		Prefer not to say	
Prefer to self-describe: _____			

Age: ☐

Ethnicity:

Asian or Asian British *Indian* *Pakistani* *Bangladeshi* *Chinese* *Any other Asian Background*		**Black, Black British** *Caribbean or African* *Caribbean* *African* *Any other Black, Black British or Caribbean background*		**Mixed or multiple ethnic groups** *White and Black Caribbean* *White and Black African White and Asian Any other Mixed or multiple ethnic background*	

White *English, Welsh, Scottish, Northern Irish, or Irish* *Gypsy or Irish Traveller* *Roma* *Any other White background*		**Other ethnic group** *Arab* *Any other ethnic group*			

Do you work for:

NHS organisation	
Non-NHS organisation	Please state:

Job role:

Student/Assistant/Trainee		**Social worker**	
Qualified Professional / Practitioner – Healthcare professional/practitioner by qualification (i.e., you have a qualification relating to healthcare		Physiotherapist	
Healthcare professional/practitioner, not by qualification, but by experience of working within a healthcare team.		Medical doctor	
GP		Support worker	
Psychiatrist		Healthcare assistant	
Psychologist		Ambulance worker	
Occupational therapist		Paramedic	
Nurse		Other (please specify):	

Employment status:

Employed full-time	
Employed part-time	
Unemployed (including looking for work	
Student	
Retired	
Self employed	
Other (please specify):	

Years of experience:

Less than 1 year	
1-5 years	
6-10 years	
More than 10 years	

Highest level of educational attainment:

Diploma	
Bachelor's degree	
Master's degree	
PhD	
Post-Graduate Degree	
Other (Please Specify)	

How many hours approximately of in-service education/training/Continuing Professional Development on self-compassion / compassionate care have you attended, since your initial registration?

None	
1-5 Hours	
6-10 Hours	

10-20 Hours	
20-30 Hours	
+30 Hours	
Can’t Remember	

Approximately how many patients experiencing covid related problems would you encounter IN AN AVERAGE WEEK during the pandemic?

None	
1-5	
6-10	
10-20	
20-30	
+30	

When working with patients during the covid pandemic - were you able to receive supervision and/ or guidance from a more experienced person?

Yes	
No	

Have you ever worked in a ward/department which specialises in working with people with covid/covid related problems?

Yes	
No	

Appendix H The Moral Injury Events Scale (MIES; Nash et al., 2013)

Instructions: Please circle the appropriate number to indicate how much you agree or disagree with each of the following statements regarding your experiences at any time since joining your post

		Strongly Disagree	Moderately Disagree	Slightly Disagree	Slightly Agree	Moderately Agree	Strongly Agree
1	I saw things that were morally wrong						
2	I am troubled by having witnessed others' immoral acts.						
3	I acted in ways that violated my own moral code or values						
4	I am troubled by having acted in ways that violated my own morals or values.						
5	I violated my own morals by failing to do something that I felt I should have done						
6	I am troubled because I violated my morals by failing to do something that I felt I should have done						
7	I feel betrayed by fellow colleagues who I once trusted						
8	I feel betrayed by public officials who I once trusted.						
9	I feel betrayed by morally wrong things done by other people						

Appendix I CORE-10 (CORE-10; Connell & Barkham, 2007)

Over the last week.....

		Not at all	Only occasionally	Sometimes	Often	Most or all the time
1	I have felt tense, anxious, or nervous.					
2	I have felt I have someone to turn to for support when needed.					
3	I have felt able to cope when things go wrong.					
4	Talking to people has felt too much for me.					
5	I have felt panic or terror.					
6	I made plans to end my life.					
7	I have had difficulty getting to sleep or staying asleep.					
8	I have felt despairing or hopeless.					
9	I have felt unhappy.					
10	Unwanted images or memories have been distressing me.					

Appendix J PTSD Checklist-5 (PCL-5; Weathers et al., 2013)

Instructions: Below are a list of problems that people sometimes have in response to a very stressful experience. Please read each problem carefully and then circle one of the numbers to the right to indicate how much you have been bothered by that problem in the past month.

