MORAL INJURY: ASSESSING FORENSIC SECURE CARE & A PSYCHOMETRIC TOOL

by

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Thesis Overview

This thesis is submitted in partial fulfilment of a Clinical Psychology Doctorate and includes a literature review, empirical paper, and press release. The topic considers Moral Injury (MI): a type of trauma characterised by shame, guilt, and inner anguish that follows a violation of moral beliefs through transgressive acts.

The literature review includes a meta-analysis of the psychometric properties of the Moral Injury Event Scale (MIES). A systematic search found 42 records up to April-2022 reporting reliability data using Cronbach's Alpha. The findings support the tool as internally consistent based on pooled estimates at Full-scale and Sub-scale levels. There was high heterogeneity and inconsistencies across studies, although the estimates remained above acceptable levels throughout moderator analyses. While it's not possible to categorise the tool as psychometrically sound due to the limited reliability and validity properties in these findings, it does support the tool as internally consistent across contexts.

MI was considered relevant for a forensic secure care context due to the moral challenges and transgressive acts experienced by this population. The empirical paper presents a cross-sectional psychometric study assessing MI prevalence and its clinical associations within a UK secure care population (n=38). The results indicate that MI scores were moderate-to-high and associated with trauma, guilt, and poorer quality-of-life, but not shame or self-compassion. This study supports MI assessments within secure care settings and recommends that services and professionals should consider the moral aspects of traumatic experiences to enhance their intervention and rehabilitation strategies.

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Glossary of Terms

B	Betrayal
BMIS	Brief Moral Injury Screen
CI	Confidence Interval
ITQ	International Trauma Questionnaire
M	Mean
M3IQ	Modified Military Moral Injury Questionnaire
MI	Moral Injury
MIAS	Moral Injury Appraisals Scale
MIES	Moral Injury Event Scale
MIESS-C	Moral Injury Exposure and Symptom Scale-Civilian
MIOS	Moral Injury Outcome Scale
MIQ-M	Moral Injury Questionnaire-Military Version
MISS-M (SF)	Moral Injury Symptoms Scale-Military Version (Short-Form)
MISY	Moral Injury Scales for Youth
MORIS	Moral Injury Scale
PMIEs	Potentially Morally Injurious Events
PTSD	Post-Traumatic Stress Disorder
QUADAS-2	Quality Assessment of Diagnostic Accuracy Studies
ReQoL	Recovering Quality of Life
SCS-SF	Self-Compassion Scale-Short Form
SD	Standard Deviation
SSGS	State Shame and Guilt Scale
TO	Transgression-Other
TS	Transgression-Self
VMI	Veterans Metrics Initiative

LITERATURE REVIEW: A META-ANALYSIS OF THE INTERNAL CONSISTENCY OF THE MORAL INJURY EVENT SCALE

Abstract

Background: The Moral Injury Event Scale (MIES) (Nash et al., 2013) is a brief screening tool for measuring exposure to potentially morally injurious event(s) and any related distress. At its creation, it reported good psychometric properties and its use has extended beyond different contexts and populations.

Aim: There exists a lack of synthesis about the MIES' psychometric properties in its various uses across the literature. To address this gap, a meta-analysis was undertaken to understand its properties and identify study characteristics associated with variability.

Method: A systematic search of studies reporting reliability and validity data for the MIES via electronic databases (PsychINFO; PTSD Pubs; MEDLINE; Scopus; Web of Science) was undertaken, resulting in a total of 42 records up to April 2022.

Results: There were few papers providing data on test-retest or inter-rater reliability, so the review focused on alpha coefficients to estimate pooled effects. The findings support the MIES as an internally consistent tool based on alpha estimates, at both Full-scale (α=.88) and Sub-scale (α=.82-.92) levels, and above acceptable levels across moderator analyses ($\alpha \geq .70$). The review uncovered high heterogeneity and inconsistencies in its administration and modifications, particularly in non-military and non-US settings, although alpha estimate classifications were relatively resilient to subgroup differences.

Conclusion: The findings support the MIES as containing items that are consistent in the measurement of the same construct for assessing potentially morally injurious events and symptoms based on pooled alpha estimates at both Full-scale and Sub-scale levels.

1.1 Introduction

1.1.1 Background

Moral Injury (MI) is a form of psychological trauma resulting from violating deeply held moral beliefs and is characterised by guilt, shame, loss of trust, and inner turmoil (Litz et al., 2009; Shay, 1995). The construct represents an increasing awareness of stressors and psychological experiences beyond physical threats following traumatic events. The criteria for Post-Traumatic Stress Disorder (PTSD) are mainly fear and anxiety based while MI considers moral emotional experiences and beliefs (Bryan et al., 2016). MI and PTSD share similarities in symptomology, expression, and occurrence, including avoidance, maladaptive behaviours, psychological distress, self-blame, and social withdrawal (Hall et al., 2022; Jinkerson, 2016; Litz et al., 2009). While research supports MI as a distinct construct (Bryan et al., 2016), a sizeable minority of patients can present with both MI and PTSD following traumatic experiences (Bryan et al., 2016; Hall et al., 2022; Williamson et al., 2020). Although MI and PTSD share similarities, their underlying function differs. For instance, MI encourages self-protective behaviours to avoid feeling shame or guilt, while for PTSD it may be to assuage safety concerns.

MI conceptual models propose that Potentially Morally Injurious Events (PMIEs) lead to perceived transgressions and betrayals that disturb an individual's moral code and expectations about what is right and wrong (Jinkerson, 2016; Litz et al., 2009; Shay, 1995). Cognitive frameworks identify the appraisal of events as the mechanism in which painful discrepancies occur concerning stressor(s) and personal identity or meaning (Jinkerson, 2016). Social functional models argue that moral emotions are necessary for group cohesion

and maintaining interpersonal relationships, so moral pain is normal and non-pathological (Farnsworth et al., 2017). However, the emotional, behavioural, and functional consequences following PMIEs distinguish MI from moral pain. Much like PTSD, not everyone will develop MI following events, requiring not only assessments of exposure but vulnerability and resilience characteristics.

According to meta-analyses, MI is consistently associated with increased psychological distress and worsening treatment outcomes and functioning (Hall et al., 2022; McEwen et al., 2020). Recent developments have sought to operationalise and measure MI as a distinct psychological construct, including psychometric tools for evaluating PMIEs and related distress (Bryan et al., 2016; Koenig et al., 2019; Nash et al., 2013). Psychometric design studies have reported small to moderate correlations with other psychological distress measures supporting MI as a distinct but clinically meaningful construct (Bryan et al., 2016; Currier et al., 2018; Nash et al., 2013). Several tools have emerged recently to quantify moral distress and its health-related effects. These developments will help advance the field and support innovation and evidence-based intervention tailoring.

1.1.2 Moral Injury Psychometric Evaluation

As an emerging field, there are ongoing debates about the MI construct and the circumstances in which it is experienced and measured (Koenig et al., 2019). MI is not a diagnostic category, and there are ongoing discussions about whether it should be considered as such. Debates about identification centre on the nature of MI and whether it's important to assess PMIEs, MI-related distress, or both. MI measures differ in whether they are multidimensional and assess exposure to events and distress or are unidimensional and focus

on distress only (Koenig et al., 2019). There currently exists no gold standard for measuring MI (Koenig et al., 2019; Kolbe & de Melo-Martin, 2022) and the situation is complicated by broader debates about what constitutes MI and PMIEs. McEwen et al. (2020) critiqued the literature for conflating the measurement of both PMIEs and symptoms as it diluted the understanding between events and their potential negative psychological consequences. However, as Koenig et al. (2019) point out, an advantage in measuring both exposure and distress is it enables assessments about what may be underpinning symptomology, thereby enhancing clinical utility.

Psychometric assessment provides the opportunity to evaluate constructs on a larger scale and provides actuarial advantages, helping refine appropriate measurement and intervention strategies (Bryan et al., 2016; Currier et al., 2018; Koenig et al., 2019; Nash et al., 2013). Internally consistent and valid tools will develop a comprehensive picture of MI, helping clinicians assess patient experiences and possible distress resolution. Without reliable and valid tools, researchers and clinicians may inaccurately pathologize MI expressions as other aetiologies, limiting the potential for understanding the circumstances leading to MI. Measurement tools represent a methodologically sound way of assessing psychological distress concepts. Conceptually valid and psychometrically sound tools can evaluate MI's prevalence and perceived intensity which is a necessary precursor to addressing associated psychological distress. Assessment tools will enable clinicians and researchers to identify MI and develop and incorporate alternative strategies for alleviating MI-related distress, which may not yet be considered part of existing evidence-based intervention strategies.

The Moral Injury Event Scale (MIES) (Nash et al., 2013) represents one of the first and most used tools in the field (Hall et al., 2022; Koenig et al., 2019; McEwen et al., 2020). It

was initially developed in two large US military samples to measure PMIE exposure and distress, focusing on distinctive MI features not adequately accounted for by PTSD criteria (Bryan et al., 2016; Nash et al., 2013). The measure comprises individual statements about exposure and psychological states using general terms about events and experiences. Assessors rate items from 1 (‘*Strongly Agree’*) to 6 (‘*Strongly Disagree’*) translating lower scores as indicating higher MI-related exposure and distress. The preliminary psychometric properties yielded a nine-item tool with two sub-scales of Transgression (6-items) and Betrayal (3-items) (Nash et al., 2013), and reported good internal consistencies at Full-scale (α=.90) and Sub-scale (α=.82-.89) levels. Bryan et al. (2016) further evaluated the tool to address its initial design limitations (e.g., all-male sample) which led to a three-factor sub-scale model and the splitting of Transgression into Transgression-Other (2-items, e.g., ‘*I saw things that were morally wrong*’) and Transgression-Self (4-items, e.g., ‘*I acted in ways that violated my own moral code*’), while retaining Betrayal (3-items, e.g., ‘*I feel betrayed by leaders who I once trusted*’) (Bryan et al., 2016). Although the initial psychometric properties were promising, the researchers recommended further evaluation (Bryan et al., 2016; Nash et al., 2013).

There exists a lack of synthesis about psychometric tools within the MI assessment field. Since the MIES’ creation, other tools have emerged that differ in their scope and focus on PMIEs, MI-related distress, and target population, with many designed within and for military contexts (Koenig et al., 2019). Like all psychometrics, there are trade-offs in depth and breadth, and the MIES is a self-report tool designed for quick administration. Tools that incorporate in-depth comprehensive history taking and event details lack empirical data about their psychometric properties. The Moral Injury Scale (MORIS) (Williamson et al., 2020), Moral Injury Outcome Scale (MIOS) (Yeterian et al., 2019), and Moral Injury

Symptoms Scale-Military Version (MISS-M) (Koenig et al., 2018) represent in-depth multidimensional tools about moral transgressions; however, few have reported psychometric properties empirically. Although useful in comprehensive assessments, the screening potential of longer instruments are at a disadvantage due to their length.

The MIES is practical in that it contains nine items covering multidimensional characteristics using general terms, although it does include items specifically for US military settings. Its practicality likely explains its wide use and why it represents a reference point for other tools including the Moral Injury Appraisals Scale (MIAS; 11-item) (Nickerson et al., 2015), Moral Injury Exposure and Symptom Scale-Civilian (MIESS-C; 10-item) (Fani et al., 2021), Moral Injury Scales for Youth (MISY) (Chaplo et al., 2019), Moral Injury Symptoms Scale-Military Version (MISS-M) (Koenig et al., 2018) and Modified Military Moral Injury Questionnaire (M3IQ) (Hodgson et al., 2021). Given its status as a widely used and referenced tool, the MIES is a worthwhile instrument for consideration when synthesising information about the MI assessment field.

1.1.3 Focus and Scope

The complexity of morality and by extension MI present challenges for determining conceptual clarity and methodological assessment. If services responding to MI are to develop appropriate strategies, they will require reliable assessment tools. Reducing MI to psychometric assessment requires an appropriate review of existing methods. Although initial studies of the MIES properties were promising, further evaluation across different contexts is necessary to help clinicians and researchers select suitable assessment tools.

Investigating sample and administration variability could also help inform how certain factors might affect the measure's reliability.

Systematically pooling psychometric properties through meta-analysis generates estimates about a tool's qualities and helps inform future research and clinical applications. Meta-analyses can assess the potentially influential contexts and characteristics impacting psychometric properties. Reliability is an important property as it provides information about measurement precision (Slaney, 2017) and reflects how accurately scores represent a construct (Flake et al., 2017). Reliability is not a stable property and changes across contexts, meaning it is necessary to assess multiple applications (Slaney, 2017) and to mitigate the erroneous practice of inferring reliability from previous administrations and contexts (Rubio-Aparicio et al., 2020; Vacha-Haase et al., 2000). Different strategies exist for determining reliability including temporal stability (e.g., test-retest reliability), inter-rater/intra-rater reliability, and internal consistency (e.g., alpha coefficient) which reflects item or sub-scale correlation, typically reported as Cronbach's Alpha (Cronbach, 1951). Generally, acceptable internal consistency levels of Cronbach's Alpha for clinical and research purposes are minimally above α=.70 (Nunnally, 1975; Reuterberg & Gustafsson, 1992) to ideally above α=.90 (Nunnally & Bernstein, 1993).

1.1.3.1 Aims and Objectives

To address gaps in the literature, a meta-analysis was undertaken to assess the MIES' psychometric properties. It aimed to answer: what is the MIES' overall reliability and validity? And what factors, including sample characteristics, study design, and assessment method, might affect these estimates?

1.2 Methodology

1.2.1 Search Strategy

A systematic search of studies examining the MIES' reliability and validity was undertaken between June-2021-to-April-2022 via electronic databases (PsychINFO; PTSD Pubs; MEDLINE; Scopus; Web of Science). Boolean search terms and MeSH headings captured Moral Injury (MORAL, MORAL INJUR*, MORALLY INJURIOUS, TRANSGRESS*, BETRAY*) and the MIES (MORAL INJURY EVENT* SCALE) along with articles citing Nash et al. (2013) or Bryan et al. (2016). A Google Scholar alert for "MORAL INJURY EVENT* SCALE" was also set-up between June-2021-to-April 2022. There were no date restrictions on the searches. The search, eligibility criteria, and analysis strategy were registered on Prospero (CRD42021256446). The Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) statement was used as a reporting guideline to detail the search, selection of studies, and data analysis (Moher et al., 2009).

1.2.2 Eligibility Criteria

Table 1 details the eligibility criteria and their rationale. Selected studies included reliability and validity data (Cronbach's Alpha, Kappa, Intraclass Correlation Coefficient, Spearman/Pearson's r), either at Full-scale or Sub-scale levels. Original, empirical, and peer-reviewed studies using the measure in any capacity, including item changes, were selected. Secondary findings (e.g., systematic reviews), qualitative studies, sample sizes below 10, discussion, theoretical or position papers, book chapters, conference proceedings, and

dissertations, were excluded. Only publications written in English were eligible and MIES translations were accepted with English-written manuscripts. There were no restrictions on the publication date.

Table 1: Eligibility criteria and accompanying rationale

Inclusion criteria	Rationale
Outcome data	
Papers reporting sufficient information for the reliability or validity (Cronbach's Alpha, Kappa, Intraclass Correlation Coefficient, Spearman/Pearson's r) of the MIES and based on a clear specific sample.	To ensure outcomes can be calculated for either the primary or secondary aims.
Type of article	
Original, peer-reviewed, empirical studies using the MIES in any capacity including item changes.	The primary data of interest depends on the use of the MIES and considering its use in any capacity maximises the papers available while providing an account of the sub-scales used, reflecting its anticipated flexible use. Peer-reviewed empirical studies ensure a level of scrutiny from others in the field to check their validity.
Review (Scoping, Systematic, Narrative, Literature, Rapid, Meta-Analyses), Discussion (Theoretical, Commentaries, Book Chapters), Policy (Clinical Guidance, Procedural, Service Strategy), Exploratory and Contextual (Case studies, Qualitative), and Non-Peer-Reviewed (Dissertations, Conference Proceedings, Service Evaluations, Audit) records were excluded.	These sources represent non-empirical or non-primary data which are of limited to no relevance to the research aims.
Duplicate papers or subsets of individual samples.	To prevent repeated and therefore inaccurate calculations based on incorrect participant characteristics and so the data representing the largest sample and usable information are inputted once.
Articles are accessible and written in English. Studies administering non-English versions of the MIES were eligible so long as the manuscript was written in English.	To fit with the timeframes and language limitations of the author.
No restrictions on date.	To maximise the number of papers available and because the MIES was developed in 2013.
Participant characteristics	
No restrictions on participants/population.	To maximise the number of sources available and permit sub-group analyses pending numbers in each category. No restrictions enable a complete and accurate reflection of the uses and adaptations of the MIES.
$N \geq 10$	To ensure a reliable value of reliability and validity, improved value approximation, and reduced variability risk of each sampling distribution.

1.2.3 Screening and Data Selection

The author screened records by initially reviewing titles and abstracts, followed by a full-text review. A random proportion of papers at the full-text review stage (10%, k=16) were independently cross-validated for eligibility by the research supervisor and any disagreements were resolved by consensus. The author extracted data about the psychometric properties and study and sample characteristics for moderator analyses.

1.2.3.1 Search Results

Figure 1 illustrates the systematic search from identification to screening, eligibility, and inclusion. The search yielded 1,295 records and removed 863 duplicates and 121 after screening the title. Of the 311 remaining records screened by abstract, most were excluded as Discussion/Book chapters (43%), not using the MIES (29%), or were Dissertations (23%). Following full-text reviews of 162 records, most were excluded for lacking MIES data (70%). For papers using the same sample source, records with the largest sample size were included. Zerach and Levi-Belz (2022) combined different sources from their previous studies to report on a larger sample. Chesnut et al. (2020), Maguen et al. (2020a; 2020b), Nillni et al. (2020), and Richardson et al. (2020) were combined as '*Veterans Metrics Initiative (VMI) 2020*' based on the different data of interest spread across sources. The review excluded studies based on low sample size (Haight, Sugrue, Calhoun & Blacket, 2017), non-comparable sub-scales (Hellenthal et al., 2017; Hertz et al., 2022; Hoffman & Nickerson, 2021), modified sub-scale integrations within different measures (Spaaij et al., 2021), and unclear values to specific sub-scales (Hines et al., 2020). The final review

included 42 unique sources (including combined records) reporting reliability data for the MIES, mainly as Cronbach's Alpha.

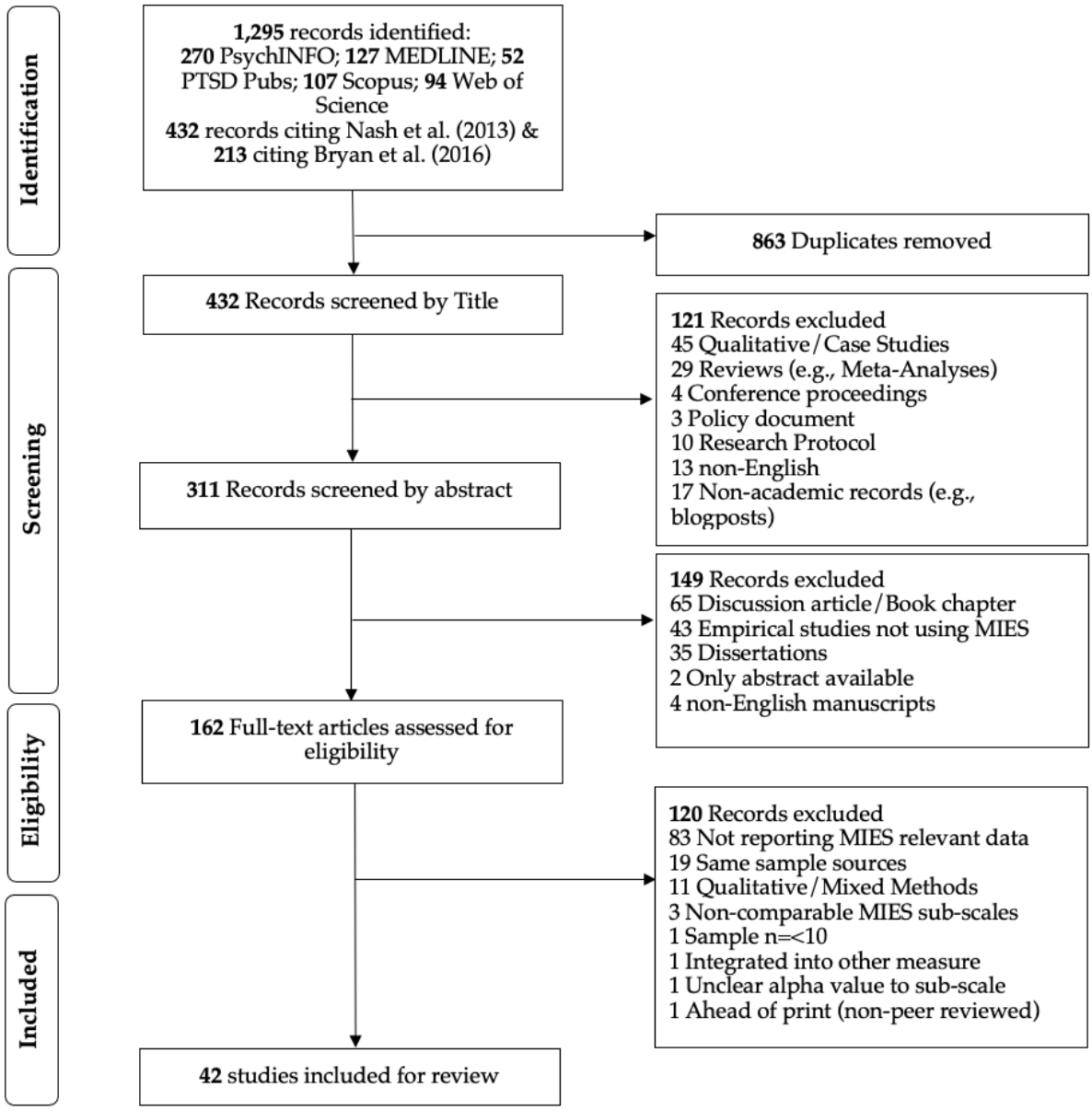

Figure 1: PRISMA flow chart of selected studies (adapted from Moher et al. (2009))

1.2.3.2 Defining Problematic Variance

Heterogeneity can result from methodological variation, measurement error or uncontrolled individual differences within the literature. Study-level effects are considered heterogeneous if they present with variation from the meta-analytical synthesis. Higgin's I^2 (Higgins et al., 2003) is a common measure of heterogeneity, with greater values indicating variation in effect not attributable to true variation in the distribution of effect in the population. As there was variation in primary study methodologies, problematic heterogeneity was defined as $I^2 > 75\%$. Where unacceptable or problematic heterogeneity occurred, then subsequent analyses focused on identifying the sources of heterogeneity in the primary studies.

1.2.4 Study Design Score

The author rated studies according to their designs including whether they specifically assessed the MIES psychometric properties or whether the tool was used in cross-sectional correlational designs for researching other primary aims. Psychometric design studies were scored higher (30) than cross-sectional designs (20) to differentiate these characteristics and exceed the maximum risk of bias scores. The scores reflect the review's aims to prioritise psychometric properties assessment. A quality score was calculated by combining study design and risk of bias scores using quality criteria defined in the following section.

1.2.5 Risk of Bias

A set of quality criteria assessed the risk of bias within the selected papers by adapting relevant frameworks. As there are no standardised guidelines for psychometric properties of non-diagnostically based constructs like MI, the Revised Tool for the Quality Assessment of Diagnostic Accuracy Studies (QUADAS-2) (Whiting et al., 2011) criteria informed six categories of bias including Selection, Performance, Reporting, Detection, Statistical, and Generalisability. The QUADAS-2 is considered the research standard for assessing the quality of studies validating diagnostic tests (Venazzi et al., 2018) and represents established, comprehensive, and transparent criteria for bias ratings. Papers were scored Low (2), Unclear (1), or High (0) in each category based on the quality criteria (Table 2). The reviewer weighted each criterion within the risk category equally while scoring. A random sample of papers (10%; k=4) was independently cross-validated for risk of bias by a research supervisor and any disagreements were resolved by consensus. Table 3 reports each paper's ratings.

Table 2: Risk of bias domains and their underlying criteria for ratings of Low, Unclear, and High risk

Domain	Details	Risk of Bias
Selection Bias	Selection bias occurs when there is a systematic difference between the characteristics of those selected for a study and those who are not. The selection reflects the target population. Have the selection methods and participant characteristics been described adequately? The study sample is representative of that for which the MIES was designed, specifically US Military Personnel.	High Risk: • The sample characteristics are not representative of the scale's target population with less than 50% US Military Personnel. • No study population characteristics are reported. • Response rate is ≤15%. • The population source is not described, and the recruitment method is unsystematic, not reported or defined. • The sample is selectively screened for possible moral injury. Unclear Risk: • The characteristics of the study population are not reported so it is unclear what proportion of the sample are US Military Personnel, or if the percentage of the sample who are US Military Personnel is lower than 50%. • The recruitment process/sampling method is unclear or has not been reported. • The response rate is not reported. • Selective screening for possible moral injury is unclear. Low Risk: • The characteristics of the study population are described and are representative of the population for which the scale was developed. All participants are US Military Personnel. • Response rate is reported and of an acceptable level (>15%). • The population source is well described, and the recruitment method is systematic and defined. • The sample is not selectively screened for possible moral injury.
Performance Bias	Between/within-group differences in the participants' motivation to complete the test.	High Risk: • Responses are not confidential or anonymous. • Participants are told which questionnaires they are completing and why along with any proposed hypotheses. • There were no validity checks in place (e.g., attentive responding, comprehension). • Participants are asked to elaborate or justify their responses. Unclear Risk: • The study does not report levels of confidentiality and anonymity. • It is unclear how much information was provided to the participant before taking part in the study. • It is unclear whether participants were asked to elaborate or justify their responses. • It is unclear about the validity checks in place (e.g., attentive responding, comprehension). Low Risk: • The study reports the level of confidentiality and anonymity. • Information and procedures do not differentially select more motivated participants. • There are validity checks in place (e.g., attentive responding, comprehension). • Participants are not asked to elaborate or justify their responses.
Detection Bias	The paper takes into consideration any alterations made to the original measure and the use of the scale. Was the MIES delivered in its original or agreed format?	High Risk: • Major (>2 words) changes to the test, including wording and/or scoring (changes made to the scoring matrix (i.e., changed from 5-point to 3-point scale or starting from 0). • The MIES including its sub-scales is combined or integrated with a different test. • Only select items or single sub-scales are administered, and the scales have not been re-validated. • The administration, completion, and scores are rated differently across participants (e.g., single Vs multiple administration). • The paper states it has been translated but does not detail how this was done, or notes problems in translation.

