

Gender Differences in Reported Potentially Morally Injurious Events Among Post-9/11 U.S. Combat Veterans, Using Two Measures

Morgan N. Myers¹, A. Solomon Kurz^{1, 2}, Jasmyn Paul³, Marcus G. Wild^{1, 2}, and Sheila Frankfurt O'Brien^{1, 2}

¹ Central Texas Veterans Healthcare System, Temple, Texas, United States

² Veterans Integrated Service Network 17 Center of Excellence for Research on Returning War Veterans, Waco, Texas, United States

³ Department of Psychology, Prairie View Texas A&M University

Objective: Military experiences that violate one's sense of right and wrong (i.e., potentially morally injurious events [PMIEs]) may result in moral injury, characterized by shame, guilt, demoralization, self-condemnation, and social withdrawal. The objective of this study was to examine gender-related differences in the rate of reporting PMIEs. **Method:** Secondary analyses were conducted on a previously collected longitudinal cohort study of postdeployment functioning among U.S. post-9/11 combat veterans in Central Texas ($N = 406$). As part of the parent study, participants completed two measures of PMIEs—the Moral Injury Events Scale (MIES; Nash et al., 2013) and the Moral Injury Questionnaire–Military Version (MIQ-M; Currier et al., 2015). Gender differences at the item response level were analyzed in a series of Bayesian multilevel item response theory models. **Results:** The most frequently endorsed responses on both the MIES and MIQ-M for both men and women were *never* or *strongly disagree*. On the MIQ-M, more veteran men endorsed experiencing PMIEs to some degree. On the MIES, more veteran women endorsed *strongly agree* to betrayal items. **Conclusions:** Veteran men and women reported any PMIE occurring at relatively high rates. Gender differences at the item response level were found for most items on both the MIES and MIQ-M, albeit of small magnitude. Awareness of gender differences in the likelihood of experiencing a given PMIE may help inform clinical assessments and case conceptualizations.

Clinical Impact Statement

Veteran men and women both report potentially morally injurious military experiences; men and women may report slightly different types of potentially morally injurious events. However, the method of assessment—asking about specific combat experiences versus appraisals of morally wrong or betrayal events—may account for some gender-based differences in rates of moral injury events. Veteran men and women's history of potentially morally injurious events should be assessed using multiple methods.

Keywords: moral injury, gender, veterans, item response theory

Supplemental materials: <https://doi.org/10.1037/tra0001782.supp>

This article was published Online First November 7, 2024.

Sheila Frankfurt O'Brien  <https://orcid.org/0000-0002-8156-1488>

Morgan N. Myers is now at Bay Pines VA Healthcare System, Port Charlotte, Florida, United States.

This article involves secondary data analysis of previously collected deidentified data; data were obtained from an institutional review board-approved data repository. Only one other study using data from this research repository has been published using the Moral Injury Events Scale. No other study has been published using both the Moral Injury Events Scale and the Moral Injury Questionnaire–Military Version, from this data repository. Thus, the present study and previous study are nonoverlapping.

The authors have no conflicts of interests to disclose. This research was supported by the U.S. Department of Veterans Affairs, the Central Texas Veterans Healthcare System, the Veterans Integrated Service Network 17 Center of Excellence, and a Career Development Award–2, Rehabilitation Research and Development Service (Grant RX003495; principal investigator: Sheila Frankfurt O'Brien). The views expressed in this article are those of the authors and do not necessarily reflect the position or policy of

Veterans Affairs or the authors' academic affiliates.

Morgan N. Myers played a lead role in writing–original draft and a supporting role in conceptualization. A. Solomon Kurz played a lead role in formal analysis, software, and visualization, a supporting role in writing–original draft and writing–review and editing, and an equal role in conceptualization and methodology. Jasmyn Paul played a lead role in conceptualization and a supporting role in writing–original draft and writing–review and editing. Marcus G. Wild played a supporting role in conceptualization and writing–review and editing and an equal role in project administration, supervision, and writing–original draft. Sheila Frankfurt O'Brien played a lead role in writing–review and editing, a supporting role in project administration and writing–original draft, and an equal role in conceptualization and supervision.