		Not at all	A little bit	Moderately	Quite a bit	Extremely
1	Repeated, disturbing, and unwanted memories of the stressful experience					
2	Repeated, disturbing dreams of the stressful experience					
3	Suddenly feeling or acting as if the stressful experience were actually happening again (as if you were actually back there reliving it)					
4	Feeling very upset when something reminded you of the stressful experience					
5	Having strong physical reactions when something reminded you of the stressful experience (for example, heart pounding, trouble breathing, sweating)					
6	Avoiding memories, thoughts, or feelings related to the stressful experience					
7	Avoiding external reminders of the stressful experience (for example, people, places, conversations, activities, objects, or situations)					
8	Trouble remembering important parts of the stressful experience					
9	Having strong negative beliefs about yourself, other people, or the world (for example, having thoughts such as: I am bad, there is something seriously wrong with me, no one can be trusted, the world is completely dangerous)					
10	Blaming yourself or someone else for the stressful experience or what happened after it					
11	Having strong negative feelings such as fear, horror, anger, guilt, or shame					
12	Loss of interest in activities that you used to enjoy					
13	Feeling distant or cut off from other people					

14	Trouble experiencing positive feelings (for example, being unable to feel happiness or have loving feelings for people close to you)?					
15	Irritable behaviour, angry outbursts, or acting aggressively					
16	Taking too many risks or doing things that could cause you harm					
17	Being “super alert” or watchful or on guard					
18	Feeling jumpy or easily startled					
19	Having difficulty concentrating					
20	Trouble falling or staying asleep					

Appendix K Adverse Childhood Experiences Questionnaire (ACE-Q; Felitti et al., 1998; Merrick et al., 2017).

Our relationships and experiences—even those in childhood—can affect our health and well-being. Difficult childhood experiences are very common. Please tell us whether you have had any of the experiences listed below, as they may be affecting your health today or may affect your health in the future.

Instructions: Below is a list of 10 categories of Adverse Childhood Experiences (ACEs). From the list below, please place a tick next to each ACE category that you experienced prior to your 18th birthday.

		Please Tick
1.	Did you feel that you didn't have enough to eat, had to wear dirty clothes, or had no one to protect or take care of you?	
2.	Did you lose a parent through divorce, abandonment, death, or other reason?	
3.	Did you live with anyone who was depressed, mentally ill, or attempted suicide?	
4.	Did you live with anyone who had a problem with drinking or using drugs, including prescription drugs?	
5.	Did your parents or adults in your home ever hit, punch, beat, or threaten to harm each other?	
6.	Did you live with anyone who went to jail or prison?	
7.	Did a parent or adult in your home ever swear at you, insult you, or put you down?	
8.	Did a parent or adult in your home ever hit, beat, kick, or physically hurt you in any way?	
9.	Did you feel that no one in your family loved you or thought you were special?	
10.	Did you experience unwanted sexual contact (such as fondling or oral/anal/vaginal intercourse/penetration)?	
11.	I have not had any experiences listed above	

Appendix L The Compassionate Engagement and Action Scales (CEAS; Gilbert et al, 2017).

Self-compassion

When things go wrong for us and we become distressed by setbacks, failures, disappointments, or losses, we may cope with these in different ways. We are interested in the degree to which people can **be compassionate with <u>themselves</u>**. We define compassion as "a sensitivity to suffering in self and others with a commitment to try to alleviate and prevent it." This means there are two aspects to compassion. The *first* is the ability to be motivated to engage with things/feelings that are difficult as opposed to trying to avoid or supress them. The *second* aspect of compassion is the ability to focus on what is helpful to us. Just like a doctor with his/her patient. The first is to be motivated and able to pay attention to the pain and (learn how to) make sense of it. The second is to be able to take the action that will be helpful. Below is a series of questions that ask you about these two aspects of compassion.

Please read each statement carefully and think about how it applies to you if you become distressed.

Please rate the items using the following rating scale:

Never 1 2 3 4 5 6 7 8 9 10 Always

Part 1
These questions ask you about how motivated you are, and able to engage with distress when you experience it. So:

When I'm distressed or upset by things...