Domain	Details	Risk of Bias
		• The rationale for choosing MIES is not appropriate (i.e., used to measure PTSD/Trauma/Shame/Guilt). • Priming for Moral Injury or other factors (e.g., shame/guilt) is used. Unclear Risk: • Minor (1-2 words) changes made to the wording of questions. • It is unclear if the measure was implemented consistently across participants, or whether the full scale was administered, translated, or was an approved version. • The rationale for choosing the MIES is unclear. • The administration format is unclear or varied (e.g., self/interviewer). • Priming for Moral Injury or other factors (e.g., shame/guilt) is unclear. Low Risk: • The full version of the scale is used, either the original version or a version approved by the scale's developer (e.g., language variant) and scored appropriately. • Administration, completion, and scores are rated consistently across participants (i.e., single administration method). • The rationale for choosing the MIES is clear and appropriate (i.e., to measure moral injury exposure/experience). • No priming is used.
Statistical Bias	The reporting of statistical information, relating to the reliability coefficient. It considers the information reported in terms of its completeness and accuracy and whether any data is adjusted.	High Risk: • The attrition rate is high and data loss is reported at an unacceptable level (≥50%). • The reliability statistics are based on adjusted data or a sub-sample only. • There is 5-20% missing data and the authors have not done something to rectify it, or the missing data levels are >20%. Unclear Risk: • Non-exact reliability coefficients are reported, data is missing, or it is unclear whether the full sample is used or just a subset of the sample to calculate reliability statistics. • The attrition rate or data loss are not reported at analysis and is therefore unclear. • It is unclear if the data was adjusted or not. • There is 5-20% missing data and the authors have done something to rectify it, or it is unclear how the missing data was handled. Low Risk: • The specific reliability coefficients are reported, and it is clear how they are calculated (i.e., no missing data) and there is no adjusted data. • The attrition rate or data loss is reported at analysis at an acceptable level (<50%) akin to an Intention-to-Treat technique. • The full sample is used to calculate the reliability or validity statistics. • There is <5% missing data.
Reporting Bias	Captures the completeness of the reporting within the study, around measure and descriptive statistics and outcomes.	High Risk: • Item wording changes of the MIES are not reported but are likely (e.g., for non-US Military samples, wording change is necessary). • There are either no descriptive statistics or important data is missing within the reported dataset (e.g., data they said they were going to report has not been included, only a subsample of results are detailed, or only significant results are reported). • Statistical and procedural information are omitted as indicated by other sources (e.g., linked papers, supplementary table). Unclear Risk: • Item wording changes of the MIES are reported but it is unclear how. • Measure outcomes and descriptive statistics are reported but only partially reported or mistakes are unclear. • There is a description (narrative) of the results but no statistics. • There are minor mistakes in descriptive information (e.g., small changes from figures or possible score ranges stated incorrectly). Low Risk:

Domain	Details	Risk of Bias
		• There is a complete account of the measure and descriptive statistics, with all results reported in full and appropriately without mistakes.
Generalisability	Captures the sample size and the ability to transfer findings to the wider population. Ratings were determined solely by sample size given the heterogeneous nature of the samples involved along with the other category criteria to limit repeat ratings.	High Risk: • The sample contains fewer than 30 participants. Unclear Risk: • The sample contains between 30 and 50 participants. Low Risk: • The sample contains more than 50 participants.

1.2.5.1 Selection Bias

Selection bias was high, with 61.9% rated high, followed by 23.8% unclear, and 14.3% low risk. The studies rated high risk was due to the inclusion of non-US military samples and therefore non-validated MIES use (Amsalem et al., 2021; Andrukonis & Protopopova, 2020; Bhalla et al., 2018; Chaplo et al., 2019; Dale et al., 2021; Fani et al., 2021; Feinstein et al., 2018; Haight, Sugrue & Calhoun, 2017; Hines et al., 2021; Houle et al., 2021; Khan et al., 2021; Lee et al., 2020; Levi-Belz & Zerach, 2022; Litam & Balkin, 2020; Maftei & Holman, 2021; Papazoglou et al., 2020; Protopopescu et al., 2021; Schwartz et al., 2021; Senger et al., 2022; Sugrue, 2020; Ulusoy & Celik, 2022; Zerach & Levi-Belz, 2022), or samples were selectively screened (Evans et al., 2018; Held et al., 2021; Maguen et al., 2021; Plouffe et al., 2021). Those rated unclear provided limited information about response rates (Bryan et al., 2016 Sample 1 & 2 (S1 & S2); Cameron, Eaton, et al., 2020; Griffin et al., 2020; Martin et al., 2017; Ogle et al., 2018), were screened (though not excluded) using MI or trauma-based questionnaires (Forkus et al., 2021; Kinney et al., 2022; Nieuwsma et al., 2021), or were recruited via other larger studies (Frankfurt et al., 2018).

1.2.5.2 Performance Bias

Performance bias was low, with 69.0% rated low, 23.8% unclear, and 7.0% high risk. The studies rated high were due to participants elaborating on responses (Fani et al., 2021; Haight, Sugrue & Calhoun, 2017; Houle et al., 2021), while those rated unclear were because the administration was vague about the collection points and information provided (Bhalla et al., 2018; Cameron, Eaton, et al., 2020; Frankfurt et al., 2018; Hines et al., 2021; Martin

et al., 2017; Protopopescu et al., 2021), or motivation differences were possible due to incentive differences (Bryan et al., 2016, S2; Held et al., 2021; VMI, 2020).

1.2.5.3 Detection Bias

Detection bias was unclear, with 54.8% rated unclear, 31.0% low, and 14.3% high risk. Many unclear ratings related to minor word changes on items referencing the US Military (Andrukonis & Protopopova, 2020; Fani et al., 2021; Haight, Sugrue & Calhoun, 2017; Hines et al., 2021; Levi-Belz & Zerach, 2022; Senger et al., 2022), unclear word changes (Litam & Balkin, 2020; Plouffe et al., 2021; Protopopescu et al., 2021; Sugrue, 2020; Ulusoy & Celik, 2022), or language adaptations without validation or developer approval (Levi-Belz & Zerach, 2022; Maftei & Holman, 2021; Zerach & Levi-Belz, 2022). Khan et al. (2021) adapted items and reported approval from the MIES developers however the changes remained unvalidated and specific to the Covid-19 pandemic healthcare context. Other unclear ratings were due to repeated completion time points (Bhalla et al., 2018; Frankfurt et al., 2018; Hines et al., 2021; Nash et al., 2013; Zerach & Levi-Belz, 2022), provision of vignettes or instructions (Chaplo et al., 2019; Houle et al., 2021; Schwartz et al., 2021), mixed assessment formats (Maguen et al., 2022; Senger et al., 2022), use of screening scales with reverse ratings to the MIES (Nieuwsma et al., 2021), or there were analyses of the Betrayal sub-scale only despite using the Full-scale (Martin et al., 2017). The studies rated high risk were because items were excluded (Dale et al., 2021; Feinstein et al., 2018; Papazoglou et al., 2020), notable changes to rating scales were made (e.g., Agree/Disagree; Never/Always) (Amsalem et al., 2021; Dale et al., 2021; Lee et al., 2020), or select members of a sample were shown the MIES before recommending its item splitting (Ogle et al., 2018).

Table 3: Ratings of risk of bias. Red indicates a high risk of bias, amber marks an unclear risk of bias, and green is a low risk of bias

Study Name	Study Design	Selection Bias	Performance Bias	Detection Bias	Statistical Bias	Reporting Bias	Generalisability	Overall Quality Index*
Amsalem 2021	Cross-sectional correlation	High risk	Low risk	High risk	Low risk	Unclear risk	Low risk	64%
Andrukonis 2020	Cross-sectional correlation	High risk	Low risk	Unclear risk	Unclear risk	Unclear risk	Low risk	64%
Bhalla 2018	Cross-sectional correlation	High risk	Unclear risk	Unclear risk	Unclear risk	Low risk	Low risk	64%
Bryan 2016 S1	Psychometric design	Unclear risk	Low risk	Low risk	Unclear risk	Unclear risk	Low risk	93%
Bryan 2016 S2	Psychometric design	Unclear risk	Unclear risk	Low risk	Unclear risk	Unclear risk	Low risk	90%
Cameron 2020	Cross-sectional correlation	Unclear risk	Unclear risk	Low risk	Low risk	Unclear risk	Unclear risk	67%
Chaplo 2019	Cross-sectional correlation	High risk	Low risk	Unclear risk	Unclear risk	Low risk	Low risk	67%
Dale 2021	Cross-sectional correlation	High risk	Low risk	High risk	Unclear risk	Unclear risk	Low risk	62%
Evans 2018	Cross-sectional correlation	High risk	Low risk	Low risk	Low risk	Unclear risk	Low risk	69%
Fani 2021	Cross-sectional correlation	High risk	High risk	Unclear risk	Unclear risk	Low risk	Low risk	62%
Feinstein 2018	Cross-sectional correlation	High risk	Low risk	High risk	Low risk	Unclear risk	Low risk	64%
Forkus 2019	Cross-sectional correlation	Low risk	Low risk	Low risk	Low risk	Unclear risk	Low risk	74%
Forkus 2021	Cross-sectional correlation	Unclear risk	Low risk	Low risk	Low risk	Low risk	Low risk	74%
Frankfurt 2018	Cross-sectional correlation	Unclear risk	Unclear risk	Unclear risk	High risk	Unclear risk	Low risk	62%
Griffin 2020	Cross-sectional correlation	Unclear risk	Low risk	Low risk	Unclear risk	Low risk	Low risk	71%
Haight 2017	Cross-sectional correlation	High risk	High risk	Unclear risk	Low risk	Low risk	Unclear risk	62%
Held 2021	Cross-sectional correlation	High risk	Unclear risk	Low risk	Low risk	Low risk	Low risk	69%
Hines 2021	Cross-sectional correlation	High risk	Unclear risk	Unclear risk	High risk	Unclear risk	Low risk	60%
Houle 2021	Cross-sectional correlation	High risk	High risk	Unclear risk	Low risk	Unclear risk	Low risk	62%
Khan 2021	Cross-sectional correlation	High risk	Low risk	Unclear risk	Low risk	Unclear risk	Low risk	67%
Kinney 2022	Cross-sectional correlation	Unclear risk	Low risk	Low risk	Low risk	Low risk	Low risk	74%
Lee 2020	Cross-sectional correlation	High risk	Low risk	High risk	Unclear risk	High risk	Low risk	60%
Levi-Belz 2022	Cross-sectional correlation	High risk	Low risk	Unclear risk	Low risk	Unclear risk	Low risk	67%
Litam 2020	Cross-sectional correlation	High risk	Low risk	Unclear risk	Unclear risk	Unclear risk	Low risk	64%
Maftei 2021	Cross-sectional correlation	High risk	Low risk	Unclear risk	Unclear risk	High risk	Low risk	62%
Maguen 2021	Cross-sectional correlation	High risk	Low risk	Low risk	Low risk	Low risk	Low risk	71%
Maguen 2022	Cross-sectional correlation	Low risk	Low risk	Unclear risk	Low risk	Low risk	Low risk	74%
Martin 2017	Cross-sectional correlation	Unclear risk	Unclear risk	Unclear risk	Unclear risk	High risk	Low risk	62%
Nash 2013	Psychometric design	Low risk	Low risk	Unclear risk	Unclear risk	Low risk	Low risk	95%
Nieuwsma 2020	Cross-sectional correlation	Unclear risk	Low risk	Unclear risk	High risk	High risk	Low risk	62%
Ogle 2018	Cross-sectional correlation	Unclear risk	Unclear risk	High risk	Unclear risk	Unclear risk	Low risk	62%
Papazoglou 2020	Cross-sectional correlation	High risk	Low risk	High risk	Unclear risk	High risk	Low risk	60%
Plouffe 2021 S1	Cross-sectional correlation	High risk	Low risk	Unclear risk	Low risk	Low risk	Low risk	69%
Protopopescu 2021	Cross-sectional correlation	High risk	Unclear risk	Unclear risk	Low risk	Unclear risk	Low risk	64%
Schwartz 2021	Cross-sectional correlation	High risk	Low risk	Unclear risk	Low risk	Unclear risk	Low risk	67%
Senger 2022	Cross-sectional correlation	High risk	Low risk	Unclear risk	Low risk	Unclear risk	Low risk	67%
Sugrue 2019	Cross-sectional correlation	High risk	Low risk	Unclear risk	Unclear risk	Low risk	Low risk	67%
Thomas 2021	Cross-sectional correlation	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	76%
Ulusoy 2022	Cross-sectional correlation	High risk	Low risk	Unclear risk	Low risk	Unclear risk	Low risk	67%
VMI 2020	Cross-sectional correlation	Low risk	Unclear risk	Low risk	Unclear risk	High risk	Low risk	67%
Wisco 2017	Cross-sectional correlation	Low risk	Low risk	Low risk	Unclear risk	Unclear risk	Low risk	71%
Zerach 2021	Cross-sectional correlation	High risk	Low risk	Unclear risk	Low risk	Unclear risk	Low risk	67%

**Overall Quality Index is calculated as a combination of Study Design Score (Psychometric Design=30; Cross-Sectional Correlation=20) and Risk of Bias (Low=2; Unclear=1; High=0) Score*

1.2.5.4 Statistical Bias

Statistical bias was low, with 50.0% rated low, 42.9% unclear, and 7.1% high risk. Unclear ratings were recorded where there was uncertainty about samples and reliability statistics (Andrukonis & Protopopova, 2020; Bhalla et al., 2018) or attrition rates (Bryan et al., 2016, S1; Chaplo et al., 2019; Dale et al., 2021; Griffin et al., 2020; Litam & Balkin, 2020; Maftei & Holman, 2021; Martin et al., 2017; Ogle et al., 2018; Papazoglou et al., 2020; VMI, 2020). Other unclear ratings were due to acceptable missing data levels (5-20%) managed appropriately (Bryan et al., 2016, S2; Lee et al., 2020), missing data exclusions and handling not defined (Sugrue, 2020; Wisco et al., 2017) or the model was changed to fit the data (Nash et al., 2013). Those rated high risk were due to high attrition rates (>50%) (Frankfurt et al., 2018), missing data (>20%) (Nieuwsma et al., 2021), or selective time points despite differences in sample characteristics acknowledged through attrition (Hines et al., 2021).

1.2.5.5 Reporting Bias

Reporting bias was unclear, with 52.4% rated unclear, 33.3% low, and 14.3% high risk. Unclear risk ratings were mainly because of limited descriptions of probable word changes despite them being necessary (e.g., non-US Military samples) (Amsalem et al., 2021; Hines et al., 2021; Houle et al., 2021; Litam & Balkin, 2020; Protopopescu et al., 2021; Schwartz et al., 2021; Ulusoy & Celik, 2022; Zerach & Levi-Belz, 2022). Others provided missing or non-interpretable demographic information (Andrukonis & Protopopova, 2020; Senger et al., 2022; Wisco et al., 2017), minor inconsistencies in details including Likert scales and interpreting scores (Bryan et al., 2016, S1, S2; Evans et al., 2018; Feinstein et al., 2018;

Forkus et al., 2019), inconsistencies between text and table statistics (Dale et al., 2021; Levi-Belz & Zerach, 2022), associated publication discrepancies (Cameron, Eaton, et al., 2020), referencing missing sources (Frankfurt et al., 2018), lacking clarity by using charts and not text (Khan et al., 2021), or administration procedures were unclear (Ogle et al., 2018). Those rated high risk included those with probable word changes plus additional factors including inconsistent reporting of metrics (Lee et al., 2020), inconsistencies between charts, tables, and text (Maftei & Holman, 2021), the proportion of valid responses (VMI, 2020), or lacking details about study limitations (Papazoglou et al., 2020). Other ratings of high risk were due to missing descriptive statistics and reimbursement details in the main report (discovered through supplementary files) (Nieuwsma et al., 2021) and reporting data for Betrayal sub-scales only along with unclear administration (Martin et al., 2017).

1.2.5.6 Generalisability

Generalisability was low, with 95.2% rated low, and 4.8% unclear due to sample sizes below n<50 (Cameron, Eaton, et al., 2020; Haight, Sugrue & Calhoun, 2017). Although Cameron, Eaton, et al. (2020) reported n=40, the lower figure of n=38 was included based on an associated publication stating a different figure (Cameron, Shea, et al., 2020). Haight, Sugrue and Calhoun (2017) were close to high risk but rated unclear (n=32). It's worth noting the eligibility criteria included studies with sample sizes above n>10, so a lack of high risk ratings might reflect the narrow n=10-30 threshold.

1.2.5.7 Risk of Bias Summary

Overall, the level of bias was mixed but mostly low (48.8%), followed by unclear (33.7%), and high (17.5%). Given Generalisability bias accounted for a proportion of low and unclear ratings, when this was excluded, the rankings became low (39.5%), unclear (39.5%), and high (21.0%). Only one study did not report any (unclear or high) risk (Thomas et al., 2021), while others did not record any high risk ratings (Bryan et al., 2016, S1, S2; Cameron, Eaton, et al., 2020; Forkus et al., 2019, 2021; Griffin et al., 2020; Kinney et al., 2022; Maguen et al., 2022; Nash et al., 2013; Wisco et al., 2017). Although Thomas et al. (2021) reported no identifiable risk, their quality index score was lower than Nash et al. (2013) and Bryan et al. (2016) as these were psychometric design studies. Selection bias recorded the highest risk due to the validity of the MIES in non-US military samples. Performance, Statistical and Generalisability bias recorded many low ratings, while Detection and Reporting bias were mostly unclear. All studies were included in the meta-analysis despite the risks of bias because of the low number of sources available. The findings should therefore be interpreted with this in mind, although they do represent an illustrative summary of the literature as it stands. Altogether, study ratings were relatively consistent and skewed towards low or unclear, supporting the field as methodologically robust when reporting reliability estimates of Cronbach's Alpha.

1.2.6 Data Analysis

The review aimed to generate pooled estimates of psychometric properties about the reliability and validity of the MIES. Although there exist several properties of reliability and validity, nearly all papers reported Cronbach's Alpha. To account for variability and sample sizes, all estimates were transformed using variance weighting to stabilise the variable influences and provide approximate results toward normal distribution. The resulting figures better reflect naturally occurring phenomena and allow for inferences as distributions are stabilised. The estimates were corrected for the variability in bias quality criteria (Low, Unclear, High) with each compared to model estimates involving ratings of the best-rated study, thereby stabilising the distribution, and managing issues of variability. Consistent with other research and guidelines (Cicchetti, 1994; Ponterotto & Ruckdeschel, 2007; Santos et al., 2020; Stockings et al., 2015), pooled alpha estimates were classified '*Excellent*' (α>.89), '*Good'* (α=.85–.89), '*Moderate'* (α=.80–.84), '*Fair'* (α=.75–.79), or '*Unsatisfactory'* (α<.75). In the interests of word count and narrative clarity, the results include clinical interpretations, which are later expanded on in the Discussion section.

Multiple outcomes are combined into single quantitative outcomes using procedures described by Borenstein (2009). Heterogeneity was assessed using the I^2 statistic (>50%) and Cochran's Q statistic (p>.10). All analyses used RStudio Software for statistical computing v.1.4. (R Core Team, 2018) and metafor package (Viechtbauer, 2010). Subgroup analyses include comparisons by population (e.g., military/non-military), socio-demographics (e.g., age, gender, ethnicity), tool modifications, study design and assessment method, location, and publication year.

1.3 Results

1.3.1 Data Analysis: Reliability and Validity

The search yielded 42 records reporting alpha coefficients, including 29 at Full-scale, and 22 Betrayal, 19 Transgression-Self, and 19 Transgression-Other, Sub-scales. Primary study characteristics are reported in Table 4, and alpha coefficients in Table 5. In all 42 records, there were 34,734 participants with an average age of 38.9 years (SD=9.99), 65.4% proportion of Males (SD=29.10%), and 68.9% proportion of White/Caucasian ethnicity (SD=17.62%). Most studies were US-based (73.8%), and in Military (61.9%) and Community (73.8%) samples. These proportions were similar across Full-scale and Sub-scales. The Full-scale included 30,423 participants, Transgression-Self and Transgression-Other included 28,287 participants, and Betrayal included 29,572 participants.

Table 4: Characteristics of primary studies for alpha coefficients

	N	Population	Location	Setting	Age (Years) M (SD)	Male (%)	Ethnicity (% White/ Caucasian)	Education (%College/ University)	Married (%Currently Married	Army Veterans (%)	Assessment Method	Payment
Amsalem 2021	350	Health professionals	US	Community	34.8 (11.50)	25.7%	73.1%	-	-	-	Online	Paid
Andrukonis 2020	153	Vets	US	Clinic	-				43.7%	-	Online	Unclear
Bhalla 2018	222	Military	US	Community	32.6 (5.54)	100.0%	82.8%	22.2%	97.7%	100.0%	Online	Unclear
Bryan 2016 S1	151	Military	US	Clinic	34.1 (8.41)	63.8%	66.9%	-	-	0.0%	Paper	Not paid
Bryan 2016 S2	935	Military	US	Community	27.1 (8.11)	82.3%	57.4%	-	-	84.0%	Computer	Paid
Cameron 2020	38	Military	US	Clinic	48.2 (8.4)	86.8%	78.9%	-	-	-	Unclear	Not Paid
Chaplo 2019	473	University students	US	Community	20.5 (1.91)	21.4%	70.0%	100.0%	-	-	Online	Partial
Dale 2021	265	Health professionals	US	Community	37.6 (11.08)	18.1%	77.7%	90.9%	63.4%	-	Online	Paid
Evans 2018	155	Military	US	Clinic	50.0 (11.58)	86.2%	25.0%	-	-	57.0%	Interview	Unclear
Fani 2021	83	General population	US	Clinic & Community	40.1 (12.9)	8.4%	12.0%	38.6%	-	-	Interview	Paid
Feinstein 2018	80	Journalists	Europe & US	Community	43.00 (8.44)	58.8%	-	85.0%	58.5%	-	Online	Not paid
Forkus 2019	203	Military	US	Community	35.08 (-)	77.3%	70.4%	-	-	52.2%	Online	Paid
Forkus 2021	465	Military	US	Community	38.0 (11.45)	71.6%	69.5%	-	60.1%	63.7%	Online	Paid
Frankfurt 2018	310	Military	US	Clinic & Community	40.7 (8.55)	75.8%	57.1%	-	66.1%	90.3%	Mixed	Unclear
Griffin 2020	498	Military	US	Community	-	73.9%	-	-	-	22.5%	Online	Not Paid
Haight 2017	32	Health professionals	US	Community	-	18.0%	66.0%	-	-	-	Interview	Unclear
Held 2021	161	Military	US	Clinic	39.9 (8.27)	91.3%	71.4%	-	59.0%	93.2%	Interview	Not Paid
Hines 2021	96	Health professionals	US	Community	40.6 (10.4)	49.0%	-	-	-	-	Online	Not Paid
Houle 2021	55	Military	Canada	Clinic & Community	47.6 (10.40)	81.2%	92.7%	-	69.1%	61.8%	In person	Paid
Khan 2021	839	General population	US	Community	37.1 (11.1)	20.0%	58.6%	63.4%	34.0%	-	Online	Paid
Kinney 2022	145	Military	US	Clinic	33.1 (7.70)	92.4%	-	-	-	-	In person	Paid
Lee 2020	367	Military	South Korea	Community	72.0 (2.66)	100.0%	-	-	86.9%	88.0%	Mail	Not Paid
Levi-Belz 2022	296	Health professionals	Israel	Community	40.3 (10.83)	22.4%	-	-	70.9%	-	Online	Paid
Litam 2020	109	Health professionals	US	Community	37.5 (12.39)	23.8%	75.2%	-	-	-	Online	Not Paid
Maftei 2021	114	Health professionals	Romania	Community	38.9 (9.82)	24.6%	-	-	-	-	Online	Not Paid
Maguen 2021	1,321	Military	US	Community	-	93.7%	75.1%	37.1%	72.0%	47.5%	Online	Paid
Maguen 2022	14,057	Military	US	Community	-	82.3%	66.2%	41.7%	63.5%	50.5%	Mixed	Paid
Martin 2017	562	Military	US	Community	59.1 (16.6)	83.8%	66.7%	50.1%	36.5%	89.4%	Unclear	Not Paid
Nash 2013	533	Military	US	Community	28.7 (8.19)	100.0%	82.8%	-	-	-	Interview	Not paid
Nieuwsma 2020	315	Military	US	Community	22.7 (3.5)	86.6%	55.6%	-	69.1%	67.0%	Mail	Paid
Ogle 2018	356	Military	US	Community	46.4 (10.36)	70.3%	-	-	45.9%	0.0%	Unclear	Not Paid