Correspondence concerning this article should be addressed to Sheila Frankfurt O'Brien, Veterans Integrated Service Network 17 Center of Excellence for Research on Returning War Veterans, 4800 Memorial Drive (151C), Waco, TX 76711, United States. Email: sheila.frankfurt@va.gov

There has been a consistent upward trend in the number of women serving in the U.S. military, with recent data showing that women make up 17.5% of the active-duty military force (U.S. Department of Defense, 2022). As such, there is an increased need for research examining the ways in which common military experiences differentially impact the men and women who serve. For instance, given the nature of war and combat, many service members and veterans report experiencing confrontations with moral and ethical challenges as part of their military service. For some, military experiences that violate one's sense of right and wrong (referred to as potentially morally injurious events [PMIEs]) result in significant distress and functional impairment, recognized as a clinical phenomenon *moral injury*, characterized by shame, guilt, demoralization, self-condemnation, and social withdrawal (Litz et al., 2009). Over the last decade, moral injury has garnered widespread research interest (Griffin et al., 2019; Hall et al., 2022) and has been a target of novel interventions (e.g., Burkman et al., 2022; Pernicano et al., 2022). However, relatively little is known about the ways in which men and women's experiences with moral injury might differ (Kelley et al., 2019; Maguen et al., 2020).

Veteran women may face unique challenges relative to their veteran male counterparts, such as sex-specific premenstrual, perinatal, perimenopausal, and gynecologic impacts on their mental health functioning (Miller & Ghadiali, 2015); increased likelihood of being a single parent (Clever & Segal, 2013); and experiences with workplace gender bias (Thomas et al., 2018). Veteran women may also experience different rates of exposure to various PMIEs. For instance, although military sexual trauma (MST) is a pervasive problem affecting both men and women, prevalence rates consistently show higher rates of MST among women as compared to men (Wilson, 2018). MST is frequently included in the nomological network of events that may be potentially morally injurious because of presumptive interpersonal and institutional betrayal (Frankfurt et al., 2018), and research has suggested that group treatments for veteran men who experienced MST may benefit from a "moral injury" framework (Yahalom et al., 2023). Examination of differences in veteran men and women's military-related experiences, particularly related to exposure to PMIEs, offers an initial step toward the development of increased access and better targeted interventions for the specific mental health needs of veteran women.

Most empirical studies of moral injury have relied on one of two published self-report measures: (a) the Moral Injury Events Scale (MIES; Nash et al., 2013) and (b) the Moral Injury Questionnaire–Military Version (MIQ-M; Currier et al., 2015). The nine-item MIES assesses exposure to PMIEs, such as committing or witnessing a morally transgressive act or experiencing a significant betrayal, as well as the experience of feeling troubled by such events. Respondents are asked to indicate the extent to which they agree with various statements reflecting the experience of PMIEs over the entirety of their military career, with six response anchors ranging from "strongly agree" to "strongly disagree." The first six items are organized as pairs: the first item asking whether one has experienced a particular type of PMIE and the second asking if the respondent found that event to be troubling. The last three items ask about betrayal experiences by political/military leaders, unit members, or civilians. Initial validation research suggested adequate convergent validity of the MIES with measures of potentially related constructs,

including depression, anxiety, posttraumatic stress disorder (PTSD), and negative affectivity (Nash et al., 2013), and subsequent validation studies have offered further support for the construct validity of the measure (Bryan et al., 2016; Plouffe et al., 2023).

The 19-item MIQ-M assesses exposure to various specific PMIEs, including disproportionate violence or mistreatment enacted against the enemy or civilians, experiences of betrayal from leaders or trusted civilians, failure to act or mistakes that led to violence or harm, and involvement in moral or ethical dilemmas (Currier et al., 2015). Respondents are asked to reflect upon their warzone deployment(s) and indicate the frequency at which they experienced such PMIEs, with four response anchors ranging from "never" to "often." Initial validation research has offered support for the convergent validity of the measure with respect to relationships with combat exposure, impairment in work and social functioning, and depression and PTSD symptoms, as well as incremental validity in predicting PTSD and depression symptoms, suicide risk, and impairment in work and social functioning (Currier et al., 2015). Notably, both the MIES and MIQ-M potentially confound the exposure to morally transgressive acts and reactions to such acts (Frankfurt & Frazier, 2016).

