Psychometric Evaluation of the Moral Injury Events Scale

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ABSTRACT Literature describing the phenomenology of the stress of combat suggests that war-zone experiences may lead to adverse psychological outcomes such as post-traumatic stress disorder not only because they expose persons to life threat and loss but also because they may contradict deeply held moral and ethical beliefs and expectations. We sought to develop and validate a measure of potentially morally injurious events as a necessary step toward studying moral injury as a possible adverse consequence of combat. We administered an 11-item, self-report Moral Injury Events Scale to active duty Marines 1 week and 3 months following war-zone deployment. Two items were eliminated because of low item-total correlations. The remaining 9 items were subjected to an exploratory factor analysis, which revealed two latent factors that we labeled perceived transgressions and perceived betrayals; these were confirmed via confirmatory factor analysis on an independent sample. The overall Moral Injury Events Scale and its two subscales had favorable internal validity, and comparisons between the 1-week and 3-month data suggested good temporal stability. Initial discriminant and concurrent validity were also established. Future research directions were discussed.

INTRODUCTION

One of the most distinctive features of post-traumatic stress disorder (PTSD) as a mental disorder diagnosis—its linking of current symptoms with a presumably etiologic stressor event—is also one of its most controversial.[1] Despite three decades of research and multiple revisions of the diagnostic criteria for PTSD, it remains unclear which stressor types are capable of inducing post-traumatic stress symptoms. In keeping with current conceptions of PTSD as a disorder of Pavlovian fear conditioning or neural fear circuitry,[2–5] the diagnostic criteria for PTSD in DSM-IV-TR require exposure to "an event or events that involve actual or threatened death or serious injury, or a threat to the physical integrity of others" (the A1 criterion), to which the person must respond with "intense fear, hopelessness, or horror" (the A2 criterion).[6]

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Potentially fear-evoking stressor experiences that threaten lives and safety are highly correlated with PTSD in both civilian and veteran populations,[7–9] and exposure to life-endangering combat events is a robust predictor of PTSD in military personnel deployed to war zones.[10–12] Yet, a number of studies have found significant PTSD symptoms in persons whose major stressors did not involve a close brush with death or serious injury.[1] So-called non-A1 stressors that have been found to correlate with subsequent PTSD in civilian populations include the nonviolent death of loved ones, chronic illnesses, sexual harassment, marital divorce or separation, arrest or incarceration, relationship infidelity, bullying, and other distressing social events.[13–19] Studies of military populations have found PTSD to correlate with a number of stressor types other than threats to personal safety, including atrocities, the loss of close personal friends, malevolent environments, and the act of killing.[20–22] Furthermore, military personnel who develop PTSD following exposure to combat-related traumatic events may be as likely to experience peritraumatic anger as fear, helplessness, or horror.[23]

In their review of current controversies and challenges in defining and measuring psychological trauma, Weathers and Keane[1] called for more studies to empirically test the ability of various stressor types to elicit PTSD symptoms. They also acknowledged the need for definitions of the A1 criterion—of potentially traumatic events—that could account for why apparently low-magnitude stressors can, at times, lead to PTSD. In this article, we describe the development and psychometric properties of a new scale to measure exposure to events that may be traumatic and lead to PTSD not because they involve threats to life and safety, but because they violate deeply held moral beliefs and values.

The Concept of Moral Injury or Inner Conflict

The idea that psychological injury can result from transgressions of deeply held moral and ethical beliefs and

expectations is far from new. Ancient Greek tragedies, often written and performed by combat veterans, spoke of miasma—a moral pollution or defilement arising from participation in war, whose cure was believed to be katharsis, or social cleansing.[24] In his exploration of the parallels between the experiences of Homer's Achilles and modern Vietnam veterans, Shay focused on betrayals of "what's right" as central to war-zone trauma.[25] Shay later defined moral injury more specifically as the psychological consequence of a betrayal of what's right by someone who holds legitimate authority in a high-stakes situation.[26,27] Shay's conception of morally injured veterans as victims of others' wrongdoing mirrors views found elsewhere in the mental health and ethics literature regarding the central role in trauma of breaches in social moral contracts and damage to belief systems.[28–31] The literature on the phenomenology of stress in combat also holds many descriptions of enduring distress and alterations in functioning following events in which combatants perceive themselves to violate, through action or inaction, their own moral codes. Examples include enduring guilt felt by Civil War soldiers over atrocities they committed on and off the battlefield,[32] and by World War II aircrews who bombed civilian targets.[33] Early descriptions of the Post-Vietnam Syndrome in veterans included distress over their own war-zone brutality and killing, as well as over perceived betrayals by leaders and the nation that sent them to war.[34] Focusing arguably more on perpetration than victimization in their recent conceptual review, Litz et al[35] defined potentially morally injurious experiences in war veterans as "perpetrating, failing to prevent, bearing witness to, or learning about acts that transgress deeply held moral beliefs and expectations."