	N	Population	Location	Setting	Age (Years) M (SD)	Male (%)	Ethnicity (% White/ Caucasian)	Education (%College/ University)	Married (%Currently Married	Army Veterans (%)	Assessment Method	Payment
Papazoglou 2020	370	Police	Finland	Community	-	73.5%	100.0%	-	-	-	Online	Not Paid
Plouffe 2021 S1	192	Military	Canada	Clinic	41.2 (8.42)	83.9%	-	47.4%	56.8%	77.1%	Interview	Not Paid
Protopopescu 2021	73	Military	Canada	Clinic	44.8 (11.56)	84.9%	-	50.7%	56.2%	-	Interview	Not Paid
Schwartz 2021	335	Military	Israel	Community	43.7 (9.3)	83.9%	-	-	21.8%	65.4%	Online	Paid
Senger 2022	242	First responders	US	Community	26.2 (3.06)	83.9%	86.4%	90.5%	66.1%	-	Mixed	Paid
Sugrue 2019	218	Teacher	US	Community	42.6 (11.9)	22.9%	77.1%	-	-	-	Online	Partial
Thomas 2021	496	Military	US	Community	37.8 (11.42)	70.5%	71.1%	-	-	63.7%	Online	Paid
Ulusoy 2022	124	Health professionals	Turkey	Community	33.3 (6.37)	25.8%	-	-	58.9%	-	Online	Not Paid
VMI 2020	7,200	Military	US	Community	-	82.0%	66.1%	-	-	37.8%	Mail	Paid
Wisco 2017	564	Military	US	Community	-	93.4%	76.2%	70.2%	-	41.0%	Online	Unclear
Zerach 2021	716	Military	Israel	Community	25.9 (2.62)	85.2%	-	-	20.1%	53.6%	Online	Paid

Table 5: Alpha coefficients of primary studies for MIES at Full-scale and Sub-scale (Transgression-Self, Transgression-Other, Betrayal) Levels

	Full Scale				Transgression-Self				Transgression-Other				Betrayal			
	α	95% CI		%W (random)	α	95% CI		%W (random)	α	95% CI		%W (random)	α	95% CI		%W (random)
Amsalem 2021	.87	.85	.89	3.8												
Andrukonis 2020	.86	.83	.89	3.0												
Bhalla 2018	.90	.88	.92	3.8	.93	.91	.95	5.6	.84	.80	.88	5.3	.79	.74	.84	4.2
Bryan 2016 S1					.96	.95	.97	6.1	.79	.72	.86	4.5	.83	.78	.88	4.3
Byran 2016 S2					.94	.93	.95	6.4	.79	.76	.82	5.7	.89	.88	.90	5.2
Cameron 2020	.85	.78	.92	1.4												
Chaplo 2019	.86	.84	.88	3.8	.70	.66	.74	2.6	.88	.86	.90	5.8	.83	.80	.86	4.9
Dale 2021					.94	.93	.95	5.9	.88	.85	.91	5.6				
Evans 2018	.91	.89	.93	3.7	.86	.82	.90	3.3	.83	.78	.88	4.9	.91	.89	.93	5.0
Fani 2021	.82	.76	.88	1.8												
Feinstein 2018																
Forkus 2019	.93	.92	.94	4.1												
Forkus 2021	.95	.94	.96	4.3	.95	.94	.96	6.3	.79	.75	.83	5.4	.90	.88	.92	5.2
Frankfurt 2018													.85	.82	.88	4.9
Griffin 2020	.84	.82	.86	3.7												
Haight 2017					.88	.81	.95	1.4	.83	.71	.95	2.9	.69	.50	.88	1.0
Held 2021					.90	.87	.93	4.4	.85	.80	.90	5.2	.77	.71	.83	
Hines 2021	.93	.91	.95	3.7												
Houle 2021	.80	.72	.88	1.2												
Khan 2021	.84	.82	.86	4.0	.94	.93	.95	6.4	.82	.80	.84	5.7	.75	.76	.80	
Kinney 2022													.82	.77	.87	4.1
Lee 2020	.91	.90	.92	4.1												
Levi-Belz 2022					.86	.83	.89	4.3	.95	.94	.96	5.9	.70	.64	.76	3.8
Litam 2020	.86	.82	.90	2.7												
Maftei 2021	.89	.86	.92	3.2												
Maguen 2021	.90	.89	.91	4.3	.91	.90	.92	6.3	.85	.83	.87	5.9	.78	.84	.88	5.1
Maguen 2022	.90	.89	.90	4.4	.91	.91	.91	6.5	.85	.85	.86	6.0	.78	.77	.79	5.3
Martin 2017													.86	.79	.85	5.1
Nash 2013	.90	.87	.91	4.1									.82	.80	.86	4.9
Nieuwsma 2020	.89	.87	.91	3.9												
Ogle 2018					.92	.91	.93	5.8	0.66	.60	.72	4.7	.83	.79	.85	4.8
Papazoglou 2020	.75	.71	.79	2.7												
Plouffe 2021 S1	.90	.88	.92	3.7												
Protopopescu 2021	.87	.82	.92	2.4												
Schwartz 2021					.91	.89	.93	5.5	.80	.76	.84	5.3	.82	.75	.85	4.7
Senger 2022	.85	.82	.88	3.3	.92	.90	.94	5.4	.63	.54	.72	3.6	.83	.79	.87	4.6
Sugrue 2019					.91	.89	.93	5.1	.91	.89	.93	5.8	.80	.81	.83	4.3
Thomas 2021	.95	.94	.96	4.3												
Ulusoy 2022																
VMI 2020	.91	.91	.91	4.4	.93	.93	.93	6.5	.76	.75	.77	5.9	.82	.70	.78	5.3
Wisco 2017	.85	.87	.89	4.0	.93	.92	.94	6.2	.87	.85	.89	5.8	.74	.74	.84	4.6
Zerach 2021	.85	.83	.87	4.0												

α=Alpha coefficient; 95% CI: Confidence Interval; % W (random): Random-effects model weighting (Calculated by adjusting the study weights based on sample size and according to the extent of variation within the sample of estimates, including the within-studies and between-studies variance)

1.3.1.1 Selection of the Meta-Analytical Model

The DerSimonian and Laird (1986) estimator calculated the between studies variance (tau^2) and, as displayed in Figure 2, the distribution of primary study effects showed no evidence of non-normality in the distribution of alpha coefficients across all levels. These support using the random-effects model with the DerSimonian and Laird (1986) estimator as an appropriate method for the meta-analyses (Hedges & Vevea, 1998).

1.3.1.2 The Omnibus Test

The omnibus test is a weighted average inclusive of the sources of variation contained within datasets. It tests for heterogeneity and amends the weighting of records according to fixed or random-effects modelling. The tests for the Full-scale and Sub-scale reported significant heterogeneity ($p<.001$) further supporting the use of random effects as it provides estimates based on partial pooling and adjusted weighting based on sample variation. High heterogeneity levels were observed for the Full-scale ($I^2=96\%$, $tau^2=.0006$, $p<.01$) and Transgression-Self ($I^2=96\%$, $tau^2=.0003$, $p<.01$), Transgression-Other ($I^2=97\%$, $tau^2=.0035$, $p<.01$), and Betrayal ($I^2=96\%$, $tau^2=.0023$, $p<.01$). This suggests the estimates of alpha coefficients are biased by the presence of uncontrolled or confounding factors.

Figure 3 illustrates forest plots summarising study results and heterogeneity. The pooled alpha estimate was '*Excellent'* for Transgression-Self (α=.92; 95% CI: .91-.93), '*Good'* for the Full-scale (α=.88; 95% CI: .87-.89), and '*Moderate'* for Transgression-Other (α=.83; 95% CI: .80-.85) and Betrayal (α=.82; 95% CI: .79-.84). For the Full-scale and Transgression-Self plots, most records centred around the average estimate, indicating

consistency, and reflecting the narrow confidence intervals (95% CI: α=.87-89; α=.91-.93). All studies for the Full-scale and Transgression-Self, including their confidence intervals, were above α=.70, while two records for Transgression-Other and Betrayal were below this level. Compared with other records, Chaplo et al. (2019) (α=.70) differed from the average alpha estimates for Transgression-Self (α=.86-96), as did Senger et al. (2022) (α=.63) and Ogle et al. (2018) (α=.66) for Transgression-Other (α=.76-.95). For Betrayal, Haight, Sugrue and Calhoun (2017) reported wider confidence intervals (95% CI: α=.50-.88) compared with others, suggesting greater intra-sample variability that may reflect the smaller sample size (n=32). The figures illustrate high heterogeneity across scales indicating that studies were inconsistent due to factors other than chance. Accordingly, moderator analyses were undertaken to investigate possible factors influencing the alpha estimates and sources of heterogeneity.

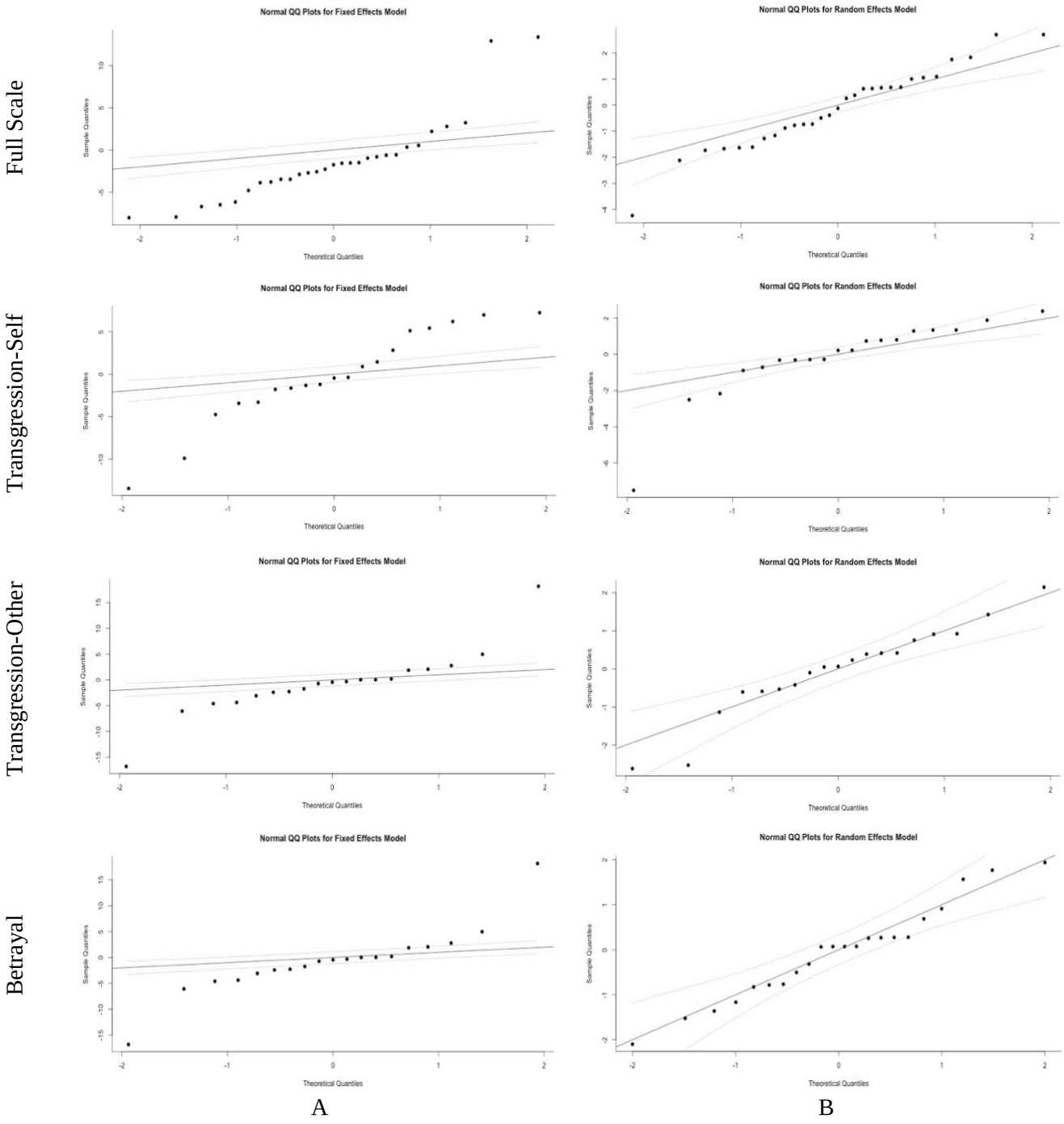

Figure 2: QQ plot of the distribution of alpha coefficients within the primary studies. Charts A depicts the fit of the fixed-effect model and Charts B shows the fit of the random-effects model calculated using the DerSimonian and Laird (1986) estimator

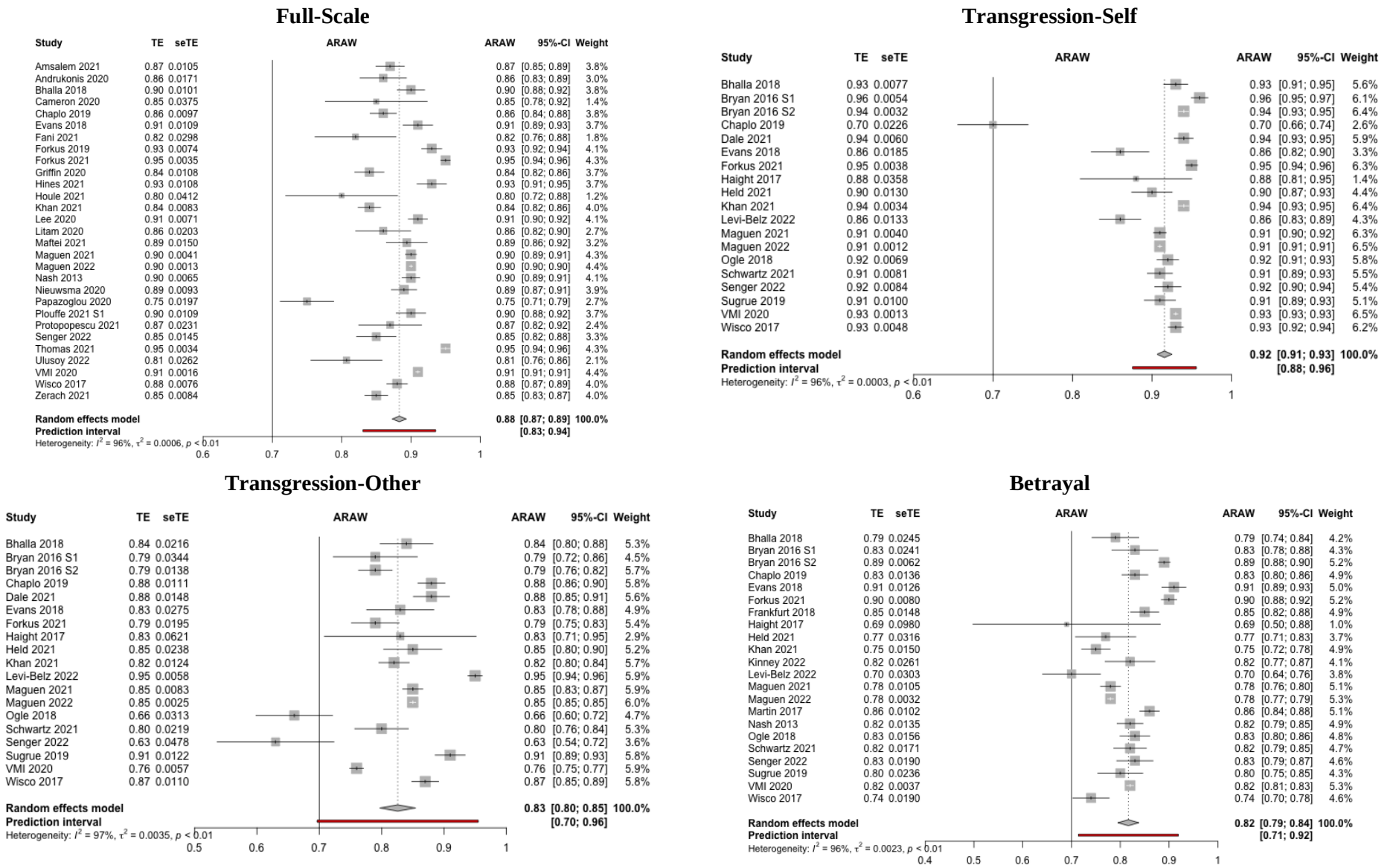

Figure 3: Forest plots of total alpha coefficients at Full-scale and Sub-scale Levels

1.3.1.3 The Impact of Influential Primary Studies

"Leave-one-out" analyses assessed the impact of disproportionately influential studies in which the random-effects model was calculated with each primary study removed to assess changes in weighted average effect size (i.e., influence) and heterogeneity (i.e., discrepancy). These "leave-one-out" analyses are presented on the Baujat plots (Baujat et al., 2002) in Figure 4, with the influential and discrepant studies identified by the top-right quadrant(s).

For the Full-scale, Papazoglou et al. (2020) was identified as both influential and discrepant within the literature and synthesis. The random-effects model was recalculated with Papazoglou et al. (2020) removed, resulting in a corrected random-effects model synthesis of α=.89, equating to an approximately $\leq$1% increase relative to the uncorrected estimate. Given the negligible effects on the overall estimate, the study was retained. Upon further examination, Papazoglou et al. (2020) omitted item six from the MIES and did not report information about item modifications despite them being necessary for their non-US military sample, suggesting the Full-scale internal consistency was resilient to such effects.

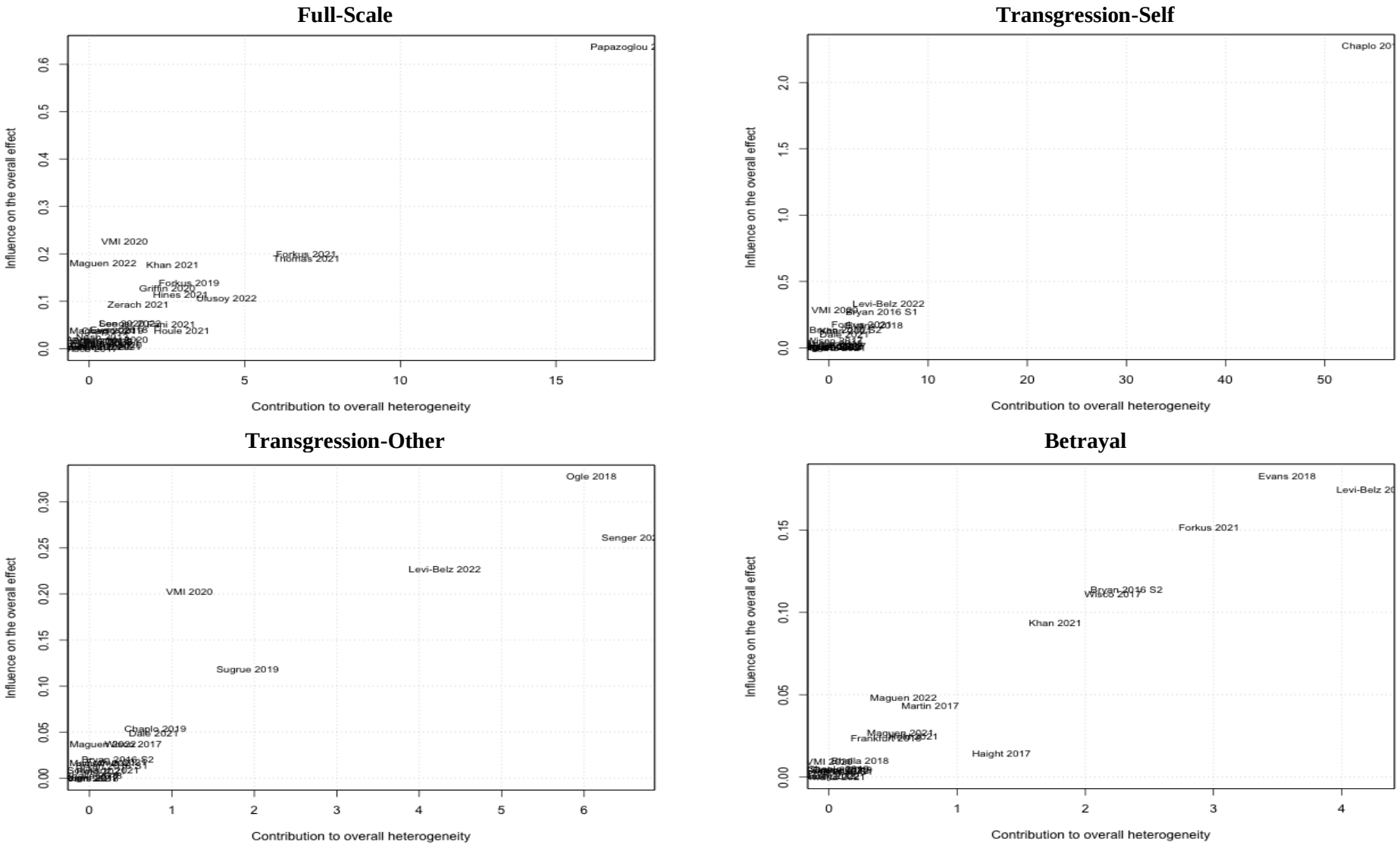

Figure 4: Baujat et al. (2002) diagnostic plot of sources of heterogeneity. The vertical axis reports the influence of the study on the overall effect, and the horizontal axis reports the discrepancy of the study with the rest of the literature

For Transgression-Self, Chaplo et al. (2019) was identified as influential and discrepant which when removed and effects recalculated resulted in a synthesis of α=.92. For Transgression-Other, Levi-Belz and Zerach (2022), Ogle et al. (2018), and Sugrue (2020) were identified, removed, and effects recalculated resulting in syntheses of α=.82, α=.83, and α=.82 with each removed respectively, and α=.82 with all three removed. Although Ogle et al. (2018) and Sugrue (2020) reported α<.70 (see Table 5), their negligible effect(s) on the overall estimate supports their inclusion. For Betrayal, Bryan et al. (2016, S2), Evans et al. (2018), Forkus et al. (2021), Levi-Belz and Zerach (2022) and Wisco et al. (2017) were identified as influential and discrepant and with each removed and effects recalculated, the syntheses reported α=.81, α=.81, α=.81, α=.82, and α=.82 respectively. When all five were removed, this synthesis reported α=.81. All adjustments equated to approximately ≤1% changes relative to the uncorrected estimates. As there were no concerns about the methodological risk of bias upon re-examination, this suggests that Sub-scale internal consistencies were resilient to influential and discrepant studies, supporting its use across contexts.

1.3.1.4 The Effect of Risk of Bias in the Primary Studies

To assess the study-level risk of bias effects upon heterogeneity, subgroup analyses were conducted on alpha coefficients for the ratings of '*Low'* and '*Any'* risk (Unclear and High risk combined) within the six types of methodological bias (Table 6). Using two bias categories maximises the numbers available within subgroups and reduces the likelihood of erroneous inferences due to multiple and underpowered comparisons. Moreover, defining '*Unclear'* as '*Any'* risk represents a conservative estimate of potential bias effects.

Table 6: The effects of risk of bias in the primary studies at Full-scale and Sub-scale Levels.

	Low Risk					Any Risk						
	k	**α**	**95% CI**		**I^2**	**k**	**α**	**95% CI**		**I^2**	***X^2***	***p***
Full-Scale												
Selection bias	6	.91	.90	.93	97.7%	23	.87	.85	.89	95.3%	12.25	<.001**
Performance bias	22	.88	.87	.90	96.8%	7	.89	.87	1.00	77.0%	.42	.516
Detection bias	9	.91	.89	.93	97.4%	20	.87	.86	.88	91.3%	10.28	≤.001**
Statistical bias	15	.89	.87	.90	97.3%	14	.88	.86	.89	92.4%	0.59	.443
Reporting bias	10	.90	.88	.92	97.9%	19	.87	.86	.89	93.3%	3.61	.058
Generalisability bias	28	.88	.87	.89	96.1%	1	.85	.78	.92	-	0.79	.374
Transgression-Self												
Selection bias	3	.92	.91	.94	94.4%	16	.91	.90	.92	98.4%	1.43	.232
Performance bias	13	.91	.89	.92	96.7%	6	.93	.92	.94	73.2%	5.02	.025*
Detection bias	8	.93	.92	.94	93.6%	11	.90	.89	.92	95.0%	7.14	.008**
Statistical bias	10	.91	.90	.92	95.2%	9	.92	.91	.93	94.7%	1.15	.283
Reporting bias	8	.90	.88	.92	96.5%	11	.93	.92	.93	90.0%	6.55	011*
Generalisability bias	18	.92	.91	.93	96.2%	1	.88	.81	.95	-	1.10	.315
Transgression-Other												
Selection bias	3	.83	.76	.89	99.1%	16	.82	.79	.86	95.8%	0.00	.959
Performance bias	13	.84	.82	.87	96.4%	6	.79	.74	.83	87.6%	5.15	.023*
Detection bias	8	.82	.78	.86	94.8%	11	.83	.80	.87	97.2%	0.38	.539
Statistical bias	10	.83	.79	.87	97.1%	9	.82	.77	.87	97.0%	0.03	.853
Reporting bias	8	.86	.84	.88	82.5%	11	.80	.74	.86	98.4%	2.89	.089
Generalisability bias	18	.83	.80	.85	97.5%	1	.83	.71	.95	-	0.00	.947
Betrayal												
Selection bias	4	.79	.76	.82	96.2%	18	.82	.80	.85	93.1%	2.19	.139
Performance bias	14	.81	.78	.84	95.9%	8	.83	.80	.86	93.6%	1.01	.316
Detection bias	9	.83	.80	.87	96.7%	13	.81	.78	.83	89.7%	1.37	.241
Statistical bias	11	.80	.76	.84	96.7%	11	.83	.80	.85	92.5%	.82	.365
Reporting bias	10	.81	.77	.84	95.6%	12	.82	.79	.85	94.9%	.39	.533
Generalisability bias	21	.82	.80	.84	96.2%	1	.69	.50	.88	-	1.68	.195

α=Alpha coefficient; 95% CI: Confidence Interval; k: Number of studies; X^2: Test statistic; p-value
***p≤.01; *p≤.05*

At Full-scale, Selection (p<.001) and Detection (p≤.001) bias evidenced statistically significant differences, with lower levels associated with higher alpha estimates, changing from '*Excellent'* to '*Good'* classifications. The Higgins I^2 value for the 23 studies at risk of Selection bias and 20 Detection bias were I^2=95% and I^2=91% respectively suggesting their inclusion may contribute to heterogeneity and decrease estimates. The Higgins I^2 value for the six studies at low risk of Selection bias and nine of Detection bias were I^2=98% and I^2=97% respectively. Considering the bias criteria, this indicates alpha estimates are affected by the change of population to non-military, wording changes, selective screening, and inconsistent administration. Such findings support the need for analysing reliability estimates of all populations, especially in those with non-validated characteristics. Nevertheless, the overall rating of '*Good'* suggests that clinically, these effects may not be meaningful.