Exposure to PMIEs among veterans may be relatively common in military service. Wisco et al. (2017) reported that among 564 veterans (93% male) who completed the MIES as part of the National Health and Resilience in Veterans Study in 2013, 41.8% endorsed at least one PMIE, with 25.5% reporting transgressions by others, 10.8% reporting transgressions by self, and 25.5% reporting betrayal; these rates were broadly replicated among a sample of 1,321 combat-exposed veterans (93.7% men) who completed the MIES in the 2019–2020 wave of the National Health and Resilience in Veterans Study (Nichter et al., 2021). In another study using the MIES, Maguen et al. (2022) found somewhat higher reported rates of witnessing a PMIE (43.1%), perpetrating a PMIE (21.8%), and betrayal (40.2%) among 14,057 post-9/11 veterans (82.3% men) who completed the MIES as part of the Comparative Health Assessment Interview Research Study.

A small number of studies (Bryan et al., 2016; Kelley et al., 2019; Maguen et al., 2020, 2022) have examined gender differences in the prevalence rates of moral injury, although findings have been mixed. At least two studies (Maguen et al., 2020, 2022) have documented gender differences in the self-reported occurrences of PMIEs, both of which employed large, nationally representative samples of post-9/11 U.S. veterans. In a sample of recently separated veterans ($N = 7,200$) who completed the MIES as part of the second wave of The Veteran Metrics Initiative study, Maguen et al. (2020) found that veteran women were more likely than veteran men to report having witnessed a PMIE and being troubled by a witnessing-based PMIE, as well as feeling betrayed by military leadership or fellow service members. There were no differences between men and women on reported exposure to perpetration-based PMIEs. Maguen et al. (2022) demonstrated similar findings, reporting that veteran women were more likely to endorse PMIE exposure via witnessing (52.5%) and betrayal (49.8%) compared to veteran men (41% and 38.1%, respectively), when assessed using the MIES (with endorsement defined by any "agree" response).

Nevertheless, other studies have not found gender differences in the reported occurrences of PMIEs (Bryan et al., 2016; Kelley et al., 2019). Kelley et al. (2019) examined gender differences among a mixed sample of veterans, reservists, and active-duty service

members ($N = 256$) across three domains of PMIEs assessed by a modified version of the MIQ-M (Robbins et al., 2017): atrocities of war, cognitive/emotional changes from combat, and leadership failure/betrayal. There were no gender differences observed in reported exposure to these PMIEs, nor did men and women report being differentially troubled by these PMIEs. Additionally, gender did not moderate the association between moral injury and any mental health symptoms. Likewise, Bryan et al. (2016) examined scores on the MIES among Air Force active-duty personnel engaged in outpatient mental health treatment ($N = 151$) and active-duty military personnel primarily serving in the Army National Guard ($N = 935$). A three-factor solution demonstrated the best fit with the sample data, with factors identified as transgressions committed by others (Transgressions-Others), transgressions committed by self (Transgressions-Self), and experience of betrayal (Betrayal). Men and women did not demonstrate mean score differences on these three factors in either sample. Of note, Kelley et al. (2019) and Bryan et al. (2016) both utilized convenience samples that were small relative to those employed by Maguen et al. (2020) and Maguen et al. (2022) and included active-duty military personnel. These sampling differences may offer one explanation for the observed differences in findings across studies.

The extent to which there are meaningful gender differences in the occurrence of PMIEs remains unclear in part because previous studies tend to report gender differences at the scale or factor level. Given that the MIES and MIQ-M confound exposure with impact, as well as combine markedly different types of PMIEs, it is possible that meaningful differences might emerge if these measures were examined at the item response level. One study reported mean score differences at the item level (Maguen et al., 2020), which notably was one of only two studies to report significant gender differences, but this data analytic approach may still obscure potentially meaningful differences in reporting rates occurring at the item response level. Furthermore, there are few data comparing gender differences on the MIES versus MIQ-M; as such, it is unknown how gender differences depend upon how PMIEs are assessed.