1	I am *motivated* to engage and work with **my distress** when it arises. **Never** 1 2 3 4 5 6 7 8 9 10 **Always**
2	I *notice* and am *sensitive* to **my distressed** feelings when they arise in me. **Never** 1 2 3 4 5 6 7 8 9 10 **Always**
3	r) I avoid thinking about **my distress** and try to distract myself and put it out of my mind. **Never** 1 2 3 4 5 6 7 8 9 10 **Always**
4	I am *emotionally moved* by **my distressed** feelings or situations. **Never** 1 2 3 4 5 6 7 8 9 10 **Always**

5	I t*olerate* the various feelings that are part of **my distress**. **Never** 1 2 3 4 5 6 7 8 9 10 **Always**
6	I *reflect* on and make sense of **my feelings of distress**.
	Never 1 2 3 4 5 6 7 8 9 10 **Always**
7	r) I do not tolerate being **distressed.** **Never** 1 2 3 4 5 6 7 8 9 10 **Always**
8	I am *accepting, non-critical and non-judgemental* of **my feelings of distress**. **Never** 1 2 3 4 5 6 7 8 9 10 **Always**

Part 2

These questions relate to how you actively cope in compassionate ways with emotions, thoughts and situations that distress you. So:

When I'm distressed or upset by things...

1	I direct my a*ttention* to what is likely to be helpful to **me**. **Never** 1 2 3 4 5 6 7 8 9 10 **Always**
2	I t*hink* about and come up with helpful ways to cope with **my** distress. **Never** 1 2 3 4 5 6 7 8 9 10 **Always**
3	r) I don't know how to help **myself**. **Never** **1** 2 3 4 5 6 7 8 9 10 **Always**
4	I take the *actions* and do the things that will be helpful to **me.** **Never** 1 2 3 4 5 6 7 8 9 10 **Always**
5	I create **inner** feelings of *support, helpfulness and encouragement*. **Never** 1 2 3 4 5 6 7 8 9 10 **Always**

Compassion <u>to</u> others

When things go wrong for other people and they become distressed by setbacks, failures, disappointments, or losses, we may cope with their distress in different ways. We are interested in the degree to which people can be **compassionate to others.** We define compassion as "*a sensitivity to suffering in self and others with a commitment to try to alleviate and prevent it.*" This means there are two aspects to compassion. The *first* is the ability to be motivated to engage with things/feelings that are difficult as opposed to trying to avoid or supress them. The *second* aspect of compassion is the ability to focus on what is helpful. Just like a doctor with his/her patient. The first is to be motivated and able to pay attention to the pain and (learn how to) make sense of it. The second is to be able to take the action that will be helpful. Below is a series of questions that ask you about these two aspects of compassion. Therefore, read each statement carefully and think about how it applies to you when **people in your life** become distressed. Please rate the items using the following rating scale:

Please rate the items using the following rating scale:

Never 1 2 3 4 5 6 7 8 9 10 Always

Part 1 – These are questions that ask you about how motivated you are, and able to engage with other people's distress when they are experiencing it. So:

When others are distressed or upset by things…

1	I am *motivated* to engage and work with **other peoples'** distress when it arises. **Never** 1 2 3 4 5 6 7 8 9 10 **Always**
2	I *notice*, and *am sensitive* to distress in **others** when it arises. **Never** 1 2 3 4 5 6 7 8 9 10 **Always**
3	r) I avoid thinking about **other people's** distress, and try to distract myself and put it out of my mind. **Never** 1 2 3 4 5 6 7 8 9 10 **Always**
4	I am *emotionally moved* by expressions of distress in **others.** **Never** 1 2 3 4 5 6 7 8 9 10 **Always**
5	I t*olerate* the various feelings that are part of **other people's** distress. **Never** 1 2 3 4 5 6 7 8 9 10 **Always**
6	I *reflect* on and make sense of **other people's** feelings of distress. **Never** 1 2 3 4 5 6 7 8 9 10 **Always**

7	r) I do not tolerate **other people's** distress.											
	Never	1	2	3	4	5	6	7	8	9	10	**Always**
8	I am *accepting, non-critical and non-judgemental* of **other people's** distress.											
	Never	1	2	3	4	5	6	7	8	9	10	**Always**

Part 2

These questions relate to how you actively respond in compassionate ways when other people are distressed. So:

When others are distressed or upset by things...