For Transgression-Self, Performance (p=.025), Detection (p=.008), and Reporting (p=.011) bias reported statistically significant differences in alpha estimates, with lower levels associated with higher estimates for Detection bias and higher levels associated with lower estimates for Performance and Reporting bias. The Higgins I^2 value for the six studies at risk of Performance bias, 11 Detection bias, and 11 Reporting bias were I^2=73%, I^2=95%, and I^2=90% respectively. The inclusion of studies at risk of Detection bias may contribute to heterogeneity and decrease the estimate, while those at risk of Performance or Reporting bias may reduce heterogeneity and increase the estimate for Transgression-Self. The Higgins I^2 value for the 13 studies at low risk of Performance bias, eight Detection bias, and eight Reporting bias were I^2=97%, I^2=94%, and I^2=97% respectively. Considering the bias criteria, it suggests that elaborating on responses, priming or inconsistent administration, or not reporting MIES modifications might affect estimates statistically. Nevertheless, although statistically significant, all comparisons remained above α=.90 suggesting that clinically these factors produce limited impact, supporting Transgression-Self's internal consistency across contexts.

For Transgression-Other, Performance (p=.023) bias estimate differences were statistically significant, with lower levels associated with higher estimates. The Higgins I^2 value for the six studies at risk was I^2=88% suggesting their inclusion may contribute to heterogeneity and decrease estimates. The Higgins I^2 value for the 13 studies at low risk was I^2=96%. Considering the bias criteria, using less confidential administration formats, and asking respondents to elaborate on responses may produce lower estimates, reducing from '*Moderate'* to '*Fair'*. Clinically speaking, these factors appear relevant for the Transgression-Other's reliability and should be considered during its administration,

although estimates remained above α=.70 and so is somewhat supportive of its use across contexts.

There were no statistically significant differences in alpha estimates based on methodological bias type for the Betrayal Sub-scale. This suggests that clinically, the Sub-scales' internal consistency is unaffected by the combination of bias categories supporting its cross-contextual use. The finding is interesting as the word change modifications which are contained within the Betrayal items seemingly influenced the Full-scale but not the Sub-scale, although it's worth emphasising the Full-scale effects were not necessarily meaningful clinically.

1.3.1.5 Subgroup Analyses and Meta-Regression

To explore the impact of study-level covariates upon alpha coefficients, subgroup analyses were undertaken (Table 7). A meta-regression was conducted to test the significance of associations between alpha coefficients and variables with continuous measures (Table 8). There were statistically significant differences at the Full-scale for Modified-MIES items (p=.007), Population (p<.001), and Location (p=.036), with non-modified items (α=.90), Military samples (α=.90), and US-based studies (α=.89) reporting higher values than modified items (α=.84), non-Military samples (α=.85), and non-US-based studies (α=.85). This suggests that non-US military and Modified-MIES' reduce alpha estimates and ratings from '*Excellent'* to '*Good'*. From a clinical perspective, these category differences may not affect the decision to choose this tool, however they do indicate some change making it important to assess reliability in other contexts and where modifications are made.

For Transgression-Self, there were statistically significant differences for Population (p=.021), with Military (α=.92) reporting higher alpha coefficients than non-Military (α=.91) samples. Although statistically significant, its overall effect from a clinical perspective appears negligible as the rating categories of '*Excellent'* are unchanged. For Transgression-Other, there were statistically significant differences in Assessment Format (p=.017) and Payment (p=.003), with online (α=.86) reporting higher estimates than not online (α=.80) and paid (α=.82) and partial (α=.89) reporting higher estimates than not paid (α=.77). This indicates online formats may lead to more consistent estimates of '*Good'* compared with '*Moderate'* when administering the Sub-scale, as does payment type changing from '*Moderate*/*Good'* to '*Fair'*. For clinical purposes, this supports the use of consistent methods when administering and reporting reliability estimates for Transgression-Other, especially when formats and incentives differ. Again, all estimates were above α=.70 so clinically these factors may not be important in its use across contexts. There were no statistically significant differences between factors for Betrayal, supporting its internal consistency across contexts.

Table 7: Subgroup analysis by factors at Full-scale and Sub-scale levels

	Level	k	I^2	α	95% CI		X^2	*p*
Full Scale								
Setting[1a]	Clinic	5	54.9%	.89	.87	.91	0.01	.928
	Community	22	96.9%	.89	.87	.90		
Assessment Format[2a]	Online	17	97.3%	.88	.86	.90	2.96	.085
	Not Online	9	68.9%	.90	.89	.91		
Modified MIES items[3a]	Yes	6	94.2%	.84	.80	.88	7.42	.007**
	No	15	96.8%	.90	.89	.91		
Factor Model4[a]	2	7	75.4%	.89	.88	.91	0.04	.848
	3	15	97.4%	.89	.87	.91		
Payment5[a]	Paid	13	97.7%	.89	.88	.91	2.45	.118
	Not Paid	11	91.0%	.87	.84	.89		
Population	Military	18	96.4%	.90	.89	.91	11.34	<.001**
	Non-Military	11	89.0%	.85	.83	.88		
Location	US	21	96.4%	.89	.88	.90	4.4	.036*
	Non-US	8	92.2%	.85	.82	.89		
Transgression-Self								
Setting	Clinic	3	95.1%	.91	.85	.97	0.06	.806
	Community	16	96.1%	.92	.91	.93		
Assessment Format[2b]	Online	10	95.6%	.91	.89	.92	2.61	.106
	Not Online	6	91.5%	.93	.91	.94		
Modified MIES items	Yes	6	89.0%	.91	.89	.93	0.33	.564
	No	13	97.0%	.92	.91	.93		
Payment[5b]	Paid	10	96.8%	.92	.91	.93	1.32	.518
	Partial	2	98.6%	.81	.60	1.00		
	Not Paid	3	93.7%	.93	.89	.96		
Population	Military	12	96.3%	.92	.91	.93	5.34	.021*
	Non-Military	7	96.0%	.88	.85	.92		
Location	US	17	96.2%	.92	.91	.93	1.66	.197
	Non-US	2	90.3%	.89	.84	.94		
Transgression-Other								
Setting	Clinic	3	2.8%	.83	.80	.86	0.04	.851
	Community	16	97.8%	.83	.79	.86		
Assessment Format[2c]	Online	10	95.8%	.86	.83	.90	5.72	.017*
	Not Online	6	77.8%	.80	.77	.83		
Modified MIES items	Yes	6	97.5%	.81	.73	.89	0.31	.580
	No	13	95.5%	.83	.80	.86		
Payment[5c]	Paid	10	98.5%	.82	.78	.86	11.5	.003**
	Partial	2	69.7%	.89	.87	.92		
	Not Paid	3	91.5%	.77	.65	.88		
Population	Military	12	96.0%	.81	.78	.84	2.56	.110
	Non-Military	7	95.9%	.86	.81	.91		
Location	US	17	95.5%	.82	.80	.85	0.53	.467
	Non-US	2	97.7%	.88	.73	1.00		
Betrayal								
Setting[1d]	Clinic	4	88.7%	.84	.77	.90	0.54	.462
	Community	17	96.5%	.81	.79	.83		
Assessment Format[2d]	Online	9	95.3%	.79	.75	.84	2.32	.128
	Not Online	8	94.8%	.84	.80	.87		
Modified MIES items	Yes	6	82.2%	.78	.74	.82	3.32	.068
	No	16	96.9%	.83	.80	.85		
Factor Model	2	4	22.8%	.82	.81	.84	0.53	.468
	3	18	96.7%	.81	.78	.84		
Payment5	Paid	10	97.9%	.81	.78	.84	0.71	.701
	Partial	2	17.8%	.82	.79	.85		
	Not Paid	5	64.9%	.83	.80	.85		
Population	Military	16	96.9%	.83	.80	.85	3.28	.070
	Non-Military	6	83.4%	.78	.74	.82		
Location	US	20	96.3%	.82	.80	.84	0.92	.337
	Non-US	2	91.6%	.76	.65	.88		

α=Alpha coefficient; 95% CI: Confidence Interval; k: Number of studies; X^2: Test statistic; p-value; I^2: Higgin's I^2
[1]Setting: 'Clinic & Community' [a] (k=2) [d] (k=1); [2]Assessment Format: 'Mixed/Unclear' [a,b,c] (k=3), [d](k=5); [3]Modified items: [a]'Unclear' (k=8); [4]Factor Model: [a]N/A/Unclear (k=7); [5]Payment: [a]'Unclear' (k=4) & 'Partial' (k=1),, [b,c]'Unclear' (k=4), [d]'Unclear' (k=5).)
***p≤.01; *p≤.05*

Table 8: Meta-regression of continuous moderators at Full-scale and Sub-scale levels

	k	Coefficient	Standard Error	z	*p*
Full Scale					
Year	29	-.003	.003	-.929	.353
Number of Metrics	29	.003	.003	1.10	.269
Response Rate	15	-.024	.020	-1.16	.245
Attrition Rate	16	-.024	.028	-.853	.394
Age (Years)	23	.001	.001	.702	.483
Male %	28	.048	.020	2.44	.015*
Ethnicity (% White/Caucasian)	20	-.050	.036	-1.39	.165
Education (% College/University)	10	-.068	.022	-3.10	.002*
Married (% Currently)	14	.083	.041	2.01	.044*
Religion (% Agnostic/None)	5	-.102	.070	-1.46	.145
Time in Service (Years)	6	-.006	.006	-1.12	.261
Deployed at least once (%)	9	.030	.022	1.40	.162
Combat Exposure (%)	3	-.051	.048	-1.08	.282
Unemployed %	16	.062	.076	.822	.411
Army (%)	15	.055	.033	1.67	.096
PTSD (%)	9	-.056	.052	-1.07	.285
Depression (%)	6	-.099	.025	-3.90	<.001**
Alcohol/Substance Use (%)	5	-.041	.041	-1.01	.313
Income (>$60,000)	6	-.126	.087	-1.45	.147
Transgression-Self					
Year	19	-.003	.002	-1.38	.169
Number of Metrics	19	-.004	.003	-1.24	.216
Response Rate	9	-.050	.024	-2.07	.039*
Attrition Rate	9	-.011	.030	-0.36	.718
Age (Years)	13	.001	.001	1.14	.253
Male %	19	.035	.017	2.08	.038*
Ethnicity (% White/Caucasian)	16	.052	.043	1.21	.226
Education (% College/University)	8	-.072	.032	-2.22	.026*
Married (% Currently)	11	-.010	.032	-0.33	.740
Religion (% Agnostic/None)	3	-.060	.087	-0.69	.492
Time in Service (Years)	3	-.001	.001	-0.85	.396
Deployed at least once (%)	8	.005	.030	0.17	.865
Combat Exposure (%)	4	-.023	.027	-0.88	.380
Unemployed %	10	-.054	.038	-1.40	.162
Army (%)	12	-.016	.018	-0.90	.366
PTSD (%)	7	-.040	.019	-2.07	.038*
Depression (%)	6	.061	.153	0.40	.693
Alcohol/Substance Use (%)	3	.131	.130	1.01	.314
Income (>$60,000)	8	.015	.031	0.50	.618
Transgression-Other					
Year	19	.004	.008	0.57	.569
Number of Metrics	19	.005	.008	0.64	.521
Response Rate	9	.098	.055	1.79	.073
Attrition Rate	9	-.188	.149	-1.26	.207
Age (Years)	13	.001	.002	0.51	.610
Male %	19	-.097	.043	-2.27	.023*
Ethnicity (% White/Caucasian)	16	.030	.097	0.31	.753
Education (% College/University)	8	.018	.037	0.49	.625
Married (% Currently)	11	.123	.088	1.40	.161
Religion (% Agnostic/None)	3	.458	.299	1.53	.126
Time in Service (Years)	3	.022	.004	6.02	<.001**
Deployed at least once (%)	8	.170	.111	1.53	.127
Combat Exposure (%)	4	.181	.042	4.25	<.001**
Unemployed %	10	.028	.116	0.24	.810
Army (%)	12	.091	.052	1.76	.078
PTSD (%)	7	.076	.066	1.16	.247
Depression (%)	6	.606	.343	1.77	.077
Alcohol/Substance Use (%)	3	.012	.042	0.30	.767
Income (>$60,000)	8	.026	.079	0.33	.742
Betrayal					
Year	22	-.006	.004	-1.58	.113
Number of Metrics	22	-.002	.006	-0.38	.702
Response Rate	10	-.030	.042	-0.71	.477
Attrition Rate	12	.097	.091	1.07	.284
Age (Years)	16	-.001	.001	-0.54	.587
Male %	22	.060	.043	1.40	.161
Ethnicity (% White/Caucasian)	18	-.178	.084	-2.13	.034*
Education (% College/University)	8	.039	.058	0.69	.493
Married (% Currently)	12	-.049	.086	-0.56	.572

	k	Coefficient	Standard Error	z	*p*
Religion (% Agnostic/None)	3	-.117	.208	-0.562	.574
Time in Service (Years)	5	.001	.002	0.69	.491
Deployed at least once (%)	11	-.040	.063	-0.63	.532
Combat Exposure (%)	5	-.051	.053	-0.96	.338
Unemployed %	10	.133	.108	1.24	.216
Army (%)	14	.026	.044	0.58	.559
PTSD (%)	7	.003	.058	0.06	.955
Depression (%)	5	-.871	.187	-4.67	<.001**
Alcohol/Substance Use (%)	3	-.390	.334	-1.17	.243
Income (>$60,000)	8	-.082	.103	-0.79	.430

k: Number of studies reporting relevant data; z-score; p-value
***p≤.01; *p≤.05*

At Full-scale, there were positive associations of statistical significance between alpha coefficients (α) and proportions of Males (β=.048, p=.015) and those Married (% Currently) (β=.083, p=.044), and negative associations for Education (% College/University) (β=-.068, p=.002), and Depression (β=-.099, p<.001). For Transgression-Self, the Response rate (β=-.050, p=.039) and proportions of Education (% College/University) (β=.072, p=.026) and PTSD (β=-.040, p=.038) were negatively associated while the proportion of Males (β=.035, p=.038) was positively associated. For Transgression-Other, the association between alpha coefficient and Time in Service (Years) (β=.022, p<.001) and Combat Exposure (%) (β=.181, p<.001) showed positive associations, while the proportions of Males (β=-.097, p=.023) reported negative associations. For Betrayal, the association between the proportions of Ethnicity (% White/Caucasian) and Depression showed statistical significance with decreases of β=-.178 (p=.034) and β=-.871 (p<.001) in every unit change of α respectively.

The proportions of Males increasing alpha estimates may reflect military samples. The Time in Service and Combat Exposure effects on Transgression-Other supports this possibility. Combat Exposure's influence on Transgression-Other may represent possible variable events during exposure. PTSD decreasing Transgression-Self estimates may be due to actions done or by another individual. Response rate effects on Transgression-Self might reflect selective sampling and therefore greater possibility of differences between studies.

The incidences of mental health ratings, especially Depression, seem to influence alpha estimates, particularly on the Betrayal Sub-scale. While the numbers assessed are low and should be interpreted with caution, their effects on rating consistency might reflect the multidimensionality of the MIES, which assesses both exposure and distress. Other socio-demographics including ethnicity, marriage, and education levels seem to influence alpha estimates and may reflect differences in conceptions of morality, event exposure, and management of distress within categories. The lack of significant differences in other socio-demographic factors including age, unemployment, and income suggests the MIES may be internally consistent across these groups. It should be noted these interpretations are speculative and will require further work to untangle the different explanations between comparisons. Overall, it supports the need for robust assessments of mental health-related and socio-demographic factors when using the MIES to maintain its internal consistency.

1.3.1.6 The Impact of Publication and Small Study Biases

Publication bias is caused by a tendency to publish statistically significant findings over non-significant results, while small study bias refers to smaller sampled studies presenting greater variability risk in measurements of alpha coefficients. Both biases are identified using funnel plots showing the magnitude of a study's alpha estimates (i.e., influence) and deviation from the meta-analytic average (i.e., discrepancy). Without publication bias, the effects of small-sampled studies will scatter more widely at the bottom than those with larger samples at the top which lie closer to the overall meta-analytic effect, thus creating symmetrical funnel shapes. As shown in Figure 5, there is limited evidence of publication bias and small-study effects in the distribution of alpha coefficients at all levels. The plots

are asymmetrical, indicating marked heterogeneity, but not publication bias as small studies are no less variable or report higher alpha values than larger studies.

1.3.1.6.1 Orwin's Failsafe Number

Orwin (1983) describes the calculation of a failsafe number, which calculates how many studies with non-significant results would reduce the overall meta-analytical estimate to below minimally interpretable values. The calculation suggests at a Full-scale level, 27 studies with an average effect size of α=.50 and 531 studies of α=.69 would be required to reduce the observed value of α=.88 to α=.70. For the Sub-scales, these values translate as 20 studies at α=.50 and 410 studies at α=.69 for Transgression-Self, 12 studies at α=.50 and 239 studies at α=.69 for Transgression-Other, and 13 studies at α=.50 and 256 studies at α=.69 for Betrayal. These figures indicate the observed values are relatively protected against publication bias and the publication of future studies.

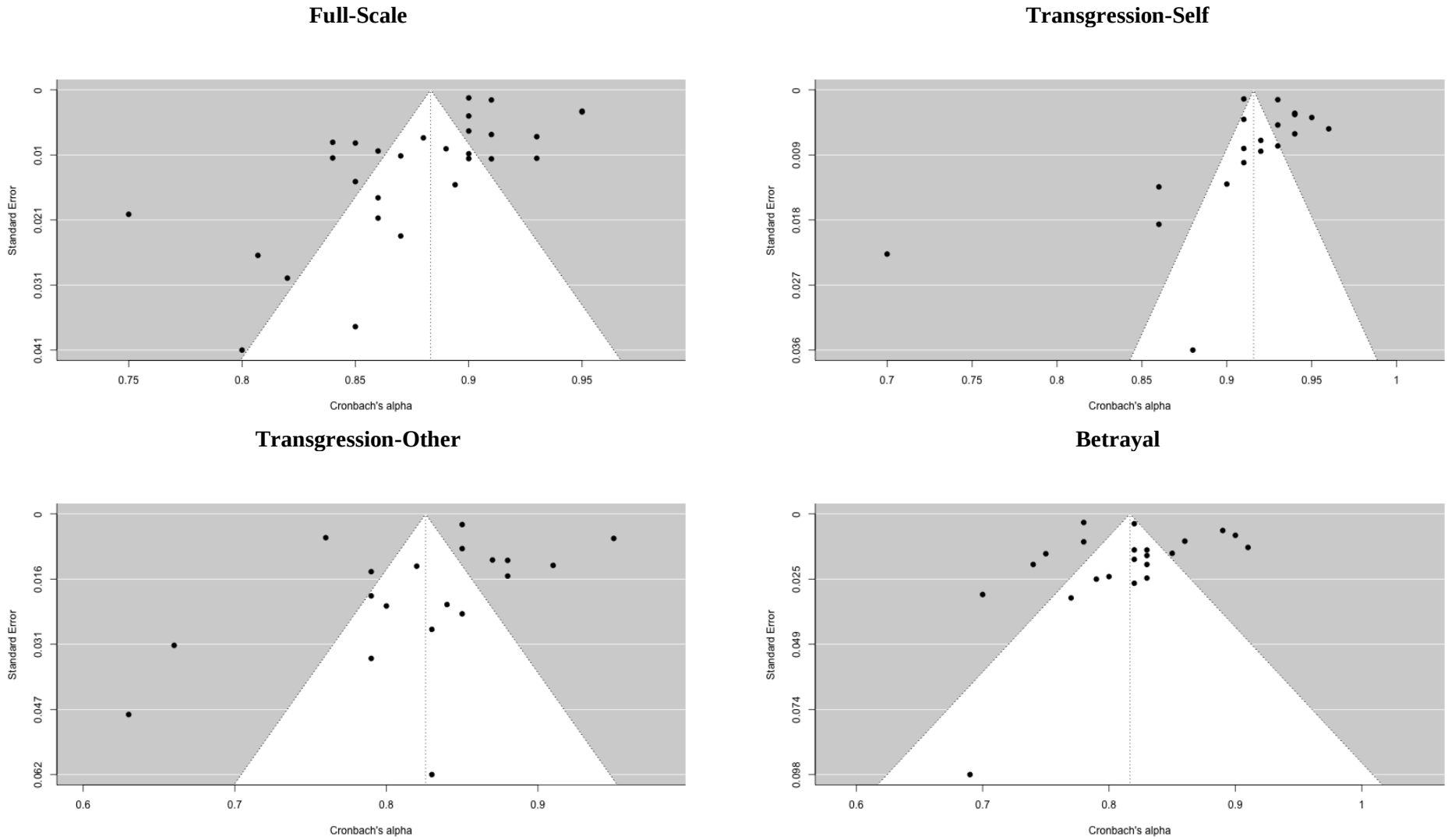

Figure 5: Funnel plot of alpha coefficients at Full-scale and Sub-scale levels. The 95% confidence interval of the expected distribution of alpha coefficients is shown as an inverted "funnel"

1.4 Discussion

1.4.1 Summary of Findings

This meta-analysis of pooled alpha coefficients (k=42) supports the MIES as an internally consistent tool for assessing events and symptoms of PMIEs across contexts, although it must be interpreted within a context of significant, high heterogeneity. There was limited evidence of publication bias and small-study effects, which additionally seemed stable against future publication influence. Both the Full-scale (α=.88) and Sub-scales (α=.82-.92) exceeded the recommended minimum alpha value (α=.70) (Nunnally, 1975; Reuterberg & Gustafsson, 1992) and optimal value (α=.90) for Transgression-Self (α=.92) (Nunnally & Bernstein, 1993). Given the lack of other reliability statistics (e.g., test-retest; temporal stability), there remains limited evidence about whether the MIES is a psychometrically sound tool beyond its original study designs (Bryan et al., 2016; Nash et al., 2013).

The general quality of studies was good and although comparisons reported statistically significant differences, from a clinical perspective, alpha estimates remained generally between '*Excellent'* to '*Good'* supporting its internal consistency across contexts. Most studies used an English, non-translated MIES, and took place in the US with relatively homogeneous male samples, illustrating a lack of diversity. There were several significant findings in the moderator analyses, although these should be interpreted with caution due to the low numbers within subgroups. Most differences were related to Male and Military factors, which might reflect the circumstances in which the MIES was developed and administered (Bryan et al., 2016; Nash et al., 2013). Select mental health-related (e.g., Depression, PTSD) and socio-demographic (e.g., Gender, Ethnicity, Education) factors

reported variable effects on Full and Sub-scale estimates. The findings therefore support robust assessments of mental health and socio-demographic information when using the MIES, particularly beyond the US Military.

1.4.2 Interpretations

Suitable psychometric properties are relevant for developing and evaluating assessment tools for both clinical and research purposes, as they provide estimates for measurement precision during different applications. The consistent ratings above recommended thresholds increase confidence in the MIES as an internally consistent tool, helping clinicians and researchers select it as an appropriate measure. Overall, the reliability estimates of the MIES compare favourably with other MI assessment tools based on their respective psychometric designs (Chaplo et al., 2019; Fani et al., 2021; Koenig et al., 2018) although not the MIAS (α=.95-.98) (Hoffman & Nickerson, 2021; Nickerson et al., 2015) or Expressions of Moral Injury Scale-Military Version (EMIS-M) (α=.90-.95) (Currier et al., 2018). While it's not possible to compare measures at meta-analytical levels, and although it does not imply superiority, the MIES has acquired sufficient applications compared to other tools, supporting its internal consistency across contexts.

Scales with fewer items naturally decrease alpha coefficients, and tools must balance internal consistencies without unnecessary duplication or redundancy (Hair, 2014). As Transgression-Other contains fewer items (k=2), this may explain the lower alpha estimates and only instances of '*Fair'* classifications in subgroup analyses. Streiner (2003) argues that alpha estimates above α=.90, like Transgression-Self, may contain redundant or duplicate items, although most tend to categorise this as '*Excellent'* (Cicchetti, 1994; Ponterotto &

Ruckdeschel, 2007; Santos et al., 2020; Stockings et al., 2015). These considerations are noteworthy as the MIES was originally designed as a two-factor model (Transgression; Betrayal) (Nash et al., 2013) but following Bryan et al. (2016) tends to be reported as three-factors. The variable numbers of studies between Full-scale and Sub-scales show how researchers selectively report alpha estimates, making comparisons of Sub-scales difficult. Assessments involving larger samples and anonymised formats may enhance Sub-scale reliabilities according to the subgroup differences observed. It also seems necessary to conduct confirmatory factor analyses to determine the appropriate factor models when interpreting the MIES Sub-scales.