Our study examines gender differences in the occurrence of moral injury events in a longitudinal cohort study of post-9/11 combat veterans living in Central Texas. Texas has the second highest concentration of veterans in any U.S. state, and most of those veterans live in the Central Texas region (Texas Workforce Investment Council, 2021), which is home to the U.S. Army's Fort Cavazos (formerly Fort Hood) and Fort Sam Houston and the U.S. Air Force's Lackland Air Force Base. The novel contributions of this study include a large, nonclinical sample of combat veterans and the simultaneous examination of two published measures of moral injury events, the MIES and MIQ-M. We aim to characterize the occurrence of moral injury events and explore gender differences in rates of reporting these events at the item response level.

Method

Participants

The present study was a secondary data analysis using repository data of 406 U.S. post-9/11 combat veterans who resided in Texas and participated in Project Study Evaluating Returning Veterans Experiences, a longitudinal cohort study of postdeployment functioning (Frankfurt et al., 2018). Veterans were included

in the present study if they were administered the moral injury events measures, which were added at two time points of the parent study, and agreed to have their data stored in the Project Study Evaluating Returning Veterans Experiences data repository (Central Texas Veterans Healthcare System Institutional Review Board Protocol No. 00534).

Participants joined the parent study in several ways: self-referred to the parent study through advertisements, were referred from other studies, or were recruited through letters sent to those who met initial study eligibility based on medical record data. Parent study inclusion criteria were as follows: (a) provision of informed consent, (b) ability to complete study assessments, (c) willingness to be contacted for follow-up assessments, (d) stability on psychotropic medications (defined as ≥ 3 months on a selective serotonin reuptake inhibitor or monoamine oxidase inhibitor; > 1 month on an anxiolytic or β -blocker; > 1 month medication discontinuation or "wash out" for all medications) at the time of the baseline assessment, and (e) stability in psychotherapy (≥ 3 months stabilization for psychotherapy and 1-month psychotherapy wash out) at the time of the baseline assessment. Exclusion criteria were as follows: (a) planning to relocate out of the Central Texas Veterans Healthcare System within 4 months of protocol initiation; (b) meeting criteria for a diagnosis of schizophrenia, schizophreniform disorder, schizoaffective disorder, delusional disorder, or a manic/hypomanic episode; (c) reporting current suicidal or homicidal risk warranting crisis intervention; (d) reporting symptoms consistent with severe traumatic brain injury that interfere with their ability to complete the consent process or assessment (i.e., due to ethical concerns about obtaining informed consent and difficulties with completing the structured assessment); or (e) reporting current non-military-related hallucinations or delusions that cause significant distress and/or impairment.

Procedure

The Central Texas Veterans Healthcare System Institutional Review Board approved all present study procedures (Protocol No. 00679). Project Study Evaluating Returning Veterans Experiences (Clinical Trials Identifier: NCT01123642), the parent study, involved four assessments at approximately 8-month intervals (Month 0, Month 8, Month 16, Month 24). Initial eligibility was identified by phone screens, and participants completed informed consent and baseline (Month 0) interview-based and self-report assessments in person. Active participants completed self-report surveys at Month 8 and Month 16 assessments via mailed packets or a secure survey platform. The 16- and 24-month assessments included the MIES and the MIQ-M. Participants completed the interview-based and self-report assessment at 24 months assessment in person. Participants were compensated up to \$210, for completing all study assessments.

Measures

Moral Injury Events Scale

The nine-item MIES was used to assess experiences of self- and other-directed PMIEs and the degree to which PMIEs were troubling (Nash et al., 2013). The measure is endorsed using a 6-point scale ranging from (1) *strongly disagree* to (6) *strongly agree*, for a total score range of 9–54.

Moral Injury Questionnaire–Military Version

The MIQ-M was used to assess the frequency of PMIEs experienced during veterans' warzone deployments (Currier et al., 2015). The 19 items of the measure are each rated on a 4-point, frequency scale from *never* (1) to *often* (4), with a total score ranging from 20 to 80.