1	I direct *attention* to what is likely to be helpful to **others**											
	Never	1	2	3	4	5	6	7	8	9	10	**Always**
2	I t*hink* about and come up with helpful ways for them to cope with **their distress.**											
	Never	1	2	3	4	5	6	7	8	9	10	**Always**
3	r) I don't know how to help people when **they are distressed**.											
	Never	1	2	3	4	5	6	7	8	9	10	**Always**
4	I take the *actions and do the things* that will be helpful to **others.**											
	Never	1	2	3	4	5	6	7	8	9	10	**Always**
5	I express feelings of *support, helpfulness and encouragement* **to others**.											
	Never	1	2	3	4	5	6	7	8	9	10	**Always**

Compassion <u>from</u> Others

When things go wrong for us and we become distressed by setbacks, failures, disappointments or losses, others may cope with our distress in different ways. We are interested in the degree to which you feel that **important people in your life can be compassionate to your distress.** We define compassion as "*a sensitivity to suffering in self and others with a commitment to try to alleviate and prevent it."* This means there are two aspects to compassion. The *first* is the ability to be motivated to engage with things/feelings that are difficult as opposed to trying to avoid or supress them. The *second* aspect of compassion is the ability to focus on what is helpful to us or others. Just like a doctor with

his/her patient. The *first* is to be motivated and able to pay attention to the pain and (learn how to) make sense of it. *The second* is to be able to take the action that will be helpful. Below is a series of questions that ask you about these two aspects of compassion.

Please read each statement carefully and think about how it applies to the **important people in your life** when you become distressed.

Please rate the items using the following rating scale:

Never 1 2 3 4 5 6 7 8 9 10 Always

Part 1 These are questions that ask you about how motivated you are, and able to engage with <u>other people's</u> distress when they are experiencing it. So,

When <u>others</u> are distressed or upset by things...

1	**Other people** are actively motivated to engage and work with my distress when it arises
	Never 1 2 3 4 5 6 7 8 9 10 **Always**
2	**Others** notice and are sensitive to my distressed feelings when they arise in me.
	Never 1 2 3 4 5 6 7 8 9 10 **Always**
3	r) **Others** avoid thinking about my distress, try to distract themselves and put it out of their mind.
	Never 1 2 3 4 5 6 7 8 9 10 **Always**
4	**Others** are emotionally moved by my distressed feelings.
	Never 1 2 3 4 5 6 7 8 9 10 **Always**
5	**Others** tolerate my various feelings that are part of my distress.
	Never 1 2 3 4 5 6 7 8 9 10 **Always**
6	**Others** reflect on and make sense of my feelings of distress.
	Never 1 2 3 4 5 6 7 8 9 10 **Always**
7	r) **Others** do not tolerate my distress.
	Never 1 2 3 4 5 6 7 8 9 10 **Always**

8	**Others** are accepting, non-critical and non-judgemental of my feelings of distress.											
	Never	1	2	3	4	5	6	7	8	9	10	**Always**

Part 2

These questions relate to how others actively cope in compassionate ways with emotions and situations that distress you. So:

When I'm distressed or upset by things....

1	**Others** direct their attention to what is likely to be helpful to me											
	Never	1	2	3	4	5	6	7	8	9	10	**Always**
2	**Others** think about and come up with helpful ways for me to cope with my distress.											
	Never	1	2	3	4	5	6	7	8	9	10	**Always**
3	r) **Others** don't know how to help me when I am distressed											
	Never	1	2	3	4	5	6	7	8	9	10	**Always**
4	**Others** take the actions and do the things that will be helpful to me.											
	Never	1	2	3	4	5	6	7	8	9	10	**Always**
5	**Others** treat me with feelings of support, helpfulness and encouragement.											
	Never	1	2	3	4	5	6	7	8	9	10	**Always**

Appendix M Online Debrief Statement

Debriefing Form

Study Title: An investigation of moral injury, trauma, psychological distress, and compassion in frontline healthcare professionals. **Ethics/ERGO number:** 80865
Researcher(s): Kathryn McAree
University email(s): kma1n21@soton.ac.uk
Version and date: Version 1.1 25.06.23

Thank you for taking part in our research project. Your contribution is very valuable and greatly appreciated.