An advantage of the review was in mitigating the sources of measurement error that arise from real-world research due to the various approaches in measurement techniques including choice of rater, timings, items, and settings. On their own, alpha coefficients provide biased estimations resulting from specific measurement designs (Cronbach & Shavelson, 2004). The analysis presents the psychometric properties of alpha coefficients for the MIES from a broader population than its initial design (Bryan et al., 2016; Nash et al., 2013) and further supports its utility as a reliable tool based on alpha estimates. This review did not analyse structural validity and therefore does not account for whether the tool measured MI across contexts. Therefore, although the MIES represents an internally consistent tool, the basis on which it measures MI, which itself is debated, cannot be answered by this review. Future work should focus on operationalising the concept of MI and consider how assessment tools align with these definitions.

1.4.3 Conceptual Debates and Future Developments

There currently exists limited knowledge and awareness among clinicians and researchers about MI and its psychometric assessment (Koenig et al., 2019). Due to the various inconsistencies identified in definitions, models, assessment tools, and thresholds, it's challenging for stakeholders to interpret and contextualise MI in both clinical and research samples. Improved conceptual clarity and methodological consistency would enhance this field and provide additional advantages including benchmarking, allowing for appropriate context comparisons. As a brief screening tool, and like the wider field, the MIES lacks any assessment or gold standard guidelines regarding its administration and interpretation (Koenig et al., 2019). The review originally aimed to assess average MIES scores, but due to inconsistent ratings, calculations, and reporting across studies, this was not possible. The review highlighted how, even within a single tool, there is wide variability and inconsistencies. Other measures of MI vary in their assessment of events and symptoms and target populations, with each possessing relative advantages and disadvantages. Emerging measurement tools of MI are offering greater in-depth assessment potential which could support clinical strategies, although they lack reliability data (Hodgson et al., 2021; Williamson et al., 2020; Yeterian et al., 2019).

The MIES represents one of the first and most used assessment tools for MI (Koenig et al., 2019) and represents a valuable tool for screening and basing future measures. The psychometric properties of alpha coefficients appear relatively resilient to adaptations, although future work should focus on validation in non-military samples. The purpose of the MIES, and any brief scale, is not to assess the precise circumstances but to screen for PMIEs and associated distress. In terms of developing a model of how MI relates to distress,

particularly in different samples and settings, other complementary methods exploring event details would be valuable. Intervention studies remain limited but crucial to informing optimal treatment options and will require complementary symptom-focused tools and robust assessments of psychological distress to monitor change (Koenig et al., 2019). Qualitative work will be valuable for understanding MI in different contexts and could inform model building. Such an approach can be strengthened by theory-led approaches to enhance face validity for which the MIES represents a useful reference (Koenig et al., 2019; McEwen et al., 2020; Yeterian et al., 2019).

Clinicians and researchers should exercise their own judgments when selecting the MIES and should assess and report on reliability statistics to inform future developments and interpretations of the tool. When referring to these findings, it's important to understand the narrow nature for which they are reporting reliability (e.g., alpha estimates). Alternative metrics may be better suited based on population type and outcome of interest (e.g., event exposure Vs symptoms) for which they are designed and validated compared with the MIES. This review should help inform the psychometric choice based on pooled alpha estimates.

1.4.4 Limitations

Several limitations should be considered when interpreting this review. For many sources, the MIES was not a primary outcome. The findings represent a selective sample of alpha coefficients and not necessarily every instance of the MIES being used, nor its complete psychometric properties reported. It's possible that studies reporting alpha estimates below generally accepted levels ($\alpha<.70$) chose not to use or report on the MIES, thereby skewing the availability of information. The relatively smaller samples within

moderator analyses likely reduced power and should be interpreted with caution. While the search strategy encompassed broad terms, the reviewer may have overlooked publications not reporting the MIES within titles and abstracts. The eligibility criteria excluded non-English records (k=17) which may have omitted translations of the MIES in wider populations. The review likely favoured studies in contexts where English proficiency was high, which typically correlates with higher gross national income per capita (McCormick, 2013). The pooled estimates included clinical and community samples, which may naturally inflate figures, although there were no significant differences found. While select records were independently cross-validated for selection and risk of bias ratings, most decisions relied on the author's subjective ratings and would therefore benefit from joint and inter-rater review in future iterations.

1.4.5 Conclusion

This review quantified the psychometric properties, primarily alpha coefficients, of the MIES across a range of studies. Its findings support the MIES as an internally consistent tool based on pooled alpha estimates, both at Full-scale and Sub-scale levels. The review uncovered high heterogeneity and inconsistencies in its administration and modification, particularly in non-military and non-US settings, although the alpha estimates were relatively resilient to subgroup differences from a clinical perspective. This review has extended analyses about the MIES beyond its initial design (Bryan et al., 2016; Nash et al., 2013) and supports its internal consistency across contexts, helping clinicians and researchers identify it as a possible assessment tool. Professionals working within this field should assess and report on the psychometric properties of the MIES, including validity, reliability, and accuracy.

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EMPIRICAL PAPER: THE PREVALENCE OF MORAL INJURY AND ITS CLINICAL ASSOCIATIONS IN A UK SECURE CARE POPULATION

Abstract

Introduction: Moral injury (MI) is a form of trauma characterised by shame, guilt, and loss of trust that follows violating moral beliefs through transgressive acts and experiencing betrayal. MI is mostly researched in military contexts although non-military studies are emerging but not yet within forensic clinical contexts.

Method: Secure care services provide treatment and support to those imprisoned or admitted following a criminal offence. This study assessed MI's prevalence and its clinical associations within a UK secure care population (n=38) using a cross-sectional psychometric design. The sample had an average age of 39.3 years (SD=10.51), were mostly Male (81.6%), White/Caucasian (68.4%), and resided in Medium-secure settings (78.9%). Measures included a modified Moral Injury Event Scale (MIES), International Trauma Questionnaire (ITQ), Recovering Quality of Life (ReQoL-20), State Shame and Guilt Scale (SSGS), and Self-Compassion Scale-Short Form (SCS-SF).

Results: The findings indicate that compared with other sources, MI ratings were moderate-to-high. Based on clinical associations, ratings between MI and trauma were strong, MI and guilt moderate, and MI and poorer quality-of-life low. There were no significant associations between MI, shame, or self-compassion at Full-scale and Sub-scale levels.

Discussion: Using psychometric assessments, this study found moderate-to-high ratings of Potentially Morally Injurious Events and MI-related distress which were associated with PTSD, complex-PTSD, guilt, and poorer quality-of-life. Based on these findings, services

and professionals should consider MI for clinical assessments and explore intervention and service strategies to enhance rehabilitation potential from MI-related distress.

2.1 Introduction

2.1.1 Moral Injury

The notion that people can be profoundly harmed by morally transgressive acts committed by themselves or others is predominant in human history. Drawing on military literature, Shay (1995) coined the term Moral Injury (MI) to define experiencing a betrayal of moral values by those in legitimate authority during high-stakes situations. Litz et al. (2009) further developed the concept to include individual action or inaction, proposing a definition of: "*perpetrating, failing to prevent, bearing witness to, or learning about acts that transgress deeply held moral beliefs and expectations*" (p. 700). There has been growing interest in the field with an acceleration of studies since 2013 following the advent of MI assessment tools (Koenig et al., 2019). As MI is a concept initially developed for military contexts, most research and theory originate here (Litz & Kerig, 2019; Nash, 2019). Recent work has expanded the focus from population-specific military contexts to broader and shared human psychological experiences and with it the opportunity to assess MI in diverse settings.

MI is a form of trauma defined by shame, guilt, and inner conflict following moral transgressions and betrayal which violate an individual's moral code (Jinkerson, 2016; Litz et al., 2009). MI is considered a psychological construct distinct from Post-Traumatic Stress Disorder (PTSD), which is typically characterised by fear-based anxiety processes, although both can co-occur (Bryan et al., 2016; Hall et al., 2022; Nash et al., 2013; Williamson, Murphy, Stevelink, et al., 2020). Proponents of the MI construct point toward the distress caused by guilt, shame, and the moral and ethical dimensions of traumatic experiences

(Byran et al., 2016; Litz et al., 2009). Both MI and PTSD share overlapping features including survivor guilt which is commonly endorsed in military samples (Currier et al., 2015) and can be interpreted as a moral experience. While PTSD does account for cognitive-affective states like guilt, shame, and self-deprecation, it is limited in scope and may only be applicable in the event of life threats, omitting the full spectrum of potentially morally transgressive acts (Litz & Kerig, 2019).

2.1.1.1 Clinical Relevance of Moral Injury

Morality is an important aspect of human flourishing and injuries are characterised by suffering and clinically relevant health consequences (Litz & Kerig, 2019). Meta-analyses show that MI is a reliable indicator of poor mental health, with moderate associations found between MI and PTSD, depression, and anxiety, and mixed associations with substance use (Hall et al., 2022; McEwen et al., 2020; Williamson et al., 2018). Although less frequently assessed, MI is positively associated with suicidality and self-harm, sleep disorders, treatment-seeking, and poorer physical health and quality-of-life (Hall et al., 2022). Conversely, social connectedness, self-compassion, and religiosity/spirituality can offer protective functions for MI-related distress (Brémault-Phillips et al., 2019; Coady et al., 2021; Forkus et al., 2019; Litz et al., 2009). Given MI's core symptomatic features of shame and guilt can result in defensive avoidance, social withdrawal, self or externalised blame, and loss of trust (Jinkerson, 2016), understanding its occurrence is critical for clinical assessment and intervention strategies.

2.1.1.2 Moral Injury Conceptual Models

MI remains a debated construct with definitional inconsistencies and limited established frameworks. MI conceptual models share a general theme of experiencing events that contradict moral values and create dissonance and distress when not appropriately processed and integrated (Jinkerson, 2016; Litz et al., 2009). Unlike PTSD, MI develops after, not during, distress-inducing events and through a perceived conflict in moral values relating to self or others' actions (Jinkerson, 2016; Litz & Kerig, 2019). There is currently little consensus about the criteria for PMIEs and whether they are analogous to PTSD event criteria (Litz & Kerig, 2019). The literature separates PMIEs from MI in which profound distress is characteristic. Like PTSD, morally transgressive acts are necessary but not the sole determinant of subsequent distress, although event characteristics may determine the MI-related consequences. The field considers two broad types of PMIEs which include self-transgressions where individuals act or fail to act, and other-transgressions that involve direct or indirect exposure to others' acts (Litz & Kerig, 2019). These acts may be unintentional or deliberate but will represent traumatic experiences. Self-transgressions typically lead to shame, guilt, and internalising distress, and other-transgressions lead to anger, resentment, and externalising blame (Litz & Kerig, 2019).

The specific pathways between PMIEs and subsequent distress are unclear (Litz & Kerig, 2019). Cognitive models conceive MI as occurring through event appraisal wherein negative attributions about transgressions are perceived as incompatible with personal values which creates and maintains features of guilt, shame and associated psychological distress (Litz et al., 2009). MI relates to crises of identity resulting in enduring bewilderment, demoralisation, self-loathing, and futility, which is underpinned by internalised sensitivities

towards social exclusion (Litz & Kerig, 2019). As moral emotions are expected and inescapable, it is only when experiences, distorted cognitions, and avoidant behaviours become destabilising that MI may be considered pathological (Jinkerson, 2016; Litz & Kerig, 2019). Self-compassion may reduce the association between MI and indicators of psychopathology by reducing guilt and blame through acceptance that suffering and morally transgressive acts are part of the human experience (Forkus et al., 2019; Manalo, 2019). MI conceptual models also posit that self-forgiveness can mitigate internal anguish and conflict (Litz et al., 2009).

There currently exists no gold standard for assessment nor any established clinical thresholds about what could be labelled pathological MI. It may be MI does not obtain sufficient validity to be considered a distinct syndrome and subsequent PTSD criteria may account for morally distressing experiences. Nevertheless, there does appear to be a unique phenomenon of MI undefined by current PTSD criteria as shown by the relatively distinct indicators of psychopathology (Bryan et al., 2016; Hall et al., 2022). Fundamentally, MI characterises impairment and maladaptive functioning with defining features common to psychosocial experiences and is therefore of clinical interest and value across contexts.

2.1.1.3 Beyond Moral Injury in the Military

Although MI research remains predominately military-focused, there is increasing attention on non-military settings which suggests MI is not unique to particular contexts (McEwen et al., 2020; Williamson et al., 2018). Understanding prevalence across studies is challenging as MI is not a diagnosis and assessment tools lack categorical thresholds, resulting in studies with varying criteria to mark the presence, absence, and proportion of

MI. Additionally, studies often report summary statistics for the full sample and vary in how they calculate and report scores making comparisons difficult. Nevertheless, numerous studies have assessed MI occurrence in non-military populations including health professionals (41-52%) (Borges et al., 2021; Lamb et al., 2021; Riedel et al., 2022), refugees and asylum seekers (35-38%) (Hoffman et al., 2019; McEwen et al., 2022; Nickerson et al., 2015), educators (33-80%) (Currier et al., 2013; Sugrue, 2020), social workers (92%) (Haight et al., 2016, 2017), undergraduates (77%) (Chaplo et al., 2019; Hoffman & Nickerson, 2021), the general population (17-57%) (Khan et al., 2021; Terpou et al., 2022; Thomas, Bizumic, et al., 2021), and for those reporting scores only and not proportions, police and first responders (Lentz et al., 2021; Papazoglou et al., 2020; Roth et al., 2022), journalists (Feinstein et al., 2018), and chaplains and religious leaders (Carey et al., 2016).

Some sources have discussed MI risks among those working within prisons (Gangemi, 2021; Kothari et al., 2020; Maddocks, 2021) and secure care hospitals (Kothari et al., 2020) due to the ethical dilemmas and high-stake situations encountered. However, few studies have considered those detained or receiving services despite the same risk factors for trauma attributed to professionals being more directly encountered by detainees. Certain authors have noted the similarities in PMIEs between military and forensic contexts, including being directly involved in death or failing to prevent harm to another person (Facer-Irwin et al., 2021; Lynd & Lynd, 2017). As work on MI expands, those in forensic services, particularly those with poor mental health, represent a group worthy of consideration.

2.1.2 Moral Injury within Forensic Secure Care

2.1.2.1 Secure Care in the UK

Across the UK, forensic secure care hospitals provide support, accommodation, and interventions to those with severe mental health problems who represent a risk to the public (NHS, 2016). Services house those detained under the Mental Health Act (1983, 2007) along High, Medium, and Low secure tiers. Multidisciplinary teams provide support and interventions according to clinical need and focus on managing and improving mental and physical health, and community or prison re-integration. Secure care focuses on rehabilitation within public protection and punishment contexts sanctioned by the legal system. Recent policy shifts have emphasised avoidable admission, community-based approaches, and improved pathways in-and-out of hospitals (NHS, 2016). Secure care represents a high-cost service, accounting for approximately 20% of England's mental health budget (Centre for Mental Health, 2011). Admissions can experience long waiting lists and prolonged lengths of stay, prompting the need for improved treatment packages, risk management support, and service-user co-production in research, policy, and practice (Centre for Mental Health, 2011). While few studies exist regarding the moral emotional experiences of those in forensic and particularly secure care settings, the profound and enduring distress observed in MI research suggests this may be a population wherein the construct has relevance and clinical value.

2.1.2.2 Moral Injury in Secure Care

MI conceptual models appear relevant for forensic secure care settings which are characterised by severe moral and ethical challenges, witnessing human cruelty and suffering, and transgressing moral norms (Maddocks, 2021; Roth et al., 2021). Violence and proximity to death, both perpetrating or witnessing, are common in this population and unlike military contexts, those living in civilian contexts may be unprepared for PMIEs. Military culture creates a code of conduct that prepares for and normalises violence and death (Litz et al., 2009), which in part reflects the way criminal gangs and radicalising groups might foster violent behaviour and expectations (Alleyne & Wood, 2010; Kerig et al., 2016; Wainryb & Pasupathi, 2010). The forensic system epitomises Shay's (1995) criteria of high-stake situations (e.g., life threats, physical and mental harm risks), legitimate authority, and morally transgressive acts. PMIEs may occur during incarceration as forensic settings pose a greater risk for transgressive acts due to heightened conflict and violence; an issue potentially exacerbated by the Covid-19 pandemic which further restricted movements (Hesselink & Booyens, 2021; Scott et al., 2022).

The moral and ethical repercussions that veterans feel upon returning from the military could reflect similar trajectories to those separated from society due to criminality. Those admitted to secure care through the Mental Health Act (1983, 2007) may not be deemed criminally responsible owing to their mental state at the time of transgression and MI may occur during stabilisation and (re)gaining insight (Roth et al., 2021). Committing acts during psychotic episodes or drug-induced states may create dissonance between actions and moral beliefs, risking further distress and inner conflict (Adshead et al., 2015; Roth et al., 2021).

Traumatic events and PMIEs can lead to other risk factors for incarceration including alcohol and substance use (Davies et al., 2019; Maguen et al., 2021; Panza et al., 2022), homelessness (Conard et al., 2021; Edwards et al., 2021), sexual victimisation (Facer-Irwin et al., 2021), direct interpersonal violence (Facer-Irwin et al., 2021), and terrorism, radicalisation or extremism (Bont, 2020; de Lint & Praino, 2022; Karmel & Kuburic, 2021; Williamson et al., 2021). MI might lead to criminality through its associations with anger, hostility, and substance use (Ashwal-Malka et al., 2022; Kelley, Braitman, et al., 2019; Maguen et al., 2021; Martin et al., 2017; Wojciechowski, 2021). Those younger, female, minority ethnic, ex-military, homeless, incarcerated, and abusing alcohol or substances report greater trauma histories and MI (Conard et al., 2021; Levin, 2021; Nicholson et al., 2022; Wojciechowski, 2021). What's more, military studies around MI reference criminal activities including sexual abuse (Brown et al., 2021; Conard et al., 2021; McCormack & Bennett, 2021) and less-than-honourable discharges (Higgins, 2021; McClean, 2021) increasing subsequent detainment risk in forensic settings.

2.1.2.3 Assessing Moral Injury in Secure Care

The need to advance and understand MI within forensic settings presents challenges. The shame and withdrawal features mean those experiencing MI might remain hidden and overlooked which is an issue exacerbated by forensic contexts that discourage admissions of vulnerability due to violence, intimidation, and exploitation from others (Fritzon et al., 2021; Hesselink & Booyens, 2021; Maddocks, 2021; Roth et al., 2021; Scott et al., 2022). PMIEs have implications for managing disclosures about illegal activities, potentially dissuading individuals from sharing experiences (Williamson, Murphy, Castro, et al., 2020).

Disclosing highly distressing experiences also poses risks to patient wellbeing, which is a concern for vulnerable groups like those in secure care.

Given cognitive appraisal and subsequent dissonance are integral to MI's destabilising effects, it's reasonable to suggest those with reduced moral reasoning capacities represent lower risk. Research on trauma's long-term impacts, poor mental health, and substance use have reported consequences for brain functioning, emotional numbing, and interpersonal difficulties, each risking criminality through greater impulsivity, hostility and aggression, victim-blaming, vulnerability to exploitation, and difficulties understanding a situation's moral aspects (Alleyne & Wood, 2010; Craig & Rettenberger, 2022; Crisford et al., 2008; Fritzon et al., 2021; Kerig & Becker, 2010; Kerig et al., 2016; Mcloughlin, 2018; Parish, 2014; Terpou et al., 2022). Stigma and alienation might reinforce moral disengagement among offenders through reduced stakes or affiliation with society (Fritzon et al., 2021; Maddocks, 2021; Moore et al., 2016; Roth et al., 2021). Cognitive distortions and unusual beliefs can underpin offending justification, minimisation, and condoning offences (Alleyne & Wood, 2010; Clarke, 2017; Crisford et al., 2008; Kerig et al., 2016; Maddocks, 2021; McCormack & Bennett, 2021). Psychopathy and Anti-social and Borderline Personality Disorders are high among offenders and are defined by violating and disregarding the rights of others suggesting offence justification and minimisation may be prevalent (Bebbington et al., 2017; Facer-Irwin et al., 2021). Accordingly, it might be the case that an offender's moral code is less susceptible to breaches and therefore injury. This aligns with overarching societal narratives about offenders' perceived immorality (Maddocks, 2021; Moore et al., 2016).

In contrast, evidence suggests offenders can and do have morals (Maddocks, 2021) which can change during incarceration (Mapham & Hefferon, 2012; Mcloughlin, 2018; Stevens, 2012) and after regaining insight into the consequences of their actions (Roth et al., 2021). Although there are few studies among forensic populations about MI, there is work showing heightened levels of specific moral emotions and related states like guilt, shame, and PTSD (Crisford et al., 2008; Roth et al., 2021). There exist two recent qualitative studies on MI within forensic settings, including an article from Canada (n=9) (Roth et al., 2021) and a doctoral thesis from the UK (n=7) (Maddocks, 2021). Both studies report themes consistent with MI definitions and report guilt for victims, shame about actions, inner conflict about one's morality, and experiencing betrayal from those in authority, institutions, and caregivers. Although these studies support MI's likelihood among forensic populations, it is limited to small and heterogeneous samples, and susceptible to investigator bias influencing accounts.

2.1.3 Research Topic

2.1.3.1 Problem Statement

It is important to understand the extent to which MI affects secure-care populations and whether it is associated with psychological distress, event types, or individual characteristics. There are few empirical papers about this topic for forensic populations and no prevalence studies exist. Of particular interest are those residing in secure care settings due to the clinical focus on supporting their mental health.

The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for reporting observational, cross-sectional studies were used to guide the writing of the manuscript sections (von Elm et al., 2007).

2.1.3.2 Aims and Objectives

The primary research aim is to assess MI's prevalence within a UK secure-care population. The study will consider the relevant clinical associations relating to MI ratings, including trauma, shame and guilt, and self-compassion. Based on the literature and theoretical models, the study hypothesised that MI is prevalent among this population and positively associated with distress, trauma, shame, and guilt, but inversely associated with self-compassion. It was unclear which socio-demographic or event type characteristics might influence scores.

2.2 Methodology

2.2.1 Design

Between October-2021 to March-2022, a cross-sectional psychometric study assessed the prevalence of PMIEs, MI-related distress, and possible clinical associations across eight secure care sites. Participants were recruited via ward community meetings, Posters publicising the study, and liaising with ward teams and responsible clinicians to identify eligible participants (Appendix 4.2.4). Residents expressing an interest received an Information Sheet (Appendix 4.2.1), a verbal summary about the study, the opportunity to ask questions, and at least 48-hours to consider their participation. The researcher informed potential participants of their rights to withdraw, the voluntary nature of their involvement, the confidentiality of their responses, and the handling of their data. Participants confirmed their willingness to participate by signing a Consent Form (Appendix 4.2.2) before data collection started.

The researcher gave participants a battery of self-report psychometrics and all participants completed the questionnaires using pen-and-paper and with the researcher speaking the items aloud. Data collection took place within a single appointment and lasted 15-minutes on average (range: 10-to-60-minutes). Two Assistant Psychologists recruited and collected data from five participants, while the author obtained the rest. The researcher provided a Debrief Sheet (Appendix 4.2.3) and supported all participants following data collection before returning them to the ward. Participants could request their data removal up to two-weeks following the session, after which point the author anonymised entries and removed any identifying links.

The eligibility criteria included those deemed suitable for recruitment and with a capacity to consent by their responsible clinician and care team, those housed in the setting for at least 1-month to ensure they were settled, and those who could read, speak, and comprehend English with or without an interpreter. The study excluded participants who declined or experienced an adverse response relating to the study, demonstrated active suicidal, self-harm or harm-to-other's risk, were detained in seclusion, were experiencing psychotic or dissociative episodes, were currently taking or dependent on alcohol or other substances (except nicotine), or were receiving medication which affected their ability to concentrate or stay awake.

2.2.2 Participants

The study recruited 38 participants from eight single-sex adult secure care sites (five medium-secure; three low-secure) across two organisations in the West Midlands, UK. The author visited 25 medium secure and five low secure wards but was unable to visit five medium and one low-secure ward due to Covid-19 restrictions (n=3), no response from the wards (n=2), or ward recruitment refusal (n=1). Among the candidates approached and eligible, there was a 22.9% response rate. One participant withdrew in the two-week period after data collection but did not provide a reason. There were no adverse responses reported relating to the study. The overall sample had an average age of 39.3 years (SD=10.51), were mostly Male (81.6%), White/Caucasian (68.4%), and resided in Medium-secure settings (78.9%) (Table 9, p. 95).

2.2.3 Data Collection

2.2.3.1 Measures

Cronbach's Alpha is selected as a reliability metric as it suits the methodological constraints and cross-sectional design which did not permit other reliability and validity calculations (e.g., test-retest; face validity). Low alpha estimates can result from a lower number of items, poor item inter-relatedness, and heterogeneous constructs. Acceptable alpha values differ according to source, typically ranging from $\alpha>.70$ to $\alpha<.95$, with some authors acknowledging that values of $\alpha>.50$ or $\alpha>.60$ are acceptable in the early research stages about predictor tests or hypothesised constructs (Hinton et al., 2004, p. 364; Nunnally, 1967, p. 226). Consistent with research guidelines (Cicchetti, 1994; Hinton et al., 2004; Ponterotto & Ruckdeschel, 2007), the psychometric coefficient alpha estimates in this study were classified '*Excellent*' ($\alpha>.89$), '*Good'* ($\alpha=.85–.89$), '*Moderate'* ($\alpha=.80–.84$), '*Fair'* ($\alpha=.75–.79$), or '*Unsatisfactory'* ($\alpha<.75$).