Data Analysis Plan

We performed all analyses with R (R Core Team, 2023), managed data and made figures with packages from the tidyverse (Wickham et al., 2019), and fit the models with the brms package (Bürkner, 2017). We analyzed the MIES and MIQ-M items in a series of Bayesian multilevel item response theory (IRT) models (Bürkner, 2021, cf. De Boeck et al., 2011), which can be viewed as variants of the graded response model (Samejima, 1997). This multilevel approach to IRT provides more stable estimates through multilevel partial pooling (Bürkner, 2021; Gelman & Hill, 2006) and accommodates missing values through full-information estimation (De Boeck et al., 2011). The IRT framework clarifies how to decompose variation in the item responses into person- and item-specific parameters and provides a way to interpret those parameters in light of contemporary psychometrics (Bürkner, 2021). We ran two series of models with each measure. The first models estimated item responses on the MIES and MIQ-M for the whole sample, and the second models estimated item response thresholds on the MIES and MIQ-M separately for men and women.

For the first models, we fit an unconditional cumulative logit IRT model where responses were nested within i persons and j items, separately for each questionnaire. The six response options for the MIES items were modeled with five thresholds, and the four response options for the MIQ-M items were modeled with three thresholds. For both questionnaires, the thresholds varied independently across items.

For the second models, we allowed the thresholds to vary by gender. Due to the small number of participants identifying as transgender or nonbinary ($n = 2$), the models in the second batch only included responses from those who identified as cisgender male or cisgender female. For the second models, we quantified the gender difference effect sizes as a series of differences in percentages for each Likert response category, by item. In this article, we focus on gender differences greater than 10 percentage points (analogous to a *region of practical equivalence*; Kruschke, 2018) and view those below that threshold as too small to warrant attention (cf. Kruschke & Liddell, 2018). We used weakly regularizing priors for all models (see McElreath, 2020) and the observed frequency counts from data from the previous wave (Month 16) to inform the prior means for the threshold parameters. We checked the quality of the Markov chain Monte Carlo chains for all models using visual diagnostics (e.g., trace plots) and statistical diagnostics (e.g., effective sample sizes) and checked the overall quality of the models using visual posterior-predictive checks. For a detailed account of the statistical models, including the priors, and of the various diagnostic checks, see the Supplemental Materials. The posterior distributions for all major parameters, and of the parameter contrasts, are summarized by their posterior means and percentile-based 95% credible intervals (95% CIs), which are analogous to frequentist point estimates and confidence intervals (see Bürkner, 2017; Kruschke & Liddell, 2018; McElreath, 2020).

Results

Descriptive Statistics

Table 1 displays the descriptive statistics of study variables, by gender. Most participants identified as non-Hispanic (81.0%) White (57.9%) cisgender men (74.6%), and their average age was 43.6 years. The majority reported completing a bachelor's degree or higher (73.2%), the plurality was employed full time (48.5%) or part time (5.9%), and their most common annual income bracket was \$30,000–\$44,999. The bulk of the veterans reported serving in the Army (90.1%). Veterans reported 2.4 deployments, on average.

Figure 1 displays the posterior means and 95% confidence intervals for the MIQ-M population-level item response percentages from the unconditional model using the full sample, and Figure 2 displays the same for the MIES items. Descriptively, "never" was the most frequently endorsed response option for the MIQ-M, and "strongly disagree" was the most frequently endorsed response for the MIES.

The MIQ-M items with the highest proportion of responses other than "never" were Item 1, which assesses military experiences that led to feelings of betrayal by or disappointment with military/political leaders, and Item 12, which assesses warzone experiences that were chaotic and beyond one's control. The MIQ-M items with the highest proportion of endorsements of "often" were Items 1 and 17, which assess feeling changed after seeing so much death.

The MIES item with the highest proportion of responses other than "strongly disagree" was Item 1, which assesses witnessing events that felt morally wrong. Items 1 and 7 (which assess feeling betrayed by trusted leaders) were the MIES items with the highest proportions of endorsements for the "strongly agree" response option.