Although the phenomenon of moral injury appears to be ancient, clinical constructs and terms to describe it are relatively new and evolving. In a recent qualitative study, Drescher et al[36] interviewed twenty-three Department of Defense and Veterans Affairs health care and religious ministry professionals who universally agreed that the concept of moral injury was needed to inform their work with combat veterans, and that current conceptions of PTSD did not adequately describe the morally injurious aspects of combat. At the same time, more than a third of those interviewed felt that the term "moral injury" was not optimal and that either or both words should be replaced. The U.S. Navy and Marine Corps now train their personnel to prevent, identify, and treat stress injuries in service and family members arising from any of four sources: life threat, loss, inner conflict, and wear and tear.[37] The Department of the Navy doctrinal publication for combat and operational stress control that informs this training defines "inner conflict" as "stress arising due to moral damage from carrying out or bearing witness to acts or failures to act that violate deeply held belief systems."[37] Although defined in words similar to moral injury, only the term inner conflict is used for the training of service members in the Navy and Marine Corps because the potential synonym, moral injury, is perceived by some to be pejorative.[38]

Whether the result is termed moral injury or inner conflict, stressor events that have the potential to violate deeply held moral beliefs and expectations were recently identified by a federal interagency working group as important targets for future research and surveillance in military and veteran populations.[39] As an early step toward that end, this study reports on the development and evaluation of a novel measure of exposure to potentially morally injurious events.

METHODS

Scale Development

We used an iterative, rational approach to scale construction.[40] Following a literature review, a team of experts generated a pool of items generically describing events involving perpetrating, failing to prevent, bearing witness to, learning about, or being the victim of acts that contradict deeply held beliefs and expectations.[35,36,39] Of eleven items selected by consensus, nine addressed perceived violation of moral beliefs or betrayal by self or others; the remaining two addressed perceptions of trust. Instructions asked participants to "indicate how much you agree or disagree with each of the following statements regarding your experiences at any time since joining the military." Response options were Likert-type, ranging from 1 (strongly disagree) to 6 (strongly agree). An even number of response options was chosen to preclude neutral responses. Two items were reverse-keyed; scale scores are generated by reverse coding these two items and then summing across items, with a higher score being indicative of having experienced a greater intensity of events. We labeled the resulting scale the Moral Injury Events Scale (MIES; see Appendix).

Participants

The MIES was administered to two of the four cohorts of our parent study, the Marine Resiliency Study (MRS), a prospective, longitudinal examination of risk and protective factors for combat-related PTSD in ground combat Marines. As reported elsewhere,[41] the MRS enrolled 2,610 Marines from four infantry battalions preparing to deploy from either Camp Pendleton or Marine Corps Air Ground Combat Center, 29 Palms, both in southern California, for combat duty in Iraq or Afghanistan between 2008 and 2011. Each participating Marine was assessed using a large number of biological, psychological, and social measures at four time points: approximately 1 month before deployment, and again, approximately 1 week, 3 months, and 6 months after returning from a 7-month war-zone deployment. Of 2,610 Marines enrolled in the MRS, 1,609 (62%) completed all waves of data collection. Since we developed the MIES about halfway through the process of enrollment in the MRS, only the final two cohorts of the MRS participants completed the MIES, and only at postdeployment time

points. The institutional review boards of the University of California San Diego, VA San Diego Research Service, and Naval Health Research Center approved the parent study, including incorporation of the MIES.

For this psychometric evaluation of the MIES, we selected all members of the final two cohorts of the MRS that had completed all waves of assessment, including the MIES. Cohort 1 ($N = 533$) comprised our primary participants; we analyzed their responses to the MIES and other data at two time points: approximately 1 week postdeployment, and again, at approximately 3 months postdeployment. Additional analyses were performed on Cohort 2 ($N = 506$), using MIES responses and other data at only one time point: approximately 6 months postdeployment. There were no significant differences in the demographic characteristics between Cohorts 1 and 2 (Table I).