Purpose of the study

Research has shown that self-compassion may be a resilience factor to moral injury and reduce psychological distress in healthcare professionals, however, research with professionals working directly with NHS and non-NHS patients is limited. The aim of this research was to explore whether a brief online Compassionate Mind Training increased the three flows of compassion (compassion to self, compassion to others and compassion from others) and in turn reduce moral injury and psychological distress in frontline healthcare professionals. We also collected information on depression, anxiety, trauma, and adverse childhood experiences as higher levels of these are associated with moral injury.

The data collected for this research is currently being analysed by the chief researcher. It is expected that participants who reported lower levels of compassion (to self, to others and from others) at the start of the study also reported higher levels of moral injury, adverse childhood experiences, trauma, and psychological distress. It is expected that by the end of their participation, participants will experience an increase in their levels of compassion and report a decrease in moral injury, trauma, and psychological distress.

Unfortunately, we are not able to provide individual results, however, your data will help improve our current understanding of this area and improve the interventions aimed at improving compassion towards self and others and reducing moral injury and psychological distress among healthcare professionals.

This project did not use any deception. Once again, the results of this study will not include your name or any other identifying information.

You may print a copy of this summary if you wish and if you would like a summary of the final research findings once the project is completed and did not state this on your initial consent statement, you can check the below.

Any discomfort resulting from the training or questionnaires should be temporary, however, if you continue to feel any discomfort or are in distress and would like some support, you are able to contact the Samaritans, free at any time, from any phone on 116 123.
If you have any further questions, you can contact the Chief Investigator:

Kathryn McAree - Kma1n21@soton.ac.uk

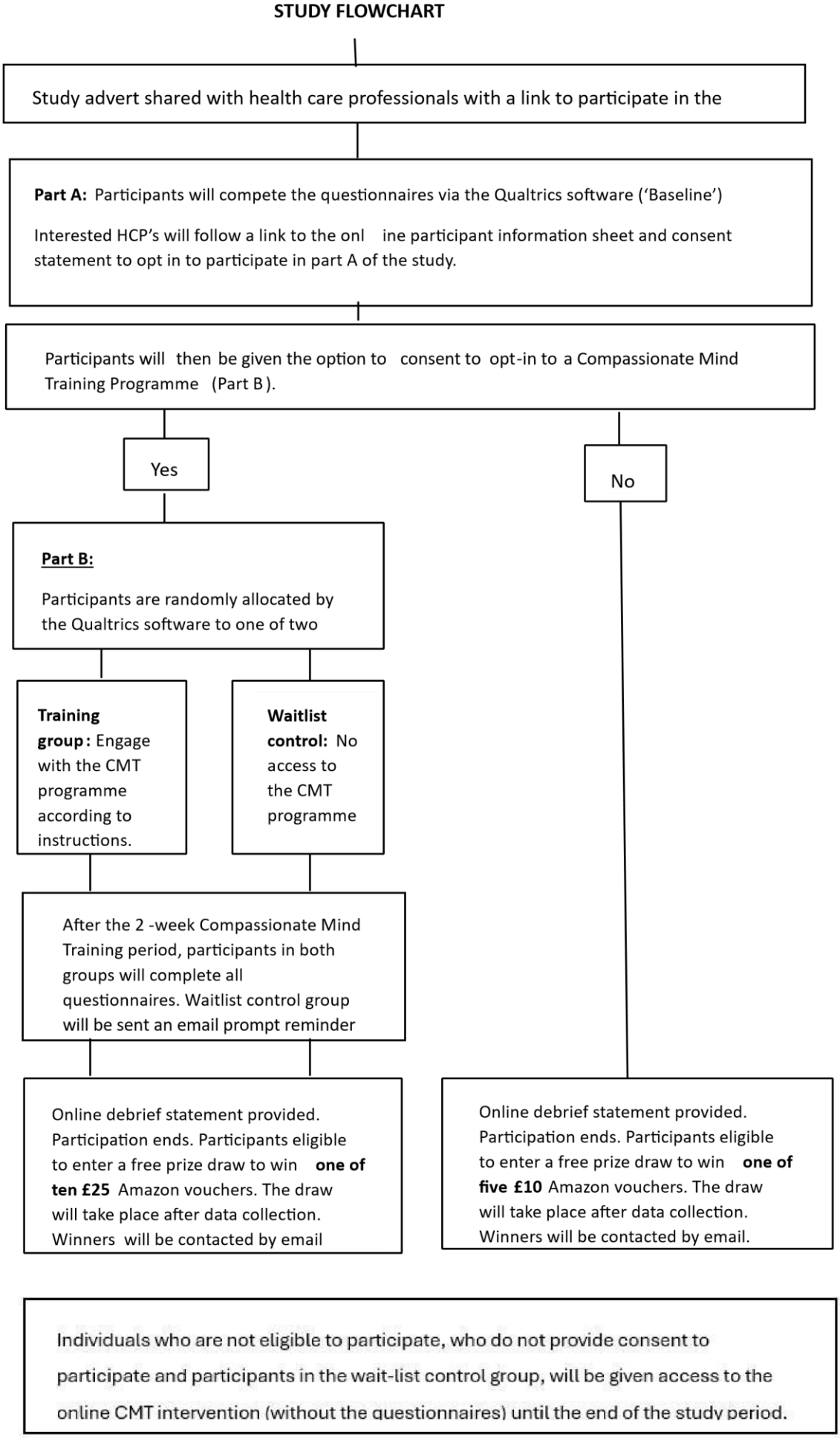
If you have questions about your rights as a participant in this research, or if you feel that you have been placed at risk, you may contact the University of Southampton Head of Research Ethics and Clinical Governance (023 8059 5058, rgoinfo@soton.ac.uk).