2.2.3.1.1 Moral Injury Event Scale-Modified (MIES)

The MIES assesses PMIEs and MI-related distress and represents a commonly used MI measurement tool (Koenig et al., 2019). In its original design, it reported good internal consistency at Full-scale and Sub-scale levels ($\alpha\geq.79$) (Nash et al., 2013) and subsequently across multiple samples ($\alpha\geq.82$) (Steen, in press). The MIES is not validated for non-military samples; however, others have adapted it for non-military contexts by modifying the US Military specific items (Steen, in press). The author adapted the measure following these observed practices and, as a relatively recent field, measurement tools for PMIEs and MI-

distress are limited. The modified-MIES used here retains six-items and modifies three-items from the original. The retained six-items are relevant for non-military contexts, including secure care settings (e.g., '*I saw things that were morally wrong*'). Item 7 wording '*leaders'* was changed to '*people'*, item 8 '*fellow service members*' to '*professionals'* (i.e., those in authority positions), and item 9 '*others outside the US militar*y' to '*other people*'. The MIES and its modified versions include nine-items using six-point Likert scales (1='*Strongly Disagree*' to 6='*Strongly Agree'*). The assessment adopted a three-factor Sub-scale model including Transgression-Self (4-items, e.g., '*I acted in ways that violated my own moral code*'), Transgression-Other (2-items, e.g., '*I saw things that were morally wrong*'), and Betrayal (3-items, e.g., '*I feel betrayed by people who I once trusted*') following confirmatory factor analyses (Table 10, p. 98).

The MIES items lack temporal features, so ratings reflect generalised and ongoing experiences. The tool does not include any clinical thresholds or severity bandings, but higher scores indicate higher incidences of PMIEs and MI with scores ranging between 9-54 at Full-Scale; 4-24 at Transgression-Self; 2-12 at Transgression-Other; and 3-18 at Betrayal Sub-scales. Several authors have arbitrarily applied score thresholds to indicate endorsement of scales with most using above 3 ('*Slightly to Strongly Agree*') (Haight et al., 2017; Levi-Belz et al., 2020; Maguen et al., 2020, 2021; Sugrue, 2020). Accordingly, the analyses considered the proportion of participants reporting within average Full-Scale and Sub-Scale scores above 3 to indicate MI endorsement.

For the current sample, the scale reported '*Moderate'* internal consistency at Full-scale (α=.80) and '*Good'* at Transgression-Self (α=.85) and '*Fair'* at Betrayal (α=.75) Sub-scales. Transgression-Other should be interpreted with caution as it reported internal consistency

below satisfactory levels (α=.59); however, given the low number of items (k=2) within the subscale and the early nature of this study within an evolving field, the lower thresholds of α>.50 or α>.60 determined its inclusion (Hinton et al., 2004, p. 364; Nunnally, 1967, p. 226). The sub-scale's inclusion allowed for other sub-scale assessments and subsequent factor (see p. 94-95) analyses revealed that its removal wouldn't have materially affected the outcome.

2.2.3.1.2 Five-Item Event Type Questionnaire

To assess Event Type characteristics, the author developed a Five-item Event Type questionnaire using items and statements adapted from other research including a UK military study (Williamson, Murphy, Stevelink, et al., 2020) and Canadian male offenders study (Mossière & Marche, 2020; Ternes et al., 2019). It included an introductory statement about PMIEs (Appendix 4.2.7) (Williamson, Murphy, Stevelink, et al., 2020) which was modified for a non-military context and to improve readability. Five closed questions followed the introduction and assessed Event frequency and Age (Years) (e.g., '*Is there an event or multiple events your answers relate to?*' rated '*Yes, one Event*'; '*Yes, multiple events*'; '*No'*; '*Don't Know*'), the influence of drugs/alcohol during the event(s), and who the event(s) involved (e.g., '*Family';* '*Friend'; Someone you knew informally'; 'Stranger'*).

The researcher did not ask participants to describe events in detail but to confirm they had an event or multiple events in mind, and to keep this in memory during the data collection. Frederickson (2019) argues that meaningful MI research is possible without asking for details about events and is a practice reflecting similar research (Mossière & Marche, 2020) and ethically responsible strategies (Williamson, Murphy, Castro, et al.,

2020). The analysis classified those unable to think of an event as '*No Event*' and as a prevalence study their scores were retained to assess possible differences and reduce selection biases that might inflate scores.

2.2.3.1.3 International Trauma Questionnaire (ITQ)

The ITQ (Cloitre et al., 2018) assesses PTSD and Complex-PTSD using 5-point Likert scales (0='*Not at all*' to 4='*Extremely'*) across 18-items covering the past month. The tool instructs participants to identify an experience that troubles them the most and to answer questions in relation to that experience. The measure is split into 9-items assessing PTSD symptoms and functional impairment, and 9-items measuring Disturbances in Self-Organisation (DSO) relating to Complex-PTSD criteria. Example items include: '*Being "super-alert", watchful, or on guard*' and '*Feeling jumpy or easily startled*'. The analysis used the dimensional scoring method by totalling items 1-to-6 for the PTSD Sub-scale (range: 0-24), items 10-to-15 for the DSO Sub-scale (range: 0-24), and the sum of PTSD and DSO for the Full-scale ITQ (range: 0-48), with higher scores indicating higher symptom severity. For this study, the internal consistency was '*Excellent'* at Full-scale (α=.93) and PTSD Sub-scale (α=.90), and '*Good'* at DSO Sub-scale (α=.88).

2.2.3.1.4 Recovering Quality of Life (ReQoL-20)

The ReQoL-20 (Keetharuth et al., 2018) contains 20-items assessing quality-of-life using 5-point Likert scales (0-4) covering the past week ('*None of the time*' to '*Most or all of the time*'). The quality-of-life areas include Activity (meaningful); Belonging and relationships; Choice, control, and autonomy; Hope; Self-perception; Well-being; and Physical health. The

measure comprises positively and negatively worded and scored items. For this study, a total score was calculated using the sum of all items, with higher scores indicating higher quality-of-life (range: 0-80). Scores below 50 are considered as falling within clinical population ranges (Keetharuth et al., 2018). Example items include: '*I felt happy*' and '*I felt lonely*'. The internal consistency of the ReQoL-20 for the present sample was '*Excellent'* (α=.92).

2.2.3.1.5 State Shame and Guilt Scale (SSGS)

The SSGS (Marschall, Saftner & Tangney, 1994) is a 10-item tool measuring current Shame (5-items) and Guilt (5-items) feelings at the moment using 5-point Likert scales (1='*Not feeling this way at all*' to 5='*Feeling this way very strongly*'). The Shame and Guilt scales are calculated separately with higher scores indicating higher incidences (ranges: 5-25). Example items include: '*I feel remorse, regret*' and '*I feel small*'. For this sample, internal consistencies for Shame (α=.90) were '*Excellent'* and Guilt (α=.88) '*Good'*.

2.2.3.1.6 Self-Compassion Scale-Short Form (SCS-SF)

The SCS-SF (Raes et al., 2011) measures Self-Compassion across 12-items using 5-point Likert scales (1='*Almost never*' to 5='*Almost always*'), and comprises positively and negatively worded and scored items. Although the tool contains Sub-scales, the developers advise calculating total scores only (range: 12-60), with higher ratings indicating higher self-compassion. A 50th clinical percentile is considered an average level of self-compassion (Hayes et al., 2016) and factorial validation studies in Dutch and English samples (n=871) reported scores of M=48.12 (SD=11.61) (Raes et al., 2011). Example items include: '*I try to see my failings as part of the human condition*' and '*When something upsets me I try to*

keep my emotions in balance'. The present sample reported '*Good'* internal consistency (α=.86).

2.2.4 Ethical Considerations

The author obtained ethical approval from the University of Birmingham internal ethics review, NHS Research Ethics Committee (Ref: 21/WM/0134) (Appendix 4.1), and local ethical review from the participating organisations. A consultation forum with experts-by-experience hosted by a national charity working with secure care settings informed the study procedures.

2.2.5 Data Analysis

Descriptive and inferential statistics assessed MI prevalence using the modified-MIES. Parametric and non-parametric tests compared Socio-demographic (e.g., age; ethnicity), Site Level (e.g., secure-level), and Event Type (e.g., single Vs multiple; drug/alcohol use) differences. Spearman's Correlation, Chi-Squared, and Multiple Linear Regression tests assessed possible associations between the MIES and other psychometric ratings. The author performed sensitivity analyses to review possible organisation effects and early/late responders (e.g., First Vs Last 3-months). The author assessed data 'missingness' either being at random or due to socio-demographic or study-level factors. Where sufficient data were available on a particular factor (above 95%), average value imputation methods for handling missing data replaced missing entries. The analysis excluded factors or participants when this was not possible and considered completer and non-completer effects. All statistical analyses used SPSS v. 26 (IBM Corp, 2019).

2.3 Results

2.3.1 Descriptive Analyses

2.3.1.1 Socio-Demographic, Site Level and Event Type Characteristics

Table 9 reports sample characteristics based on Socio-Demographic, Site Level and Event Type. There were no significant differences between socio-demographic factors based on psychometric scores except for Males (Mean Rank (MR)=19.29) reporting significantly higher ratings than Females (MR=8.50) on the SCS-SF (U(26,7)=31.50, p=.007), and Medium-secure (MR=16.13) reporting significantly lower ratings than Low-secure (MR=24.31) on the ReQoL (U(27,8)=57.50, p=.046) indicating poorer quality-of-life. Participants reported the average age of an event or most recent/impactful event as occurring 11.51 (SD=12.31) years ago, although the data were not normally distributed. Event age did not correlate with most psychometric scores but was negatively correlated with the MIES Transgression-Other Sub-scale (r(33)=-.445, p=.010) indicating higher scores were associated with recent events. Most participants (89.5%) reported thinking of events with the majority being Single (50.0%) or Multiple Events (39.5%) ('*No Event'*=10.5%). Of those reporting an event (n=34), the single or most recent/impactful event was not experienced on Drugs/Alcohol (79.4%) or intoxicated (85.3%). The Event(s) (n=34) mainly involved Strangers (41.2%) or someone they Knew Informally (38.2%). White/Caucasian participants were more likely to report events involving people they Knew Informally or Strangers than Family or Friends, compared with Non-White participants ($X^2(1,34)=4.52$, p=.033). Analyses did not find significant differences in psychometric scores for all other

comparisons of Event Types, Drugs/Alcohol use, or those involved. Sensitivity analyses found there were no significant differences between organisations or between early (first 3-months) (n=15) and late responders (last 3-months) (n=23) suggesting ratings were consistent across data collection.

Table 9: Socio-demographic, Study Level and Event Type characteristics of the overall sample (n=38)

Variable	Mean (SD) or N (%)
Socio-demographic	
Age (Years)	39.30 (10.51)
Gender	
Male	31 (81.6%)
Female	7 (18.4%)
Ethnicity	
White/Caucasian	26 (68.4%)
Black/Black British	6 (15.8%)
Asian/Asian British	3 (7.9%)
Mixed/Multiple	3 (7.9%)
Secure-Level	
Medium	30 (78.9%)
Low	8 (21.1%)
Length of Stay[1] (Months)	29.61 (20.90)
Event Type	
Age of Event (Years)	11.51 (12.31)
Event(s)	
Single	19 (50.0%)
Multiple	15 (39.5%)
No	4 (10.5%)
Drugs/Alcohol at the time of Event[1]	
Yes	7 (18.4%)
No	27 (71.1%)
'*No Event'*	4 (10.5%)
Intoxicated at the time of Event[1]	
Yes	5 (13.2%)
No	29 (76.3%)
'No Event'	4 (10.5%)
Involved [2,3]	
Friend	6 (15.8%)
Family	8 (21.1%)
Knew Informally	13 (34.2%)
Stranger	14 (36.8%)
'No Event'	4 (10.5%)

SD: Standard Deviation
[1]Data obtained on n=18 (all participants housed in their setting for at least 1-month as confirmed by their care teams); [2] Most recent/impactful Event if 'Multiple'; [3] Can select more than one option

2.3.2 MIES Characteristics and Factor Analyses

The MIES reported a score of M=38.16 (SD=11.55) at Full-scale, M=9.16 (SD=3.37) at Transgression-Other, M=15.37 (SD=7.06) at Transgression-Self, and M=13.63 (SD=4.92) at Betrayal, which translates as the 71st, 76th, 64th, and 76th maximum score percentiles (Table 11). These indicate high ratings for Full-scale, Transgression-Other, and Betrayal, and moderate scores for Transgression-Self. Using within scale averages, a total of 81.6% of participants scored above 3 at Full-Scale, 78.9% at Transgressions-Other, 60.5% at Transgressions-Self, and 76.3% at Betrayal Sub-scales. At an item-level, scores were generally rated as '*Moderately Agree*', with '*I saw things that were morally wrong*' rated highest (M=4.84, SD=1.88), and '*I violated my own morals by failing to do something that I felt I should have done*' lowest (M=3.50, SD=2.13) (Figure 6).

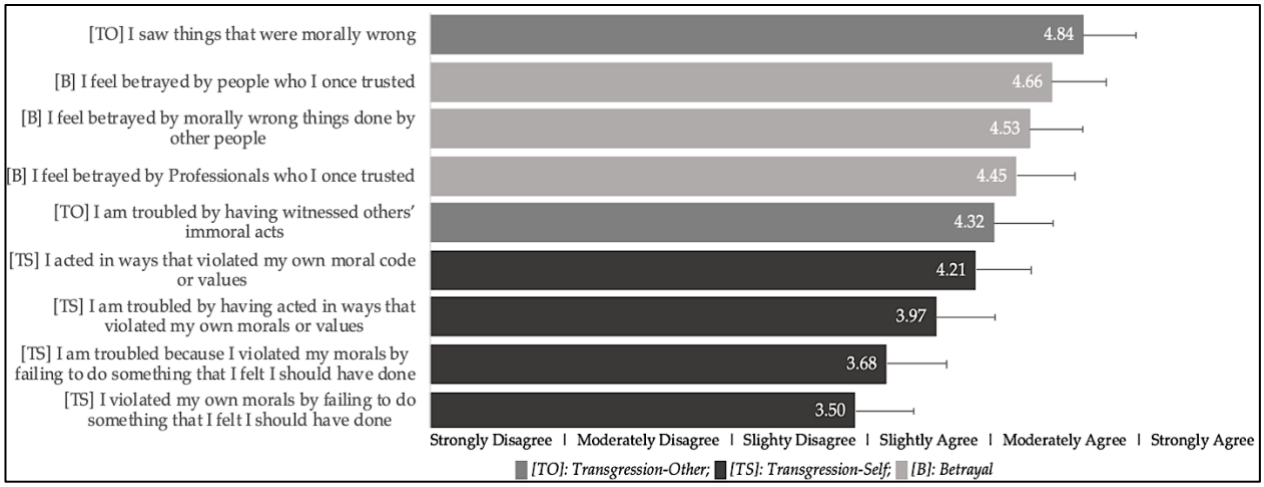

Figure 6: Item-Level averages and standard error bars for the MIES in ascending order (n=38)

Model fit statistics are provided in Table 10 and show that a three-factor model using principal components extraction and Kaiser's criterion (Eigenvalues>1) fit the data and aligned with existing theoretical item to Sub-scale categories (Bryan et al., 2016). Descriptive and inferential analyses were therefore calculated for Transgression-Self (items

3-6), Transgression-Other (items 1-2), and Betrayal (items 7-9) Sub-scales. Together the factors explained 77.2% of the variance observed (Transgression-Self=32.9%; Transgression-Other=16.2%; Betrayal=28.1%). The second MIES item factor loadings ('*I am troubled by having witnessed others' immoral acts*') overlapped with Transgression-Other (r=.507) and Betrayal (r=.727), with the former chosen as it matched existing models (Bryan et al., 2016).

Table 10: Psychometric Properties and Factor Structure for the MIES confirming the three-factor solution fit (n=38)

MIES Item	Mean	SD	Item-Total r	Factor 1 TS (α=.85)	Factor 2 TO (α=.59)	Factor 3 B (α=.75)
I saw things that were morally wrong	4.84	1.88	.792	-.122	**.871**	.032
I am troubled by having witnessed others' immoral acts	4.32	2.12	.784	.136	**.507**	.727
I acted in ways that violated my own moral code or values	4.21	1.97	.742	**.855**	-.160	.042
I am troubled by having acted in ways that violated my own morals or values	3.97	2.16	.717	**.814**	-.215	.172
I violated my own morals by failing to do something that I felt I should have done	3.50	2.13	.810	**.872**	.305	-.033
I am troubled because I violated my morals by failing to do something that I felt I should have done	3.68	2.21	.740	**.794**	.156	.343
I feel betrayed by people who I once trusted	4.66	1.98	.647	.342	.505	**.538**
I feel betrayed by Professionals who I once trusted	4.45	2.14	.767	.022	-.004	**.904**
I feel betrayed by morally wrong things done by other people	4.53	1.94	.764	.158	-.015	**.859**

B: Betrayal; SD: Standard Deviation; TO: Transgression-Other; TS: Transgression-Self

2.3.3 Other Psychometric Scores

Not all participants completed every measure after ending sessions early due to fatigue, however all consented to retain their data. The ITQ (n=35) reported a total score of M=11.74 (SD=11.67), PTSD score of M=5.29 (SD=6.44), and DSO score of M=6.46 (SD=6.20), which translates as the 24th, 22nd, and 27th maximum score percentiles respectively. The ReQoL (n=35) reported a total score of M=50.31 (SD=18.31) which is on the threshold and within a non-clinical range. Participants in medium-secure (M=46.93, SD=18.97) reported

ReQoL scores within the clinical range compared with low-secure (M=61.50, SD=11.07) (p=.007). The SSGS (n=34) reported a Shame score of M=8.56 (SD=5.58) and a Guilt score of M=11.15 (SD=6.22) which represents the 34th and 45th maximum score percentiles respectively. The SCS-SF (n=33) reported a score of M=39.35 (SD=10.84), below the measure's validation samples (M=48.12, SD=11.61) (Raes et al., 2011) but above the 50th clinical percentile (66th percentile) (Hayes et al., 2016). Males (M=42.15, SD=8.80) reported higher SCS-SF ratings than Females (M=28.86, SD=11.91) (p=.046).

2.3.4 Correlation Analyses

Table 11 and Figure 7 show descriptive statistics and psychometric scale intercorrelations. A significance threshold of $p \leq .05$ was retained due to the early nature of the field, potential associations, and numerous other research examples (Bhalla et al., 2018; Cameron et al., 2020; Fani et al., 2021; Forkus et al., 2019; Frankfurt et al., 2018; Maftei & Holman, 2021; Ogle et al., 2018; Protopopescu et al., 2021; Schwartz et al., 2021; Thomas, Weiss, et al., 2021). All MIES Sub-scales significantly and strongly correlated with each other (r=.569 to .800, $p \leq .01$) except Transgression-Self with Transgression-Other and Betrayal. Analyses reported moderate-to-large associations between the MIES and ITQ at both Full-scale (r=.618, $p < .001$) and Sub-scales (r=.382 to .625, $p \leq .05$). There were no significant associations between Transgression-Self and the ITQ DSO Sub-scale. The MIES Full-scale moderately and negatively correlated with the ReQoL (r=-.341, p=.045) indicating higher MIES scores were associated with lower quality-of-life ratings. The SSGC Guilt scores were moderately associated with MIES Full-scale (r=.470, p=.005) and Transgression-Self (r=.464, p=.006) but not Transgression-Other or Betrayal. The SSGC Shame and SCS-SF scores did not significantly correlate with the MIES Full-scale or Sub-

scales. The ITQ Total and Sub-scale scores were moderately-to-largely and negatively associated with the ReQoL ($r=-.473$ to $-.525$, $p\leq.01$) and SCS-SF ($r=-.525$ to $-.617$, $p\leq.01$), and positively with the SSGS Guilt ($r=.400$ to $.552$, $p\leq.01$) and Shame ($r=.418$ to $.604$, $p\leq.05$). The ReQoL scores strongly and negatively correlated with the SSGS Shame ($r=-.538$, $p=.001$) but not the SSGS Guilt or SCS-SF. Finally, the SCS-SF significantly correlated with the SSGS Shame ($r=-.502$, $p=.003$) but not SSGS Guilt.

Table 11: Spearman Correlations between Psychometrics at Full-scale and Sub-scale Levels

	Psychometric (N)	M	SD	Possible Range	95% CI	1	2	3	4	5	6	7	8	9	10
	MIES (38)														
1	Full-scale	38.16	11.55	9-54	[36.25, 43.39]	-									
2	Transgression-Other	9.16	3.37	2-12	[8.56, 10.71]	.631**	-								
3	Transgression-Self	15.37	7.06	4-24	[13.25, 18.2]	.800**	.206	-							
4	Betrayal	13.63	4.92	3-18	[13.03, 15.88]	.743**	.569**	.312	-						
	ITQ (35)														
5	Total	11.74	11.67	0-48	[7.74, 15.75]	.550**	.476**	.334*	.472**	-					
6	PTSD Total	5.29	6.44	0-24	[3.07, 7.50]	.632**	.386*	.520**	.395*	.890**	-				
7	DSO Total	6.46	6.20	0-24	[4.33, 8.59]	.413*	.475**	.134	.439**	.898**	.655**	-			
8	ReQoL (35)	50.31	18.31	0-80	[42.97, 56.06]	-.341*	-.211	-.150	-.435**	-.525**	-.463**	-.473**	-		
	SSGS (34)														
9	Shame	8.56	5.58	5-25	[6.57, 10.58]	.241	.231	.124	.190	.577**	.418*	.604**	-.538**	-	
10	Guilt	11.15	6.22	5-25	[8.72, 13.09]	.470**	.251	.464**	.210	.523**	.552**	.400*	-.260	.599**	-
11	SCS-SF (33)	39.35	10.84	12-60	[35.49, 43.18]	-.335	-.136	-.241	-.206	-.617**	-.552**	-.525**	.298	-.502**	-.279

CI: Confidence Interval; M: Mean; SD: Standard Deviation
DSO: Disturbances in Self-Organisation; MIES: Moral Injury Events Scale; PTSD: Post-Traumatic Stress Disorder; ReQoL: Recovering Quality of Life; SCS-SF: Self-Compassion Scale-Short Form; SSGS: State Shame and Guilt Scale
***p≤.01; *p≤.05*

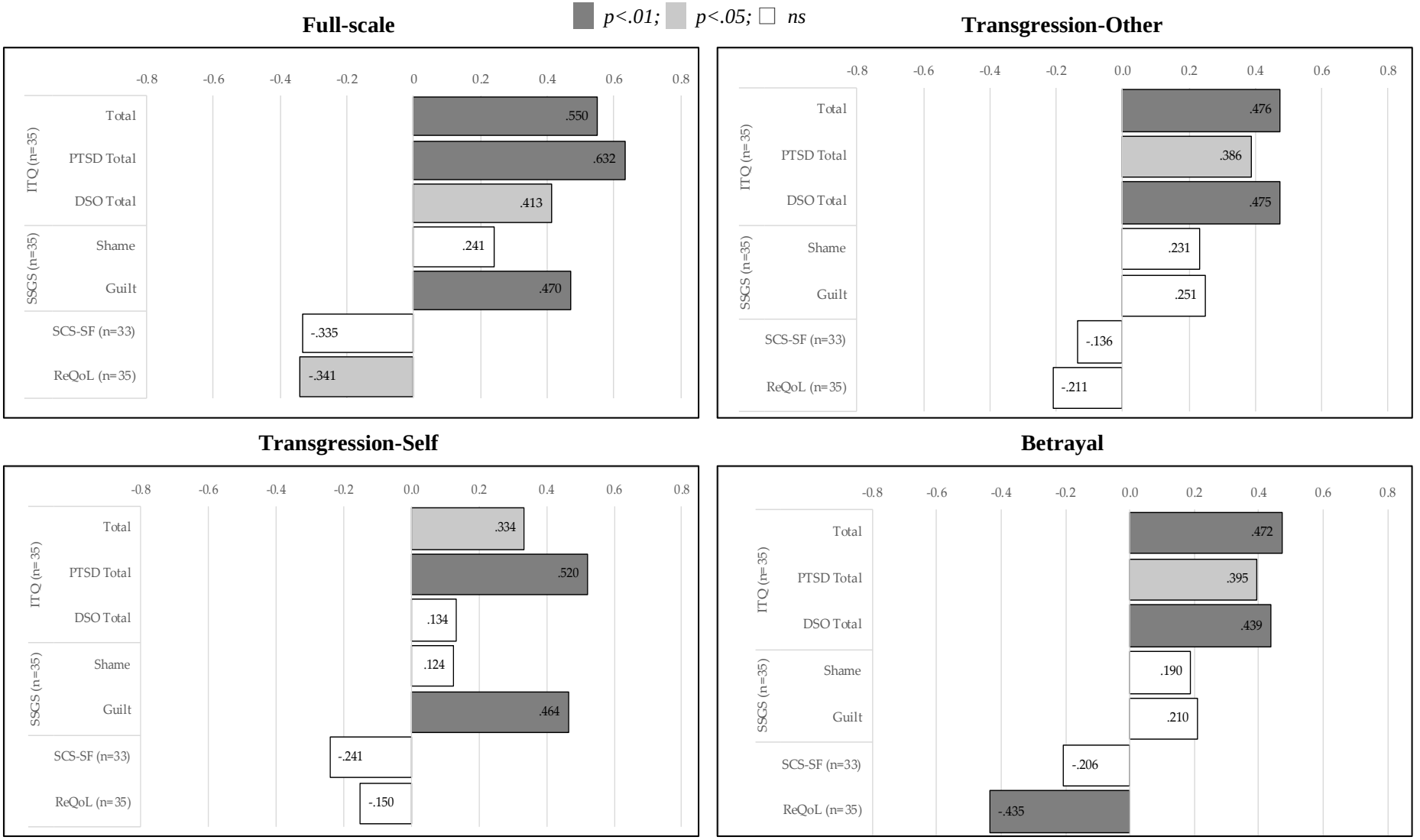

Figure 7: Chart of Spearman Correlations between MIES Full-scale and Sub-scale with the other Psychometrics

2.3.5 Regression

Following the identification of significant associations, a multiple regression analysis predicting MIES Full-scale scores was undertaken using the ITQ Total, ReQoL and SSGS Guilt ratings. Socio-demographic and event type factors were not considered as there were no significant differences in MIES scores. Three factors are appropriate within a minimum of 10 participants-per-predictor variable guideline (Wilson Van Voorhis & Morgan, 2007). Statistical assumptions and variable suitability were confirmed based on dependent variable normality (Kolmogrov-Smirnov: p=.182), multicollinearity (r_s<.70), variable linearity (observing P-P plots), and no standardised residual outliers (>±3).