Measures

In addition to the MIES, described above, seven additional measures were administered concurrently for preliminary evaluation of MIES construct validity. These measures included (1) The Beck Anxiety Inventory[42] (coefficient α for this sample was 0.87); (2) The Revised Beck Depression Inventory[43] (coefficient $\alpha = 0.88$); (3) Horizontal Cohesion Subscale[44] (coefficient $\alpha = 0.90$); (4) Combat Experiences Scale (CES) of the Deployment Risk and Resilience Inventory[45] (coefficient $\alpha = 0.88$); (5) a modified version of the Interpersonal Support Evaluation List[46] (coefficient $\alpha = 0.94$); (6) The Positive and Negative Affectivity Scale[47] (coefficient αs = 0.90 [positive] and =0.85 [negative]); and (7) PTSD Checklist-Specific[48] (coefficient $\alpha = 0.93$).

TABLE I. Demographic Characteristics

Characteristic	Cohort 1	Cohort 2
Age (Years)		
N	533	506
Mean	22.67	21.54
Median	22.00	21.00
SD	3.50	3.06
Range	18–47	18–45
Time in Service (Years)		
N	551	467
Mean	3.42	2.54
Median	3.00	2.00
SD	2.87	2.45
Range	1–26	1–20
Ethnicity (%)		
N	517	505
Black/African American	7.2	4.0
American Indian/Alaskan Native	2.9	1.4
Asian	2.1	2.4
Native Hawaiian/Pacific Islander	1.4	1.0
White	82.8	88.9
Other	3.68	2.4

Data Analytic Plan

We first report the internal consistency reliability of the MIES and the distributional properties of MIES scores (skewness and kurtosis). Because the MIES was readministered to the same participants in Cohort 1 approximately 3 months later, we evaluated the temporal stability reliability of the scale using paired *t*-tests. This was followed by an evaluation of the factor structure, using an exploratory factor analysis (EFA) with principal axis factoring. Construct validity of the MIEs was evaluated by determining if the MIES correlated with scales we hypothesized should be associated with moral injury (to show convergent validity), and uncorrelated with scales we hypothesized to be unrelated to the moral injury construct (discriminant validity). Because the MIES was also administered to a separate, large cohort of ground combat Marines from the parent study (Cohort 2), we conducted a confirmatory factor analysis (CFA) using that cohort to validate the findings of the EFA.

RESULTS

Internal Reliability and Psychometric Properties

The MIES showed good internal consistency reliability. The Cronbach's alpha for the full 11-item MIES was 0.86. Item-total correlations (the association between a given item and the sum of the remaining items) were also calculated. Low item-total correlations for items 10 and 11 (0.25 and 0.13, respectively) suggested that these items were not successfully measuring the same underlying global construct as the other items. Given that these two items are the only two reverse-keyed items, it is possible that the low item-total correlations indicated differential patterns of responding to reverse-keyed rather than nonreverse-keyed items or they were worded in a confusing manner to participants. Consequently, items 10 and 11 were eliminated from the scale. The Cronbach's alpha for the nine-item scale was 0.90, indicating excellent internal consistency. The item-total correlations ranged from 0.52 to 0.75, with an average of 0.65 (Table II). As commonly seen with Likert-type scale ratings, MIES item distributions exhibited skewness and kurtosis. Skewness in the data ranged from 0.01 to −1.74, with 8 of 9 items positively skewed; kurtosis ranged from −1.36 to 2.11.

Exploratory Factor Analysis

The factor structure of the MIES was examined using EFA. First, the factorability of the data was examined using the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO value = 0.85) and Bartlett's Test of Sphericity ($\chi^2 = 3550.55$, $p < 0.001$), both of which indicated that the data are appropriate for factor analysis.[49]

Principal axis factoring was selected because multivariate normality was not observed in the data.[50] The number of factors to be retained was determined using the Kaiser criterion,[51] which retains factors with eigenvalues greater than

TABLE II. Psychometric Properties and Factor Structure from EFA

Item Description	Mean	SD	Item-Total Correlation	Factor 1	Factor 2	Communalities
Factor 1: Perceived transgressions by self or others						
Witnessing acts of commission	3.22	1.76	0.57	0.38	0.26	0.33
Distress resulting from others' acts of commission	2.08	1.47	0.65	0.47	0.26	0.44
Perpetration of acts of commission	1.99	1.42	0.73	0.86	−0.04	0.70
Distress due to acts of commission	1.78	1.32	0.77	0.86	0.02	0.76
Perpetration of acts of omission	1.91	1.42	0.78	0.91	−0.01	0.82
Distress due to acts of omission	1.80	1.31	0.79	0.89	0.01	0.80
Factor 2: Perceived betrayal by others						
Perceived betrayal by leaders	2.07	1.51	0.68	0.02	0.88	0.80
Perceived betrayal by fellow service members	1.90	1.42	0.64	−0.06	0.93	0.79
Perceived betrayal by nonmilitary others	1.94	1.43	0.55	0.23	0.43	0.35
Eigenvalue						
Percentage of variance				5.23	1.12	

one. Following extraction, a promax (i.e., oblique) rotation was applied to enhance the interpretability of the factor solution. Oblique rotations are favored over orthogonal rotations when the latent factors are expected to intercorrelate.[52] A two-factor solution emerged, explaining 64.24% of the common variance. All nine items were retained, as they exhibited factor loadings greater than 0.35 with no cross-loadings greater than 0.30.[50]