Thank you for your participation in this research.

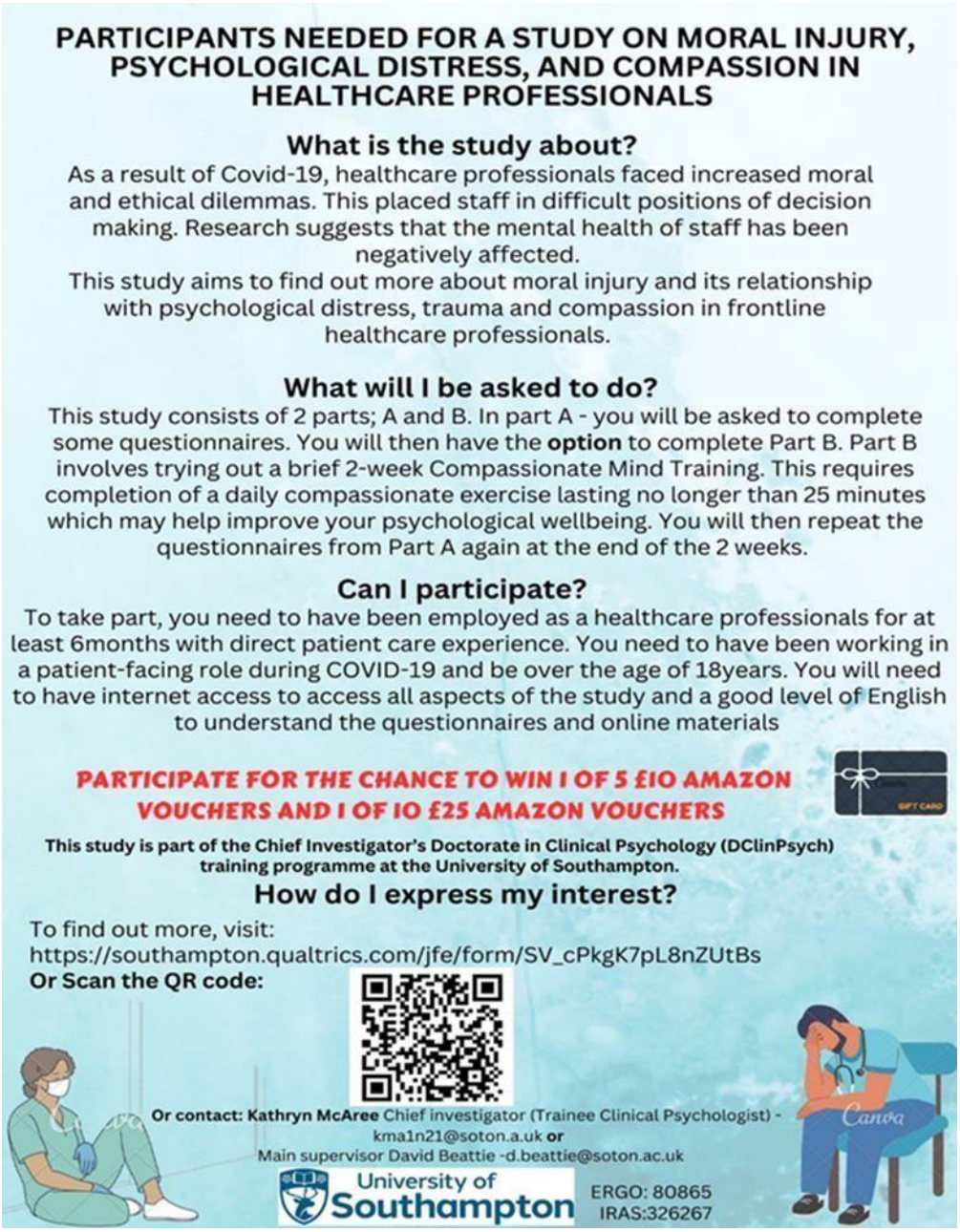
If you did not have access to the training before, or would like access to it again, please click on the following link which will be active until add date:

☐ Please check this box to indicate that would like to receive the findings of this project.

Appendix N Study Flowchart



Appendix O Study Advertisement



Appendix P Faculty of Health Sciences Recruitment Email

From: Fiona Brewer <F.Brewer@soton.ac.uk>
Sent: 03 January 2024 11:54
To: Kathryn Mc Aree <K.Mc-Aree@soton.ac.uk>; Hsreso <hsreso@soton.ac.uk>
Subject: RE: Study Advert Dissemination

Dear Kathryn,

Sure, could you send over details of the study advert?

Do you have a deadline date? The next newsletter for the School of Health Sciences (reaching healthcare students) is due out towards the end of February.

I can certainly share on twitter and Facebook.

Many thanks

Fiona

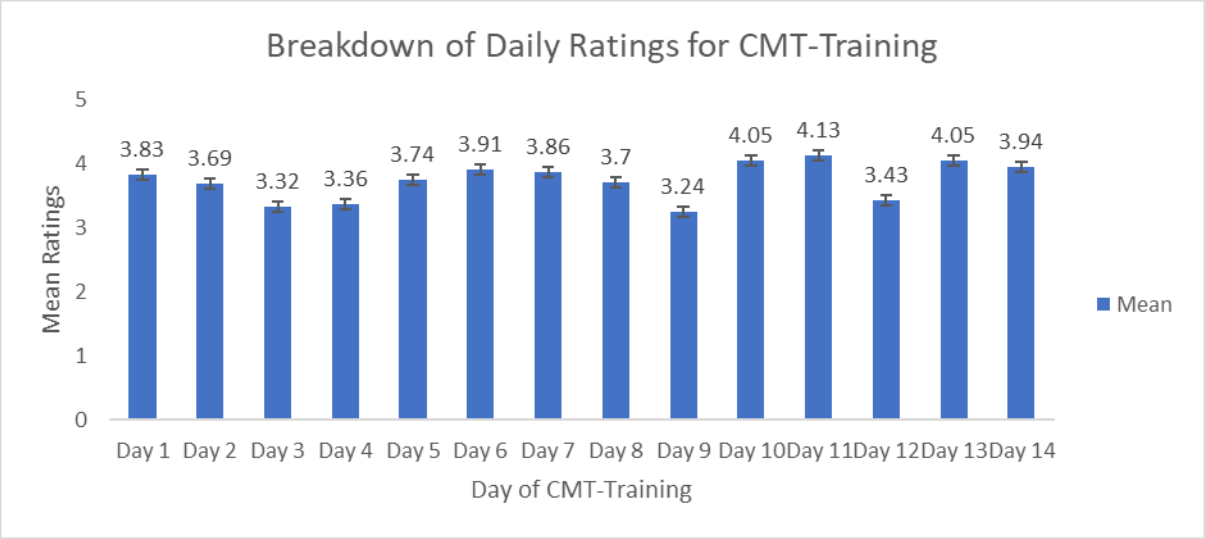
From: Kathryn Mc Aree <K.Mc-Aree@soton.ac.uk>
Sent: 29 December 2023 14:09
To: Hsreso <hsreso@soton.ac.uk>; Fiona Brewer <F.Brewer@soton.ac.uk>
Subject: Study Advert Dissemination