Variables were entered simultaneously and separately to assess contributions and provide conservative estimate comparisons with fewer variables (Table 12). Together, the variables accounted for 49.5% of the variance in MIES scores however this was mostly accounted for by the ITQ which was the only variable reporting significance within the model (F(3,33)=2.512, p<.018). The ReQoL and SSGS Guilt scores accounted for 26.7% of the variance (F(2,33)=5.66, p<.008), while the SSGS and ITQ Total accounted for 39.2% of the variance (F(2,33)=11.03, p<.001). On its own, the ITQ Total accounted for 38.0% of the variance (F(1,33)=15.70, p<.001) indicating its relatively moderate contribution to MIES score variance.

Table 12: Regression of factors between ratings of Moral Injury and PSTD, Complex-PTSD, Guilt, and Quality-of-Life

Effects	β	t	p
Cumulative model	-	3.92	.002
ITQ Total	.534	2.51	.018
ReQoL	.069	.358	.723
SSGS Guilt	.200	1.13	.269

***p≤.01; *p≤.05*

2.4 Discussion

2.4.1 Findings Summary

This study aimed to assess MI prevalence and its clinical associations within a secure care population using psychometric tools. The sample reported moderate-to-high ratings based on MIES Full-scale and Sub-scale score ranges. Participants scored items as '*Moderately Agree*' and rated Transgression-Other and Betrayal highest, indicating that others' transgressive acts contributed to overall ratings. A three-factor model was used, although the Transgression-Other Sub-scale reported below satisfactory internal consistency levels and correlated with fewer psychometric ratings.

The MIES scores were associated with PTSD, complex-PTSD, poorer quality-of-life, and guilt ratings. The ITQ accounted for a proportion (<50%) of MIES scores and correlated with all psychometrics. While the MIES correlated with guilt, it did not with shame or self-compassion. Subgroup analyses were limited by low numbers and reported few MIES score differences in socio-demographics and event type characteristics. Most participants could recall an event or multiple events which typically did not involve drugs/alcohol and mainly related to informal acquaintances or strangers, especially among White/Caucasian participants. The average event age (or most recent/impactful event) was 11.5 years, which exceeded the average length of stay (2.5 years), although this data was only available for around half the sample (n=18). The Transgression-Other Sub-scale negatively correlated with event age, indicating recent events related to higher scores.

2.4.2 Comparisons with other Literature

This study reported higher MIES scores (M=38.16) than other samples including UK Health Professionals (M=15.5) (Lamb et al., 2021) and US Military groups (M=28.7-33.9) (Cameron et al., 2020; Evans et al., 2018; Thomas, Weiss, et al., 2021) and comparable ratings with Canadian veterans and law enforcement (M=39.9) and civilians experiencing PTSD (M=39.3) (Terpou et al., 2022). The Full-scale (M=38.16) exceeded the upper bandings proposed by Lamb et al. (2021) (≥17) and Boska and Capron (2021) (≥28), while all individual average item-scores exceeded >3 (Haight et al., 2017; Levi-Belz et al., 2020; Maguen et al., 2020, 2021; Sugrue, 2020) and ≥3 (Schwartz et al., 2021) thresholds, and two-thirds exceeded >4 (Held et al., 2021; Wisco et al., 2017). Around 80% endorsed items above 3 at Full-Scale and Transgression-Other, followed by three-quarters at Betrayal, and 60% Transgression-Self, exceeding proportions reported in other non-military research (Borges et al., 2021; Currier et al., 2013; Hoffman & Nickerson, 2021; Khan et al., 2021; Sugrue, 2020); however, this should be interpreted with caution due to the varying criteria across studies. Participants generally rated other clinical psychometrics within clinical ranges and between small-to-moderate levels. The scores were comparable with post-treatment clinical samples and small-to-moderate distress categories indicating their presence but stable nature, perhaps reflecting their ongoing rehabilitation (Cloitre et al., 2021; Hayes et al., 2016; Keetharuth et al., 2018; Marschall, Saftner & Tangney, 1994; Raes et al., 2011).

2.4.3 Interpretations

The associations between MI and poorer quality-of-life align with meta-analyses (Hall et al., 2022; McEwen et al., 2020; Williamson et al., 2018) and further support the clinical utility of assessing moral emotional experiences within this population. Based on this study, the ITQ (Cloitre et al., 2018) represents a valuable assessment tool as it correlated with various psychological constructs including poorer quality-of-life, shame and guilt, and self-compassion. The moderate associations between MI and PTSD and the nature of MI as a relatively distinct construct support other findings (Bryan et al., 2016; Hall et al., 2022; McEwen et al., 2020; Williamson, Murphy, Castro, et al., 2020). Research suggests that PTSD and MI are distinct but can co-occur, which can lead to greater distress and intervention challenges (Bryan et al., 2016; Williamson, Murphy, Castro, et al., 2020). Within a UK military sample, approximately 20% reported experiencing both which was associated with increased anxiety and suicidality (Williamson, Murphy, Stevelink, et al., 2020). Their co-occurrence could relate to the same or different events further supporting the need to consider the moral aspects of traumatic experiences.

Based on this sample, self-compassion's role did not appear relevant for MI ratings, although it did for PTSD. This aligns with observations in US military populations which reports mixed findings around self-compassion mitigating MI-related distress (Forkus et al., 2019; Kelley, Bravo, et al., 2019; Manalo, 2019). Other research reports cyclical relationships between spirituality/religiosity and MI which may either exacerbate or mitigate the other (Brémault-Phillips et al., 2019; Coady et al., 2021; Kopacz et al., 2019; Litz et al., 2009). Although the relevance of spirituality/religiosity in MI among forensic populations

appears mixed (Maddocks, 2021; Roth et al., 2021), it may be valuable in understanding its influence on MI and the clinical associations observed.

The findings corroborate qualitative research demonstrating PMIEs and related distress among offending populations (Maddocks, 2021; Roth et al., 2021). These studies describe outwardly directed PMIEs which are linked with losing trust and increasing anger towards institutions and other individuals (Maddocks, 2021; Roth et al., 2021), and are consistent with the relatively higher Transgression-Other and Betrayal ratings in this study. Considering the two general types of PMIEs (Litz & Kerig, 2019), those directly or indirectly exposed to others' acts seemingly contributed to this sample's ratings. Exposure to others' acts may reflect in part feelings of guilt as indicated by the multiple significant associations. Research suggests guilt-associated MI is related to regret and concern about personal actions and a desire to make amends, while shame is harder to detect and is associated with withdrawal and obscuring information (Roth et al., 2021). The limited associations of shame may reflect the methodology in recruiting those willing to participate and a possible reluctance to disclose shameful experiences, particularly in a forensic context which may discourage admissions (Fritzon et al., 2021; Hesselink & Booyens, 2021; Maddocks, 2021; Roth et al., 2021; Scott et al., 2022). Future research should consider the clustering of specific moral emotional experiences, like guilt or shame, and how they contribute to MI within this context.

The precise mechanisms linking PMIEs with MI-related distress are debated (Farnsworth et al., 2017; Fleming, 2022; Nash, 2019). The field does not yet have an established assessment method and this study prioritised brevity over in-depth strategies. MI conceptual models link anger, resentment, and externalising blame with other-transgressions more so

than self-transgressions (Litz & Kerig, 2019). These mechanisms may explain the relatively higher Transgression-Other and Betrayal ratings, along with guilt associations, but not shame which reflects internalising effects following self-transgressions. Research identifies moral conflicts related to the forensic system which can lead to anger, anxiety, and hopelessness due to unjust perceptions and indefinite sentencing (Roth et al., 2021). Exposure to PMIEs within institutions is possible due to violence risk and stressful encounters (Hesselink & Booyens, 2021; Maddocks, 2021; Roth et al., 2021; Scott et al., 2022). Unfortunately, given the ethical and methodological constraints, the details about PMIEs were unclear. The discrepancy in event age and length of stay suggests many still have experiences which might trouble them and may not be addressed. The wide variation in event age also suggests that for some participants, PMIEs related to their detainment experiences.

The challenges in determining how PMIEs and MI develop reflect broader debates and disagreements in defining the concept. As a relatively recent field, there exist few established frameworks. While initial models focused on PMIEs, there are emerging ideas which propose that MI may result from accumulated moral distress, making it difficult to identify specific causal incidents (Nash, 2019). Fleming (2022) has put forward a model of complex-MI akin to complex-PTSD to broaden the concept and account for experiences without clear symbolising events, but which disrupt foundational moral beliefs. The concept of complex-MI, that is, persistently morally distressing experiences, seems relevant for secure care populations who, according to research, are exposed to greater traumatic events than the general population (Baranyi et al., 2018; Bebbington et al., 2017; Facer-Irwin et al., 2021; Ford et al., 2019; Macinnes et al., 2016; Peltonen et al., 2020; Stinson et al., 2016).

Exposure to and participation in violent acts at a younger age can result in enduring distress (Karmel & Kuburic, 2021) and affect brain functioning (Craig & Rettenberger, 2022; Terpou et al., 2022). Those involved in gangs from a younger age may increase exposure to PMIEs, creating at-risk groups (Kerig et al., 2013, 2016). Studies have even drawn parallels between gang grooming and child soldier experiences in war-torn countries (Kerig et al., 2013; Wainryb, 2011; Wong, 2021). Childhood traumatic experiences are relevant for MI as it represents a developmental stage where rules and expectations are formed (Litz & Kerig, 2019). Consequently, those in secure care not only represent a risk for transgressive acts in adulthood, but they likely have a history of experiencing PMIEs making them vulnerable to MI. Alternatively, if individuals live in a context and culture consistent with violence as a norm, then MI may be at reduced risk as PMIEs are less dissonant. Nevertheless, this and other studies suggest that moral emotions and related distress are common and therefore relevant for forensic populations (Maddocks, 2021; Mapham & Hefferon, 2012; Mcloughlin, 2018; Roth et al., 2021). Further exploratory work in forensic contexts around possible causal mechanisms will be valuable for informing conceptual models and clinical strategies.

2.4.4 Clinical Implications

This study represents a clinically relevant strategy for managing distress and disclosures that might occur during MI assessments (Frederickson, 2019; Williamson, Murphy, Castro, et al., 2020). It supports exploring moral emotional experiences among this population, particularly when assessing trauma histories. Given their conceptual overlap and shared origins, most studies have focused on MI and PTSD, and report moderate associations between the two (Hall et al., 2022; Williamson et al., 2020). Neuroimaging studies find that

MI operates via different neural pathways to PTSD (Barnes et al., 2019; Lloyd et al., 2019), and may result in 'literal' injuries to tissue through prolonged stress (Nash et al., 2019). MI develops after events with neural correlates aligning with negative self-referential states, differing from activations in fear-based regions like PTSD (Barnes et al., 2019). From a clinical perspective, treatments targeting primary PTSD-symptoms (e.g., anxiety, fear, and anger) may be overlooking features of MI (e.g., shame, guilt, and self-loathing). Interventions involving exposure with limited emphasis on the sense-making of moral emotions may worsen those experiencing MI. Assessing MI in forensic populations may therefore offer the potential to enhance recovery and community re-integration and inform epidemiology.

2.4.4.1 The Relational Dynamics of MI in Forensic Care

Moral codes are embedded in the forensic system which detains individuals for transgressing moral norms and restricts civil liberties to manage offence-related risk and recidivism. Morality is inherently subjective, relational, and varies across cultures, settings, and time-periods (Maddocks, 2021; Mascolo & Fasoli, 2020; Parish, 2014). Social functional theories draw attention to the idea of reciprocal altruism which reinforces cooperation and group-unity, and thereby moral norms (Litz & Kerig, 2019). Those deviating from perceived moral norms may be othered and dehumanised as an out-group ("them") by those in-group ("us") (Litz & Kerig, 2019). Offenders can experience stigma and social exclusion from society, their families, and support networks due to their behaviour and overarching societal beliefs about offender immorality (Maddocks, 2021). Social exclusion might add to alienation and subsequent withdrawal and isolation, exacerbating distress (Clarke, 2017; Mills & Codd, 2008). Offenders report greater

rumination and intrusive thinking than the general population, which can be exacerbated by their detainment and social exclusion (Crisford et al., 2008; Mossière & Marche, 2020; Ternes et al., 2019). Greater withdrawal and isolation can increase rumination which is shown to mediate MI-related distress (Bravo et al., 2020; Hamrick et al., 2020; Mossière & Marche, 2020; Ternes et al., 2019).

From a clinical perspective, it's important to consider how services and staff relate and respond to those they care for. Evidence suggests practitioners are sometimes reluctant to explore the moral dimensions of experiences, perhaps reinforcing shame and guilt about topics that can't be discussed (Maddocks, 2021). Practitioners may be unaware of the importance of moral emotions and few report awareness about MI (Levi-Belz & Zerach, 2022; Williamson, Murphy, Stevelink, et al., 2020), including within forensic settings (Maddocks, 2021; Roth et al., 2021). Moral reasoning studies support the role of meaning-making, restorative justice, and value-based interventions for addressing injured self-worth and moral beliefs (Forkus et al., 2019; Griffin et al., 2019; Jones et al., 2022; Mordeno et al., 2022). Traditional trauma-based interventions involving thought challenging and cognitive re-appraisal may not be appropriate for managing the moral emotions associated with experiences (Jinkerson, 2016; Litz et al., 2009). Unfortunately, there exist few empirically supported interventions for managing MI, and none involving forensic populations. Further work exploring other perspectives within the system, including professionals and family and friends is therefore necessary, along with clearer guidance and training on MI and its associated distress.

2.4.5 Limitations

The study occurred during the Covid-19 pandemic which resulted in restricted, inconsistent, and opportunistic ward access. The low response rate means the sample represents a minority approached, although it is equivalent to the Community Mental Health Survey (2021) (26%) but not UK prison surveys (70%, Bebbington et al., 2017; 51%, Facer-Irwin et al., 2021). The sample was majority Male, White/Caucasian, and from Medium-secure settings limiting subgroup analyses and not all participants completed every measure restricting correlation analyses. The sample reflected national offender characteristics by ethnicity (72%) but not female proportions (4%) or age profile distribution (Ministry of Justice, 2021).

Time restrictions determined the choice of psychometrics and omitted dimensions relevant to MI and forensic research including religiosity/spirituality (Coady et al., 2021) and malingering risk (Walczyk et al., 2018). As a cross-sectional design, it's not possible to make causal or temporal inferences about clinical associations. Equally, it's worth noting that the MIES has not been validated for non-US military samples and, following other research, its final three-items were modified for this study. The Transgression-Other Sub-scale's low internal consistency also warrants caution. For ethical and methodological reasons, the study did not ask for details about PMIEs, and accounts may have referred to experiences before-or-during detainment. Qualitative research is likely complementary to this study's findings (Maddocks, 2021; Roth et al., 2021) although mixed-methods designs involving the same sample would be valuable and informative.

2.4.6 Conclusions

The study assessed the prevalence of MI among a UK secure-care population, along with relevant clinical associations. Through psychometric assessment, it found moderate-to-high ratings of PMIEs and MI-related distress which were associated with PTSD, complex-PTSD, guilt, and poorer quality-of-life ratings. The scores did not correlate with shame or self-compassion which may reflect the study design or conceptual frameworks' applicability. The findings support MI and trauma assessments within secure care settings and provide a clinically relevant assessment strategy. Based on this study, services and professionals should consider MI for clinical assessments and explore intervention and service strategies to enhance rehabilitation potential from MI-related distress.

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PRESS RELEASES: MORAL INJURY - ASSESSMENT TOOLS AND FORENSIC SECURE CARE

3.1 Moral Injury Thesis Overview

For many years, researchers have studied traumatic experiences, including Post-Traumatic Stress Disorder (PTSD). However, this work has generally overlooked morally traumatic experiences characterised by feelings of shame and guilt. The notion that people can be profoundly harmed by morally transgressive acts committed by themselves or others is as old as human history. Countless literary examples refer to a morally traumatised individual, including Homer's Achilles, Dostoevsky's Crime and Punishment, Albert Camus' The Fall, Martin Amis's Time's Arrow, and Shakespeare's Lady Macbeth. Moral Injury (MI) is a psychological construct defining the distress someone experiences when their actions, or lack of actions, violate their personal moral codes. For example, being involved in the harm of or witnessing harm to another person.

Shame, guilt, and moral conflict can lead to stress, self-imposed withdrawal, and harmful health behaviours including drug and alcohol abuse. Current theories propose that MI follows a potentially morally injurious event or multiple events. These events are typically characterised by high-stake situations which include life threats or severe physical and mental harm. When interpreted by an individual, these events, and their involvement in or observations of, may be incompatible with personal values which then create and maintains features of guilt, shame, and psychological distress. The emerging research in this area shows that MI resonates with clinical samples, practitioners, and researchers. Acquiring further knowledge about MI is therefore important to understand and support assessment and treatment. Accordingly, this thesis looked at MI by evaluating a common assessment tool as part of a literature review and then looked at whether MI was common within an under-researched forensic secure care population.

3.2 Literature Review: Moral Injury Assessment Tool Evaluation

Research around MI is accelerating, with many studies looking at how to assess morally injurious events and their psychological impact. Many researchers have focused on developing assessment tools to look at MI on a larger scale and help inform measurement and treatment strategies. Psychometric assessment tools are a common way of looking at psychological concepts, but like any measure, it is critical that they are reliable and valid. Reliable and valid tools are useful because they help researchers and clinicians accurately and dependably assess psychological concepts. The Moral Injury Event Scale (MIES) is one of the first and most used assessment measures within the field. It is a brief, self-report metric that asks people to rate potential events causing MI and how much the event(s) troubles them. It includes three sub-scales covering self-transgressions (when someone commits an act or fails to act), others-transgressions (when another commits an act or fails to act), and betrayal (experienced through systems, peers, or those in positions of authority). Each sub-scale measures how much these domains violate moral values and lead to negative outcomes.

The MIES was created for US military settings but has since been used in multiple contexts and settings. A meta-analysis was performed to see whether the MIES remained a reliable and valid tool across settings and how different factors like sample characteristics (e.g., age, gender) might affect it. Searching through different databases and articles, the review found 42 records using and reporting relevant MIES data published up until April-2022. In all 42 records, there were about 35,000 participants with an average age of around 40 years. Most of the sample was Male (~65%), White/Caucasian (~70%), US-based (~75%), and in Military (~60%) and Community (~75%) settings. Most papers provided reliability information using Cronbach's Alpha which represents a measure of internal

consistency, that is, how closely each item within a set relates as a group. The records were reviewed according to a set of quality criteria which outlined possible risks of bias. Overall, the quality of studies was mixed but mostly rated as low followed by unclear, supporting the field as methodologically robust when reporting Cronbach's Alpha data.

The pooled alpha estimate supported the MIES as an internally consistent tool at both Full-scale and Sub-scale levels. Using guidelines, ratings were '*Excellent'* for the self-transgression Sub-scale, *'Good'* for the Full-scale and '*Moderate'* for others-transgression and betrayal Sub-scales. Although the review found many differences in how and where the MIES was used, the alpha estimates were relatively resilient to subgroup differences. Most differences were related to Male and Military factors, which likely reflects where the MIES was first developed and used. All subgroup differences exceeded the recommended minimum alpha values recommended by guidelines. There was limited evidence of publication bias and small-study effects, and the estimates were relatively resilient against the effects of future publications. All 42 records were diverse in character and content and should be looked at with this in mind as their inconsistency limits the finding's reliability. The lack of other reliability and validity information, including test-retest reliability, inter-rater/intra-rater reliability, and structural and face validity, means it's not possible to define the MIES as a psychometrically sound tool beyond its original study designs. Nevertheless, the findings support the MIES as an internally consistent tool based on pooled alpha estimates across settings and, from a clinical perspective, above acceptable levels.

3.3 Empirical Paper: Moral Injury and Forensic Populations

MI was first developed and assessed in the military but is now being looked at in non-military settings. One group yet to be assessed for MI are those within forensic clinical care. Across the UK, forensic secure care hospitals provide support to those with severe mental health problems who represent a risk to the public. These services provide treatment and rehabilitation to those imprisoned or admitted following a criminal offence. Given the many moral and ethical challenges and transgressive acts this population encounters, they represent an at-risk group for MI. Some have pointed out similarities between military and forensic contexts, including proximity to death or failing to prevent harm to another person.

This study therefore looked at MI's prevalence and its clinical associations within a UK secure care population. Lots of research shows MI to be a strong indicator of poor mental health with moderate links to PTSD, depression, anxiety, poorer quality-of-life, and lower self-compassion. Using a series of brief and relevant psychometric tools, the study assessed MI, trauma, quality-of-life, shame and guilt, and self-compassion in 38 participants from across eight secure care sites. Participants were recruited via Ward community meetings and through care teams to find candidates to approach so they could decide if they wanted to take part. The recruited sample had an average age of around 40 years, was mostly Male (~80%), White/Caucasian (~70%), and from Medium-secure settings (~80%).

The results indicated that compared with other groups, ratings of MI were moderate-to-high, suggesting exposure to potentially morally injurious events and MI-related distress were common. Around 9 in 10 participants reported thinking of an event, with the average age of the event (or most recent/impactful event) being 11.5 years. The age of the event

exceeded the length of stay in secure care services, which averaged around 2.5 years, indicating there were incidents potentially unaddressed in their rehabilitation. Although the sample included diverse ages, genders, and ethnicities, there were few differences between groups, however, the numbers for each were small so should be looked at carefully.

MI assessment scores were associated with higher ratings of trauma and guilt and poorer quality-of-life. There were no associations between MI scores and shame or self-compassion ratings. These links indicate that of the two broad types of MI events, those directly or indirectly involving others' acts seemingly contributed to MI ratings within this sample. The overall ratings of distress from trauma, quality-of-life, shame and guilt, and self-compassion were generally within clinical ranges and between small-to-moderate levels. This likely reflects the secure care rehabilitation focus and care team selection of participants recruited.

The findings support the value and relevance of MI within a forensic secure care setting. The moderate-to-high ratings suggest this sample had faced potentially morally injurious events and these caused them some level of distress. It echoed previous work which found that MI is associated with markers of poor mental health, including PTSD and poorer quality-of-life. Given the general differences in MI ratings and other clinical measures, along with the differences in age of event and length of stay, it suggests moral emotional experiences may be an overlooked aspect of support in secure care. Research elsewhere suggests that services and professionals may not be aware or are reluctant to explore the moral aspects of experiences due to their challenging content. The study supports MI and trauma assessments within forensic secure care settings and offers a possible strategy to explore these concepts. Clinical assessments, treatment, and service strategies should consider MI evaluation to enhance rehabilitation potential.

Appendices

4.1 Ethics Committee Approval Letter

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

Dr Scott Steen
Trainee Clinical Psychologist
Birmingham and Solihull Mental Health Foundation Trust
1, B1, 50 Summer Hill Rd
Birmingham
B1 3RB

30 July 2021

Dear Dr Steen

HRA and Health and Care Research Wales (HCRW) Approval Letter

Study title:	**The Prevalence and Clinical Impact of Moral Injury in a UK Secure Care Population**
IRAS project ID:	**295314**
Protocol number:	**RG_21-006**
REC reference:	**21/WM/0134**
Sponsor	**University of Birmingham**

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.

Please see IRAS Help for information on working with NHS/HSC organisations in Northern Ireland and Scotland.

How should I work with participating non-NHS organisations?
HRA and HCRW Approval does not apply to non-NHS organisations. You should work with your non-NHS organisations to obtain local agreement in accordance with their procedures.

What are my notification responsibilities during the study?

The standard conditions document "*After Ethical Review – guidance for sponsors and investigators*", issued with your REC favourable opinion, gives detailed guidance on reporting expectations for studies, including:

- Registration of research
- Notifying amendments
- Notifying the end of the study

The HRA website also provides guidance on these topics, and is updated in the light of changes in reporting expectations or procedures.

Who should I contact for further information?
Please do not hesitate to contact me for assistance with this application. My contact details are below.

Your IRAS project ID is **295314**. Please quote this on all correspondence.

Yours sincerely,
Helen Penistone
Approvals Manager

Email: approvals@hra.nhs.uk

Copy to: *Dr Birgit Whitman*

4.2 Study Materials

4.2.1 Participant Information Sheet

UNIVERSITY OF BIRMINGHAM

PARTICIPANT INFORMATION SHEET

The Prevalence and Clinical Impact of Moral Injury in a UK Secure Care Population

Name of Investigator: **Scott Steen**

Introduction

You are invited to take part in a study about moral hurt. Moral hurt refers to when someone suffers because of their actions or lack of actions which clash with their moral code or conscience. Moral hurt occurs along a scale causing little to great distress. This study will look at how common moral hurt is and whether it affects wellbeing or is more common after certain experiences.

Please read the info below before you decide to take part. You will be given 48-hours to decide whether to take part after reading this. The sheet explains why the study is happening and what is involved if you took part. The contact info for the research staff is listed below. Please contact us or your care team if you have any questions.

Why are we doing this study?