Factor 1 was composed of items 1to 6, which we labeled perceived transgressions by self or others. Factor 2 was composed of items 7 to 9 and reflected perceived betrayals by others, in or outside the military. Table II displays factor loadings from the pattern matrix, variance explained by each factor, and communalities for each item. The factor correlation coefficient between Factor 1 and 2 was 0.60, which supports the use of an oblique rotation. Both factors had good internal consistency (coefficient alphas were 0.89 for Factor 1 and 0.82 for Factor 2).

Temporal Stability Reliability

To evaluated temporal stability, we evaluated the association between MIES data readministered to the same 533 Marines in Cohort 1 approximately 3 months postdeployment. Paired
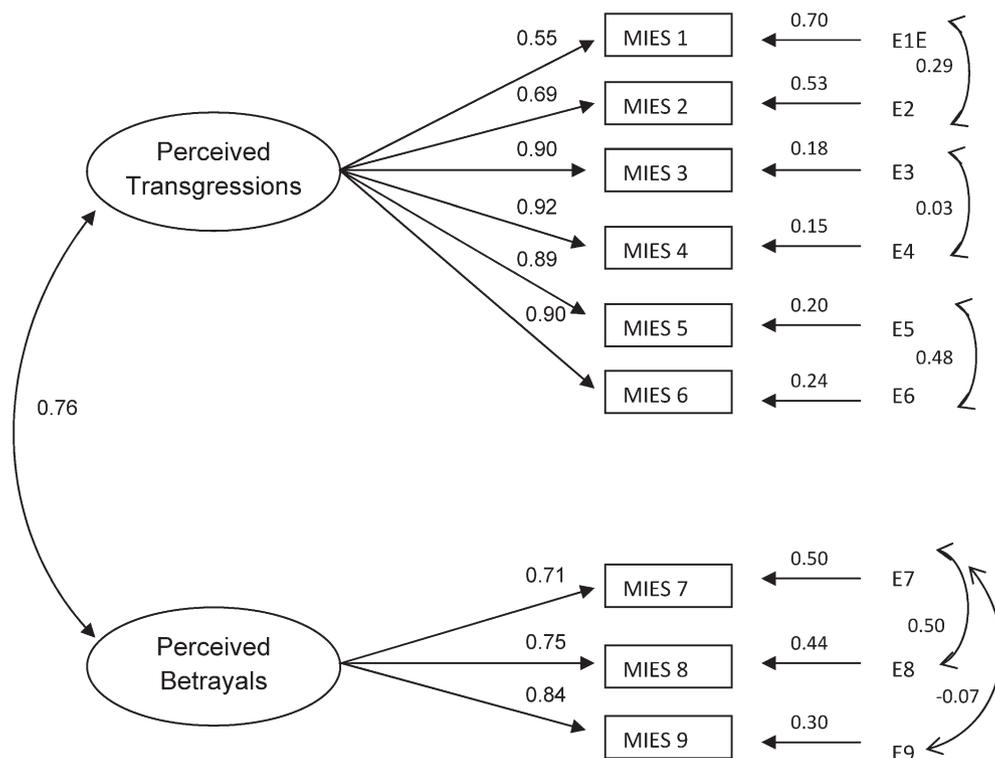

FIGURE 1. CFA of the MIES.

t-tests revealed that changes in MIES total and composite scores for factors 1 and 2 over the test–retest interval were not statistically significant (*t*s = 1.31, 0.91, and 1.59, respectively), suggesting good temporal stability. Higher test–retest reliability would be expected over shorter time intervals.

Cross-Validation of Factor Structure

We cross-validated the two-factor structure identified via EFA using CFA conducted on an separate cohort, as recommended by Kline.[53] This Cohort 2 of Marines (*N* = 506), all members of the same infantry battalion, completed the MIES 6 months after returning from a combat deployment to Iraq in 2009 (Table I).