Gender Differences on the MIQ-M

Formal contrasts of response percentage points for the MIQ-M, by men and women, are displayed in Figure 3. Overall, veteran men and women showed gender differences larger than 10 percentage points on five of the 19 MIQ-M items. In each case, veteran men were more likely to endorse experiencing PMIEs to some degree (i.e., "seldom," "sometimes," or "often") and women were more likely to endorse "never" experiencing PMIEs. In order of the magnitude of the gender difference, those were as follows: Item 11, which assessed whether veterans saw or were involved in the deaths of children (women had a 27, 95% CI [21, 34], higher percent for "never"); Item 13, which assessed if they treated civilians more harshly than necessary (women reported "never" >23% than men, 95% CI [15, 30]); Item 19, which assessed whether veterans realized they enjoyed violence (women reported "never" >21% than men, 95% CI [14, 28]); Item 6, which assessed whether veterans saw or were involved in the death of an innocent (women reported "never" >20% than men, 95% CI [12, 28]); and Item 16, which assessed whether veterans unnecessarily destroyed civilian property (women reported "never" >19% than men, 95% CI [13, 25], higher percent for "never").

Gender Differences on the MIES

Formal contrasts of response percentage points for the MIQ-M, by men and women, are displayed in Figure 4. Overall, veteran men and women showed gender differences larger than 10% on two

Table 1
Demographic Characteristics of Cisgender Participants

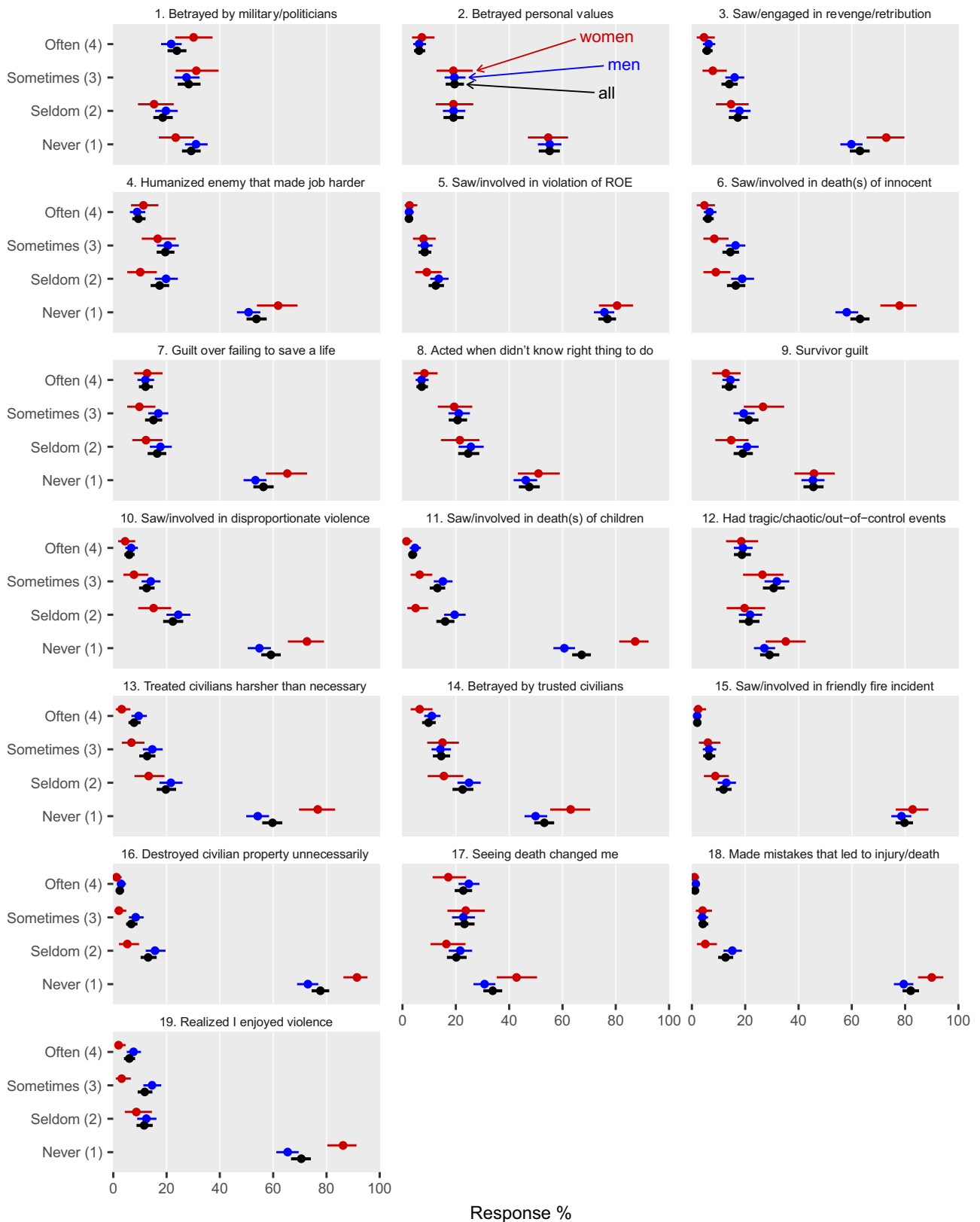