We are looking at moral hurt and whether it exists in secure care settings. Other work suggests that moral hurt can affect people's wellbeing and ways of coping. Knowing more about it could help assessment in these services.

The study will look at how common moral hurt is by using questionnaires. It will look at how moral hurt affects care by joining it with other assessment info. If there is a link, this could inform how to support people. The study is a chance for the research team to hear your experiences and maybe help others receive the right support.

Who is being asked to take part?

We are asking people in Secure Care Hospitals across the West Midlands.

Do I have to take part?

No, taking part is completely voluntary and it will not affect your care.

What will happen if I do take part?

You will be asked a series of questions about moral hurt, wellbeing, and events in your life. Most questions use a rating scale (e.g. '*Some of the time'; 'None of the time*'). The questions will not go into more detail than this.

If you consent, you will hear a statement lasting around 5-minutes and 5-to-10-minutes to debrief after. The questions in-between will take an estimated 20-to-30-minutes to complete. In total, your time taking part in this study will be around 40-minutes.

You will be asked to complete the questions with a member of the research team in a private room. This will happen on a date and time easiest for you. With your consent, the research team will view your medical records to add to your questionnaire answers. Your answers will be de-identified

meaning it won't be possible to directly identify you. Your answers will be combined with other peoples to look for patterns at a group-level.

Are there any risks to taking part?

By taking part in the study, it may cause you to experience distress. There is a risk the questions might cause a negative response in you. Some of the questions ask about sensitive topics and this might be tough.

We ask that you answer the questionnaire items only and do not disclose any other information outside of this. The researchers are duty-bound to share any information about an offence or where there is someone at-risk of harm. If there are questions you do not want to answer, you can skip them at any point without giving a reason. You retain your right to withdraw at any point without giving a reason. Your answers will not affect your right to access care. If you are affected by the questions and need support, please let the research team or member of your care team know straight away.

You may find the questions tough to answer because of how they are phrased. We ask you to answer as honestly as you can and ask for further info when stuck. If you cannot answer, you can skip a question at any point without giving a reason.

If there are any concerns in your answers showing a risk of harm to yourself or others, this will be shared with your care team. You will be told about this straight away.

What support is available should you require it?

If you experience distress from this study, either during or after, you can speak with your care team. They will offer care and support and intervene on your behalf.

Who will know that I've taken part?

Your responsible clinician will be informed of your participation in the study. Only the research team collecting the questionnaires will see your answers. Your answers are used for research purposes only and will not affect your care. Your care team will know you have taken part but will not know your answers to the questionnaires.

In the event that your scores suggest the need for support, both you and your care team will be informed. Your care team will only know the overall score, not your answers. Involving your care team will make sure you can access support as needed. You will be told about this as soon as the questionnaire is scored.

After a **2-week period**, all data is anonymised, and it will not be possible to directly link your answers to you.

What if I change my mind?

You can leave the study and completing the questionnaires at any point, without giving a reason.

If you want your answers and assessment info removed, you will need to ask the research team or care team to request this. There is a **2-week period** to request this. After this point, removing your data will not be possible as it will not be possible to directly link you with the responses.

Are there any benefits to taking part?

There is no direct benefit to taking part in this study. Your answers will not be used for anything other than this study meaning it will not affect decisions about your care or provide therapeutic value.

Will there be any financial incentives or reimbursement for taking part?

There is no financial incentive or reimbursement for taking part. Choosing whether to participate will not influence your care.

Will taking part be confidential?

Your info will be stored in line with data protection law which protects your rights. All questionnaire answers will be stored securely on the service's computers and any paper copies stored in a locked drawer, behind a locked door. The Chief Investigator will review your medical records to take assessment info from when you arrived at the service.

We will only use information that we need for the research study. Only the research team will know your responses unless a breach of confidentiality is triggered. Everyone involved in this study will keep your data safe and secure. We will also follow all privacy rules.

Your answers will be combined with other people's and assessed as one big dataset. A final, anonymised file will be transferred to a University of Birmingham secure computer and assessed a professional doctorate in Clinical Psychology. The transfer involves a password-protected and encrypted USB stick. A full set of data will be assessed for patterns.

We will make sure no-one can work out who you are from the reports we write.

How will we use information about you?

We will need to use information from you and from your medical records for this research project. No Personal Info will be taken meaning you can't be identified directly.

This information will include your:

- Questionnaire responses
- Age
- Gender
- Ethnicity
- Highest Education level
- Marital Status
- Geographical Location (using English Indices of Deprivation)
- Primary Diagnosis
- Number of Diagnoses
- Cognitive Difficulties
- Historical Substance Use
- Duration of stay in secure care services (Months)

The Chief Investigator will use this information to do the research. People who do not need to know who you are will not be able to see your name or contact details. Your data will have a code number instead. We will keep all information about you safe and secure.

Once we have finished the study, we will keep some of the data so we can check the results. All identifiers will be removed so it is no longer possible to link you with the responses. We will write our reports in a way that no-one can work out that you took part in the study.

Although identifiers will be removed, the dataset will retain the personally identifiable information listed above. This data will be transferred (using an encrypted and password-protected USB-stick) and stored at the University of Birmingham. It will be kept there for 10-years after the end of the study unless deletion is required for legal or ethical reasons.

In addition to the data collected during the research, your consent form containing your name and signature will be stored at the University of Birmingham for 10 years after the end of the study.

What are your choices about how your information is used?

You can stop being part of the study at any time, without giving a reason, but after the 2-week period following data collection, we will keep the information about you we already have. We need to manage your records in specific ways for the research to be reliable. This means that we won't be able to let you see or change the data we hold about you.

Where can you find out more about how your information is used?

You can find out more about how we use your information

- at www.hra.nhs.uk/information-about-patients/
- by asking one of the research team (listed at the end of this sheet)
- calling us on [XXXX]
- contacting the University of Birmingham's Data Protection Officer on dataprotection@contacts.bham.ac.uk

What if I have a complaint?

If you have any concerns about the study you can speak to a member of the research team in the first instance.

If you wish to make a complaint to someone outside of the research team, please speak with your care team first. If you wish to make a complaint to someone outside of the study team **and** your care team, please contact the Patient Liaison Services (PALS) XXXX by emailing XXXX or telephoning XXXX.

Who is doing the research?

This project is led by Scott Steen as part of their Doctorate in Clinical Psychology at the University of Birmingham. They are supervised by Dr Louise Earley at the University of Birmingham and Dr Deborah Morris . The findings will be written up as a doctoral thesis, journal article and slide presentation. The results will be presented at the University of Birmingham, and national conferences. The study team involved are listed below. Please use these contact details if you have any concerns or questions about the study.

Contact details

If you have any questions or are interested in taking part, then please contact the research team below and talk with your care team.

SCOTT STEEN	**Dr LOUISE EARLEY**	**Dr DEBORAH MORRIS**
(Chief Investigator)	(Research Supervisor)	(Research Supervisor)
Trainee Clinical Psychologist	Consultant Clinical Psychologist	Consultant Clinical Psychologist
T: XXXX	T: XXXX	T: XXXX

Thank you for taking the time to consider this project.

4.2.2 Consent Form

UNIVERSITY OF BIRMINGHAM

CONSENT FORM

The Prevalence and Clinical Impact of Moral Injury in a UK Secure Care Population

Participant Study ID Number:

You are invited to take part in a study about moral hurt. Moral hurt refers to when someone suffers because of their actions or lack of actions which clash with their moral code or conscience. Moral hurt occurs along a scale causing little to great distress. This study will look at how common moral hurt is and whether it affects wellbeing or is more common after certain experiences.

Name of Investigator: **Scott Steen**

	Please initial box
1. I confirm that I have read the info sheet **(v…; dated.....)** for the above project. I have had a chance to think about it and ask questions which were answered.	
2. I understand that my taking part is voluntary, and I am free to withdraw at any time without giving any reason, without my medical care or legal rights being affected.	
3. I understand my participation is anonymous and only the research team will see my responses which are for research purposes only and do not affect my care.	
4. I understand that the research team will have access to my medical records to extract info described in the information sheet and this will be in anonymised.	
5. I agree to my Responsible Clinician being informed of my participation in the study.	
6. I understand that my care team will know I have taken part so they can offer support where necessary but will not know my questionnaire responses.	
7. I agree for my final scores to be shared with my care team in the event that my scores reach a threshold suggesting the need for support.	
8. I understand that relevant sections of my medical notes and data collected during this study may be looked at by individuals from the University of Birmingham, regulatory authorities or the where it is relevant to my taking part in this research (outlined in the info sheet **(v…; dated.....)**. I give permission for these individuals to have access to my records.	
9. I have not been involved with any other psychology or research sessions today.	

10. I agree to take part in this research.

.....	.....	.....
Name of Participant	Date	Signature
.....	.....	.....
Name of Investigator	Date	Signature

Original for the study file, one copy for the participant, one copy for the medical records

4.2.3 Debrief Sheet

UNIVERSITY OF BIRMINGHAM

DEBRIEF SHEET

The Prevalence and Clinical Impact of Moral Injury in a UK Secure Care Population

Name of Investigator: **Scott Steen**

THANK YOU FOR TAKING PART IN THIS STUDY

What are the aims of the study?

The study is interested in how common moral hurt is in a secure care setting and how this effects wellbeing.

What if I have any questions about the study?

You can use the contact details provided on this sheet or ask a member of your care team to contact the study team on your behalf.

How can I contact the research team if I have any questions or if I want my answers removed?

Your answers can be removed within 2-weeks following the completion of the questionnaires.

Please use the contact details provided at the end of this sheet or ask a member of your care team to contact the research team on your behalf. After 2-weeks, any links are removed and the data is anonymised making it impossible to locate your responses, even by the research team.

What will happen to my responses?

All paper copies containing your answers will be entered on to secure service computers. Your answers will be combined with your assessment info from when you arrived at the service. Your answers will be combined with others and reviewed at a group level. 2-weeks after giving your answers, the information will be de-identified meaning it will not be possible to link your answers with you. A final, anonymised file will be transferred to a University of Birmingham secure computer and assessed as part of a final report.

Can I get a summary of the results?

Once the analysis is complete, an A4-sized poster will be displayed, and leaflets made available in the ward communal area summarising the methods, findings and next steps. It will not be possible to identify those who took part because of the anonymisation. The analysis and report write-up are expected to take up to 1-year depending how long the rest of the data collection takes.

Referral to your care team

During the study, you may have experienced a bad effect from completing the questionnaires. If there are concerns, details will be shared with your care team in the interests of providing you support. If the researcher noticed you had a bad experience or you reported scores worthy of clinical concern, they will shared this with you and discussed what will happen next. You will be involved in all discussions with your care team.

This study has raised issues that I am not comfortable discussing with the researcher – what should I do?

You can speak with your care team about any issues raised or use the contact details provided below to contact a person independent of the study team.

If you feel you have been affected by taking part and would like to speak to an independent support service, you are advised to contact:

> **Patient Advice and Liaison Service (PALS): 0800 953 0045**
> For confidential advice, support and information on health-related matters.

I have concerns about this study, or the way in which it was conducted – who should I contact?

You should contact the supervisor using the contact information provided below. If your concerns are not dealt with then you can speak with your care team or contact a person independent of the study team using the contact details below.

What if I have a complaint?

If you wish to make a complaint to someone outside of the study team, please speak with your care team first. If you wish to make a complaint to someone outside of the study team **and** your care team, please contact XXXX by emailing XXXX or telephoning XXXX.

Contact details of the study team

SCOTT STEEN	**Dr LOUISE EARLEY**	**Dr DEBORAH MORRIS**
(Principal Investigator)	(Research Supervisor)	(Research Supervisor)
Trainee Clinical Psychologist	Consultant Clinical Psychologist & Academic Psychologist	Consultant Clinical Psychologist & Academic Psychologist
T: XXXX	T: XXXX	T: XXXX

Again, thank you for taking part in this study.

4.2.4 Recruitment Poster

UNIVERSITY OF BIRMINGHAM

STUDY POSTER v1

The Prevalence and Clinical Impact of Moral Injury in a UK Secure Care Population

Introduction

We are looking at how common Moral hurt is in Secure Care Hospitals across the West Midlands. Work suggests it can affect people's wellbeing and ways of coping. Knowing more about it could help with support. We encourage you to take part so that it represents as many people as possible.

What will happen if I do take part?

You will be asked questions about at moral hurt, wellbeing, and other key events in your life using a rating scale (e.g. '*Some of the time'; 'None of the time*'). None of the questions will ask you to go into detail. You will be asked to complete them with a member of the research team in a private room. This will occur on a date and time easiest for you. The whole session will take no more than 30-minutes.

Do I have to take part?

No, taking part is completely voluntary and it will not affect your care if you decide not to take part. You can stop being a part of the study at any time and will have a 2-week window to withdraw your responses.

Who will know that I've taken part?

Only the research team collecting the questionnaires will see your responses. No Personal Identifiable Info will be taken down meaning it won't be possible to link you directly with the data. After a **2-week period**, all data is anonymised, and it will not be possible to link your answers to the findings.

What will happen to the info I give?

Your info will be collected and stored in line with data protection law which protects your rights. All responses will be stored electronically and securely on the service's computers and looked at by the research team for patterns along with other people's answers.

Who is doing the research?

This project is being conducted by Scott Steen as part of their Doctorate in Clinical Psychology at the University of Birmingham and is supervised by Dr Gary Law at the University of Birmingham and Dr Deborah Morris

Contact details

If you have any questions or are interested in taking part, then please let your care team know or contact the research team below.

SCOTT STEEN	**Dr GARY LAW**	**Dr DEBORAH MORRIS**
(Chief Investigator)	(Research Supervisor)	(Research Supervisor)
Trainee Clinical Psychologist	Programme Director | Doctorate in Clinical Psychology	Consultant Clinical Psychologist & Academic Psychologist

4.2.5 Risk Assessment Needs Plan

CLIENT RISK ASSESSMENT & INDIVIDUAL NEEDS PLAN v1

The Prevalence and Clinical Impact of Moral Injury in a UK Secure Care Population

Name of Investigator: **Scott Steen**

	**How can the researcher know when I am calm and relaxed** **How can the researcher know when I am starting to feel upset**
	**Things we can do when it becomes difficult** **How the researcher can support me to stay calm afterwards**
	**How you can support me to stay calm afterwards** ***Signs that I am calming down*** ***Responses from researchers and the care team to support me to stay calm*** ***How to support me following an incident (debrief)***

Contact details of the study team

SCOTT STEEN (Principal Investigator) Trainee Clinical Psychologist T: XXXX	**Dr LOUISE EARLEY** (Research Supervisor) Consultant Clinical Psychologist & Academic Psychologist T: XXXX	**Dr DEBORAH MORRIS** (Research Supervisor) Consultant Clinical Psychologist & Academic Psychologist T: XXXX

4.2.6 Questionnaire Cover Sheet

QUESTIONNAIRE COVER SHEET - FOR INTERNAL USE

The Prevalence and Clinical Impact of Moral Injury in a UK Secure Care Population

This Cover Sheet should be attached on top of the relevant questionnaire(s) as part of the above-named study.

Full Study Title:	The Prevalence and Clinical Impact of Moral Injury in a UK Secure Care Population
Questionnaire(s) Name (please tick):	☐ MIES Moral Injury Events Scale Modified ☐ 5-item Event Characteristic Questionnaire ☐ Recovering Quality of Life ReQoL-20 ☐ ITQ International Trauma Questionnaire ☐ SSGS State Shame and Guilt Scale ☐ SCS-SF Short Self-Compassion Scale
Participant Study ID:	
Date Questionnaire Completed:	

4.2.7 Five-Item Event Type Questionnaire

5-item Event Characteristic questionnaire about Moral Injury events

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Many people have experienced one, or more, tough times(s) in their lives resulting in a negative outcome. For example, being involved in injuring others or being asked to do something which led to something bad happening. Sometimes people experience things which go against their morals or sense of right and wrong. This can sometimes cause them to feel bad. We are asking you to think of a time when something happened to you or you saw something happen to someone else which affected your sense of right and wrong, your belief of who you are, or of the world we live in. This might be one or multiple times. Only think of times that were serious to you. We will not ask for details but ask that you keep in it in mind while answering the questionnaires. You will be asked whether you have one or many things in mind shortly. Please let the researcher know when something comes to mind. If you cannot think of something, please still complete the questionnaires as your answers are of interest to us.

Thinking about the statement, please answer the following:

Is there an event or multiple events your answers relate to? (*Please tick*)

Yes, one event ☐
Yes, multiple events ☐
No ☐
Don't know ☐

If you answered **Yes**, please complete the items below.

How old is the event (or most impactful event) in years?

_____

Had you taken any drugs or alcohol at the time of the event (or most impactful event)? (*Please tick*)

Yes ☐
No ☐
Don't know ☐

Were you fully intoxicated at the time? (*Please tick*)

Yes ☐
No ☐
Don't know ☐

Does the event (or most impactful event) involve any of the following? (*Please tick*)

Family ☐

Friend ☐

Someone you knew informally ☐

Stranger ☐

4.3 Data Tables

4.3.1 Sub-Group Comparisons by Psychometric Scores

Table 13: Sub-Group Comparisons of Socio-Demographic and Event Type Characteristics by Psychometric Scores: Mann Whitney U Tests

		MIES				ITQ				SSG		
		Ful-Scale	**TO**	**TS**	**B**	**Full-scale**	**PTSD**	**DSO**	**ReQoL**	**Shame**	**Guilt**	**SCS-SF**
Gender	*U*	59.00	106.00	63.50	70.00	68.50	59.50	91.50	97.00	89.50	73.50	31.50
	p	.064	.941	.091	.156	.229	.114	.793	.984	.835	.379	.007**
Ethnicity	*U*	139.0	160.00	158.50	102.50	101.50	124.50	86.50	82.50	111.00	103.50	91.00
	p	.484	.952	.903	.064	.283	.793	.107	.078	.752	.539	.363
Secure Level	*U*	84.50	97.50	96.00	103.00	65.00	59.50	74.50	57.50	75.00	93.00	87.00
	p	.208	.428	.407	.562	.479	.324	.768	.046*	.253	.676	.880
Event(s)	*U*	111.50	115.50	125.00	110.00	70.50	70.50	83.00	116.50	100.50	97.00	95.00
	p	.286	.354	.560	.271	.053	.053	.161	.922	.680	.592	.714
Drugs/	*U*	92.00	69.50	76.50	93.00	54.00	71.00	39.50	70.50	60.00	48.00	56.00
Alcohol	*p*	.934	.294	.452	.967	.314	.865	.075	.827	.561	.230	.511
Intoxicated	*U*	54.50	61.50	35.50	66.00	53.50	40.50	36.00	42.00	49.00	40.00	45.00
	p	.393	.603	.071	.777	.977	.441	.316	.513	.883	.498	.784
Involved Grouped	*U*	97.50	85.50	97.00	101.50	92.00	85.50	88.50	92.00	75.00	73.00	81.50
	p	.805	.458	.805	.934	.9292	.689	.790	.929	.501	.444	.847
Informal Stranger	*U*	53.50	35.00	46.50	47.50	42.50	38.50	44.50	35.00	30.00	22.00	39.00
	p	.674	.107	.381	.418	.603	.412	.710	.295	.272	.075	.965
Early/late responders	*U*	158.00	126.50	138.50	137.00	131.50	131.50	121.00	94.50	120.00	133.00	111.50
	p	.680	.172	.314	.300	.606	.606	.396	.077	.576	.917	.501
Organisation	*U*	156.00	171.00	161.00	168.50	136.50	146.00	115.50	118.00	133.00	118.50	119.50
	p	.496	.806	.593	.740	.612	.857	.230	.271	.758	.410	.580

B: Betrayal; DSO: Disturbances in Self-Organisation; ITQ: International Trauma Questionnaire; MIES: Moral Injury Events Scale; PTSD: Post-Traumatic Stress Disorder; ReQoL: Recovering Quality of Life; SCS-SF: Self-Compassion Scale-Short Form; SSGS: State Shame and Guilt Scale; TO: Transgression-Other; TS: Transgression-Self
***p≤.01; *p≤.05*

Table 14: Sub-Group Comparisons of Socio-Demographic and Event Type Characteristics by Psychometric Scores: Mean Ranks

		Mean Rank										
		MIES				ITQ				SSG		
		Full-scale	**TO**	**TS**	**B**	**Full-scale**	**PTSD**	**DSO**	**ReQoL**	**Shame**	**Guilt**	**SCS-SF**
Gender	Male	17.90	19.42	18.05	18.26	16.95	16.63	17.77	18.04	17.69	16.72	19.29
	Female	26.57	19.86	25.93	25.00	22.21	23.50	18.93	17.86	16.79	20.50	8.50
Ethnicity	White	17.73	19.69	19.81	14.88	15.23	17.32	13.86	22.50	16.60	19.15	19.40
	Non-White	20.42	19.40	19.34	21.90	19.27	18.31	19.90	15.94	17.88	16.81	15.96
Secure Level	Medium	20.68	20.25	20.30	20.07	17.59	17.80	17.24	16.13	18.62	17.92	16.85
	Low	15.06	16.69	16.50	17.38	14.33	13.42	15.92	24.31	13.88	16.13	17.57
Event(s)	Single	15.87	16.08	16.58	15.79	13.15	13.15	13.88	16.15	16.09	14.71	15.56
	Multi	19.57	19.30	18.67	19.67	19.46	19.46	18.57	15.82	14.73	16.54	14.31
Drugs/Alcohol	Yes	17.14	13.93	20.07	17.29	12.50	15.33	10.08	15.25	13.50	11.50	17.17
	No	17.59	18.43	16.83	17.56	16.84	16.16	17.42	16.18	16.00	16.50	14.43
Intoxicated	Yes	21.10	15.30	24.90	18.80	15.88	19.38	11.50	13.00	14.75	12.50	16.25
	No	16.88	17.88	16.22	17.28	16.02	15.50	16.67	16.44	15.62	15.96	14.80
Involved Grouped	Informal/Stranger	16.76	17.28	16.78	16.59	15.38	15.07	15.21	15.62	14.25	14.15	14.29
	Friend/Family	15.83	14.50	15.78	16.28	15.78	16.50	16.17	15.22	16.67	18.89	14.94
Informal Stranger	Informal	12.15	14.00	10.15	12.75	9.72	9.28	9.94	12.11	8.25	7.25	9.38
	Stranger	10.96	9.42	12.63	10.46	11.14	11.50	10.95	9.18	11.27	12.00	9.60
Early/late	1st 3-months	20.47	22.57	17.23	21.87	19.11	19.11	19.86	14.25	18.77	17.77	18.42
responders	Last 3-months	18.87	17.5	20.98	17.96	17.26	17.26	16.76	20.50	16.71	17.33	16.08
Organisation	1	20.83	20.00	20.56	20.14	17.03	18.38	15.72	15.88	16.87	19.10	18.03
	2	18.30	19.05	18.55	18.93	18.82	17.68	19.92	19.79	18.00	16.24	16.14

B: Betrayal; DSO: Disturbances in Self-Organisation; ITQ: International Trauma Questionnaire; MIES: Moral Injury Events Scale; PTSD: Post-Traumatic Stress Disorder; ReQoL: Recovering Quality of Life; SCS-SF: Self-Compassion Scale-Short Form; SSGS: State Shame and Guilt Scale; TO: Transgression-Other; TS: Transgression-Self

4.3.2 Age of Participant and Event Correlation Analyses with Psychometric Scores

Table 15: Age of Participant and Event Correlations with Psychometrics

		MIES				ITQ				SSG		
Age		**Ful-Scale**	**TO**	**TS**	**B**	**Full-scale**	**PTSD**	**DSO**	**ReQoL**	**Shame**	**Guilt**	**SCS-SF**
Of Participant	*rs*	-.007	-.308	.029	.141	-.072	.033	-.120	.040	.055	.106	.112
	p	.968	.081	.871	.434	.706	.863	.528	.834	.775	.585	.563
Of Event	*rs*	-.271	-.445	-.103	-.319	-.075	-.074	-.055	.058	.218	-.054	.018
	p	.126	.010**	.568	.071	.693	.699	.773	.762	.256	.783	.926

B: Betrayal; DSO: Disturbances in Self-Organisation; ITQ: International Trauma Questionnaire; MIES: Moral Injury Events Scale; PTSD: Post-Traumatic Stress Disorder; ReQoL: Recovering Quality of Life; SCS-SF: Self-Compassion Scale-Short Form; SSGS: State Shame and Guilt Scale; TO: Transgression-Other; TS: Transgression-Self
***p≤.01; *p≤.05*

1.1.1 Chi-Squared Tests of Sub-Group Characteristics

Table 16: Chi-Squared Tests of Sub-Group Socio-Demographic and Event Type Characteristics

	Ethnicity		**Secure**		**Event**		**Drugs**		**Intoxicated**		**Involved Grouped**		**Informal Stranger**	
	X^2	p	X^2	p	X^2	p	X^2	p	X^2	p	X^2	p	X^2	p
Gender	.285	.593	.292	.589	.228	.892	.069	.793	.022	.881	.480	.489	.480	.489
Ethnicity	-	-	.382	.537	2.61	.271	.349	.555	.008	.930	4.52	.033*	.000	1.000
Secure			-	-	1.39	.498	.419	.518	1.80	.179	1.29	.256	1.18	.277
Event					-	-	.006	.940	.600	.439	.276	.599	.627	.429
Drugs							-	-	.815	<.001**	1.75	.186	.018	.892
Intoxicated									-	-	.026	.882	.018	.892
Involved Grouped										-	-	-	-	-

***p≤.01; *p≤.05*

Ethnicity x Involved Grouped			
		df	1
		n	32
		Cramer V	.376
		Informal/Stranger	**Friend/Family**
White	Count	12	1
	Expected Count	9.3	3.7
Non-White	Count	11	8
	Expected Count	13.7	5.3