Data were analyzed using MPlus software and robust maximum likelihood estimation. The hypothesized model consisted of two first-order latent factors identified in the EFA (perceived transgressions and perceived betrayals). Correlated residuals were specified for items for which shared error variance would conceptually be expected (i.e., items 1 and 2, 3 and 4, 5 and 6, 7 and 8, and 7 and 9). The hypothesized model and resulting parameter estimates are presented in Figure 1. Collectively, fit indices suggested a good model fit (χ^2 (36) = 83.06, $p < 0.001$; SRMR = 0.04; RMSEA = 0.08; CFI = 0.96; TLI = 0.93) based on the standard cutoff recommendations.[54] All parameters were statistically significant (all *p*s < 0.001).

Construct Validity

To preliminarily assess construct validity, we examined the association of the MIES with the aforementioned measures from the MRS in Cohort 1 (*N* = 533). Because of the non-parametric nature of the data, Spearman's correlations were computed between the MIES and the additional measures. Because moral injury should not be directly dependent on combat exposure, we hypothesized that CES scores would be distinct from MIES scores. This was confirmed; the CES and MIES correlated at $r = 0.08$, suggesting discriminant validity. On the other hand, the MIES was positively correlated with several other measures of psychological distress which we hypothesized might accompany moral injury, including the Revised Beck Depression Inventory ($r = 0.40$), the Beck Anxiety Inventory ($r = 0.28$), negative affectivity ($r = 0.29$), and the PTSD Checklist ($r = 0.28$). Higher scores on the MIES were also associated with lower scores on the social support index (Interpersonal Support Evaluation List, $r = -0.29$), positive affectivity ($r = -0.15$), and the Horizontal Cohesion Subscale ($r = -0.24$). These correlations with possible psychological and social concomitants of moral injury suggest convergent validity for the MIES.

DISCUSSION

We sought to develop a psychometrically sound measure of potentially morally injurious events. The resulting nine-item MIES had excellent internal consistency and yielded underlying latent factors of perceived transgressions and per-

ceived betrayals. Both the overall scale and the subscales showed temporal stability, and we found preliminary support for the construct validity of the MIES. The results suggest that the MIES is a conceptually valid and psychometrically sound measure.

The MIES provides clinicians and researchers a tool to measure exposure to events in a military context with the potential to contradict deeply held moral beliefs. This assessment tool can be used to evaluate the prevalence and perceived intensity of such war-zone experiences, which is a necessary precursor to evaluating the biological, psychological, social, and spiritual consequences of moral injury. Research is especially needed to establish the validity of the MIES in the context of the unique syndrome of distress and impairment hypothesized to result from moral challenges in war.[35]

As has been shown by early qualitative research and the experiences of military service branches implementing combat and operational stress control programs, the concept of moral injury and terms associated with it can be controversial and can evoke negative judgments and emotions.[38] Researchers and clinicians who further assess and develop treatments for moral injury may do well to remain sensitive to the possibility that service members may inappropriately equate potentially morally injurious events with moral wrongdoing, a misconception that cannot help but evoke negative judgments and emotions. The MIES indexes only perceived contradictions between remembered behaviors and post hoc moral expectations in the necessarily complex moral context of modern warfare; it does not index wrongdoing in any form. Researchers, clinicians, and educators may also do well to remain mindful of the terms preferred by service members and veterans when discussing possible contradictions between behaviors and moral expectations.

Although early results are promising, further evaluation of the MIES with service members of both genders, in multiple military service branches, and playing various operational roles is needed. We are conducting focus group research on veterans to expand the content of the MIES and to determine ways of wording the instructions and items to fit the experience of veterans reflecting back on their service experiences.

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APPENDIX

Original version of MIES (Items 10 and 11 were removed in final version).

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

	Strongly Agree	Moderately Agree	Slightly Agree	Slightly Disagree	Moderately Disagree	Strongly Disagree
(1) I saw things that were morally wrong	1	2	3	4	5	6
(2) I am troubled by having witnessed others' immoral acts	1	2	3	4	5	6
(3) I acted in ways that violated my own moral code or values	1	2	3	4	5	6
(4) I am troubled by having acted in ways that violated my own morals or values	1	2	3	4	5	6
(5) I violated my own morals by failing to do something that I felt I should have done	1	2	3	4	5	6
(6) I am troubled because I violated my morals by failing to do something that I felt I should have done	1	2	3	4	5	6
(7) I feel betrayed by leaders who I once trusted	1	2	3	4	5	6
(8) I feel betrayed by fellow service members who I once trusted	1	2	3	4	5	6
(9) I feel betrayed by others outside the U.S. military who I once trusted	1	2	3	4	5	6
10. I trust my leaders and fellow service members to always live up to their core values	1	2	3	4	5	6
(11) I trust myself to always live up to my own moral code	1	2	3	4	5	6

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