Variable	Female		Male	
	<i>n</i>	%	<i>n</i>	%
Categorical variables				
Race				
American Indian/Alaska Native	8	7.9	18	5.9
Asian	4	4.0	14	4.6
Black/African American	44	43.6	79	26.1
Hawaiian/Pacific Islander	1	1.0	3	1.0
White	44	43.6	190	62.7
Other	4	4.0	10	3.3
Ethnicity				
Hispanic/Latino	19	18.8	58	19.1
Highest level of education				
Some high school	0	0.0	2	0.7
High school diploma or general education diploma	21	20.8	42	13.9
Some college	1	1.0	6	2.0
Associate's degree	1	1.0	19	6.3
Technical school certification	3	3.0	13	4.3
Bachelor's degree	18	17.8	45	14.9
Some graduate school	24	23.8	108	35.6
Graduate degree	33	32.7	68	22.4
Work status				
Employed full time	43	42.6	147	48.5
Employed part time	6	5.9	18	5.9
Disabled	24	23.8	66	21.8
Retired	23	22.8	80	26.4
Full-time student	10	9.9	29	9.6
Part-time student	5	5.0	7	2.3
Full-time homemaker	5	5.0	7	2.3
Unemployed (looking for work)	10	9.9	20	6.6
Unemployed (not actively looking for work)	11	10.9	27	8.9
Annual income				
\$0–\$14,999	11	10.9	13	4.3
\$15,000–\$29,999	19	18.8	51	16.8
\$30,000–\$44,999	34	33.7	69	22.8
\$45,000–\$59,999	17	16.8	62	20.5
\$60,000–\$74,999	10	9.9	50	16.5
\$75,000–\$89,999	5	5.0	26	8.6
\$90,000 or higher	5	5.0	31	10.2
Military service				
Air force	3	3.0	12	4.0
Army	91	90.1	273	90.1
Marine corps	2	2.0	19	6.3
National guard	14	13.9	36	11.9
Navy	2	2.0	17	5.6
Variable	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Continuous variables				
No. of deployments	2.3	1.1	2.4	1.2
Age	41.9	8.8	44.2	9.3
Years served in active duty	11.4	7.6	13.7	7.7
Years of education	15.3	1.8	14.6	2.4