Dear Faculty of Health Sciences ,

My name is Kathryn McAree and I am a final year Trainee Clinical Psychologist currently on the Doctorate in Clinical Psychology (DClin) course at the University of Southampton.

For my thesis, I am investigating the impact of a brief compassionate mind training on moral injury, trauma, and psychological distress in frontline healthcare workers who worked during the COVID-19 pandemic. I am hoping to recruit around 150 healthcare professionals and I was wondering if you could please share my study advert in your faculty newsletter

Appendix Q Breakdown of the Daily Ratings for CMT



Appendix R Additional Analysis of the MIES Subscale Score

Point Biserial Correlations between ACE-Q items and MI Subscales.

ACE-Item	MI-Self	MI-Other	MI-Betrayal
Emotional abuse	.152	.151	.152
Physical abuse	-.141	.050	-.015
Sexual abuse	.155	.127	.205**
Emotional neglect	.119	.017	.059
Physical neglect	-.027	.104	.010
Separation/Divorce	.007	.144	.074
Domestic violence	.070	.189*	.085
Substance abuse	.025	.143	.003
Mental Illness	-.029	.024	.029
Family Incarceration	.027	.098	.162*

Baseline Means, Standard Deviations, and Correlations Matrix for MI Subscale Correlations

Measure	M (SD)	SC	CtO	CfO	CORE	PCL	ACE	MI-total	MI-Self	MI-Other	MI-Betrayal
MI-Total	32.26 (10)	-.224**	-.020	-.005	.255**	.369**	.147	1			
MI-Self	11.76 (5.91)	-.261**	-.037	.078	.256**	.326**	.058	.854**	1		
MI-Other	8.15 (2.84)	-.102	-.020	-.071	.121	.200*	.188*	.751**	.509**	1	
MI-Betrayal	12.34 (4.10)	-.100	.019	-.076	.171*	.294**	.145	.694**	.291**	.409**	1

Note. M=Mean; SD = Standard Deviation; SC = Self-Compassion; CtO = Compassion towards others; CfO = Compassion from others; CORE = psychological distress; PCL = Post Traumatic Stress Disorder; ACE = Adverse Childhood Experiences; MI-total = MI total score, MI-Self = PMIE perpetrated by self, MI-Other = PMIEs perpetrated by others, MI-betrayals -PMIE following betrayal from leaders. *. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed)

Means and Standard Deviations for MIES subscale scores.

	Baseline (n=157)		Training (n=21)		Waitlist (n=12)	
Measure	*M (SD)*	Range	*Pre M (SD)*	Post M (SD)	*Pre M (SD)*	Post M (SD)
MI-Self	11.76 (5.91)	4-24	10.33(5.06)	11.29(5.06)	12.33(6.57)	12.75(6.93)
MI-Other	8.15 (2.84)	2-12	8.95(2.52)	8.05(2.67)	8.08(3.29)	7.67(2.61)
MI- Betrayal	12.34 (4.05)	3-18	12.52(3.66)	12.14(3.85)	11.92(5.0)	11.83(3.88)

Frequency of participants meeting clinical cuts of for Baseline study measures

Measure	N *(%)*
ACE-Q Above 4	37 (24%)
CORE Above 11	94 (22%)
CORE Above 20	28 (18%)
PTSD Above 31	32 (20%)

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