Note. Two noncisgender participants ($n = 1$ transgender man, $n = 1$ nonbinary) are not included to protect confidentiality.

of the nine MIES items. In both items, veteran women were more likely to endorse “strongly agree” to items assessing betrayal than veteran men, who were more likely to endorse “moderately disagree” through “strongly disagree.” In order of the magnitude of the gender difference, those were as follows: Item 7, which assessed feeling

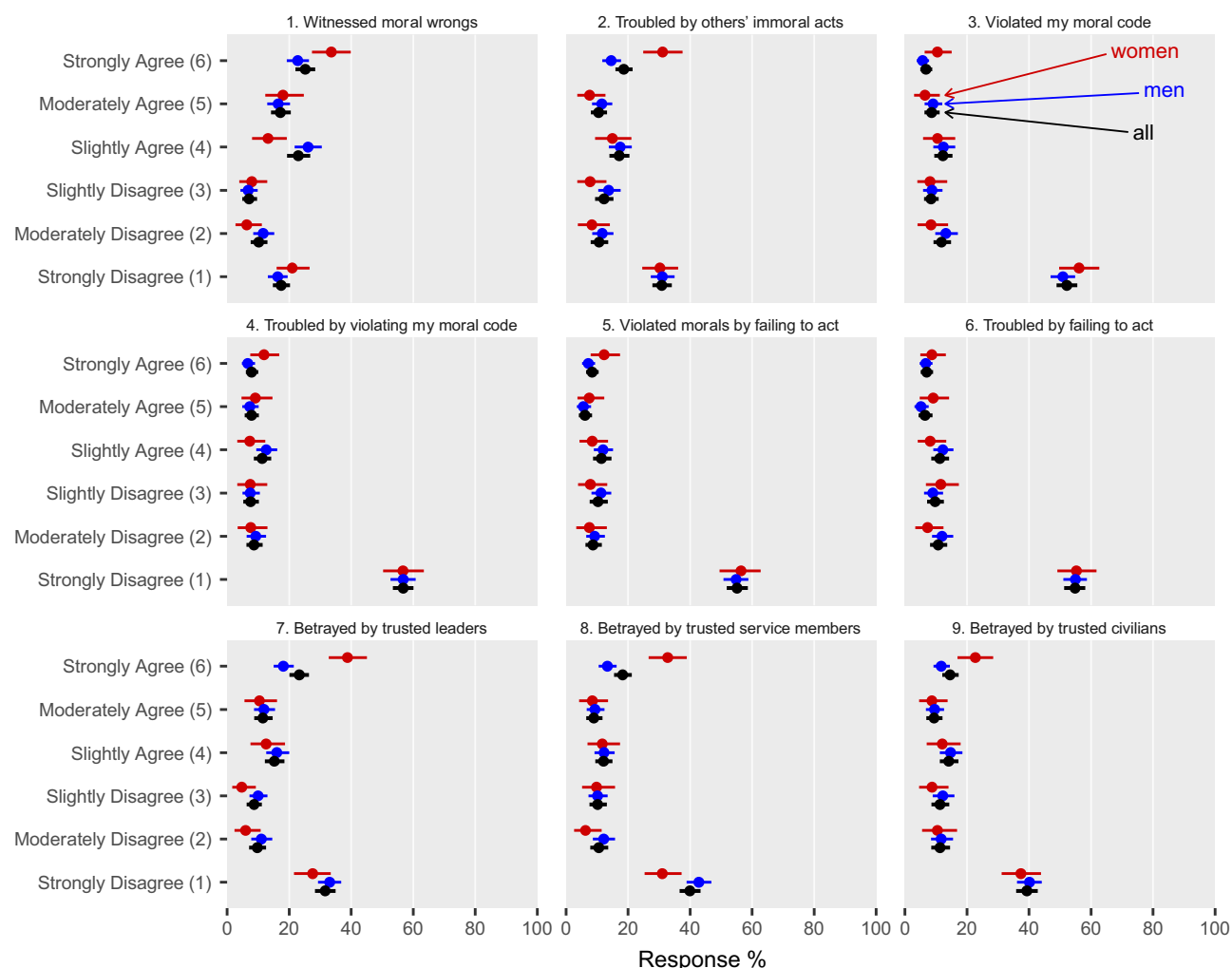
betrayed by leaders they once trusted (women reported “strongly agree” >21% than men, 95% CI [14, 28]), and Item 8, which assessed feeling betrayed by trusted fellow service members they once trusted (women reported “strongly agree” 20% more than men, 95% CI [13, 27]).

Figure 1
MIQ-M Population Estimates



Note. The dots mark the posterior means (point estimates), and the horizontal lines mark the 95% CIs. The black point intervals are from the overall model containing all participants ($n = 402$). The blue and red point intervals are from the model which allowed the thresholds to vary by gender ($n_{\text{men}} = 300$, $n_{\text{women}} = 100$). MIQ-M = Moral Injury Questionnaire–Military Version; CI = credible interval; ROE = rules of engagement. See the online article for the color version of this figure.

Figure 2
MIES Population Estimates



Note. The dots mark the posterior means (point estimates), and the horizontal lines mark the 95% CIs. The black point intervals are from the overall model containing all participants ($n = 404$). The blue and red point intervals are from the model which allowed the thresholds to vary by gender ($n_{\text{men}} = 301$, $n_{\text{women}} = 101$). MIES = Moral Injury Events Scale; CI = credible interval. See the online article for the color version of this figure.

Discussion

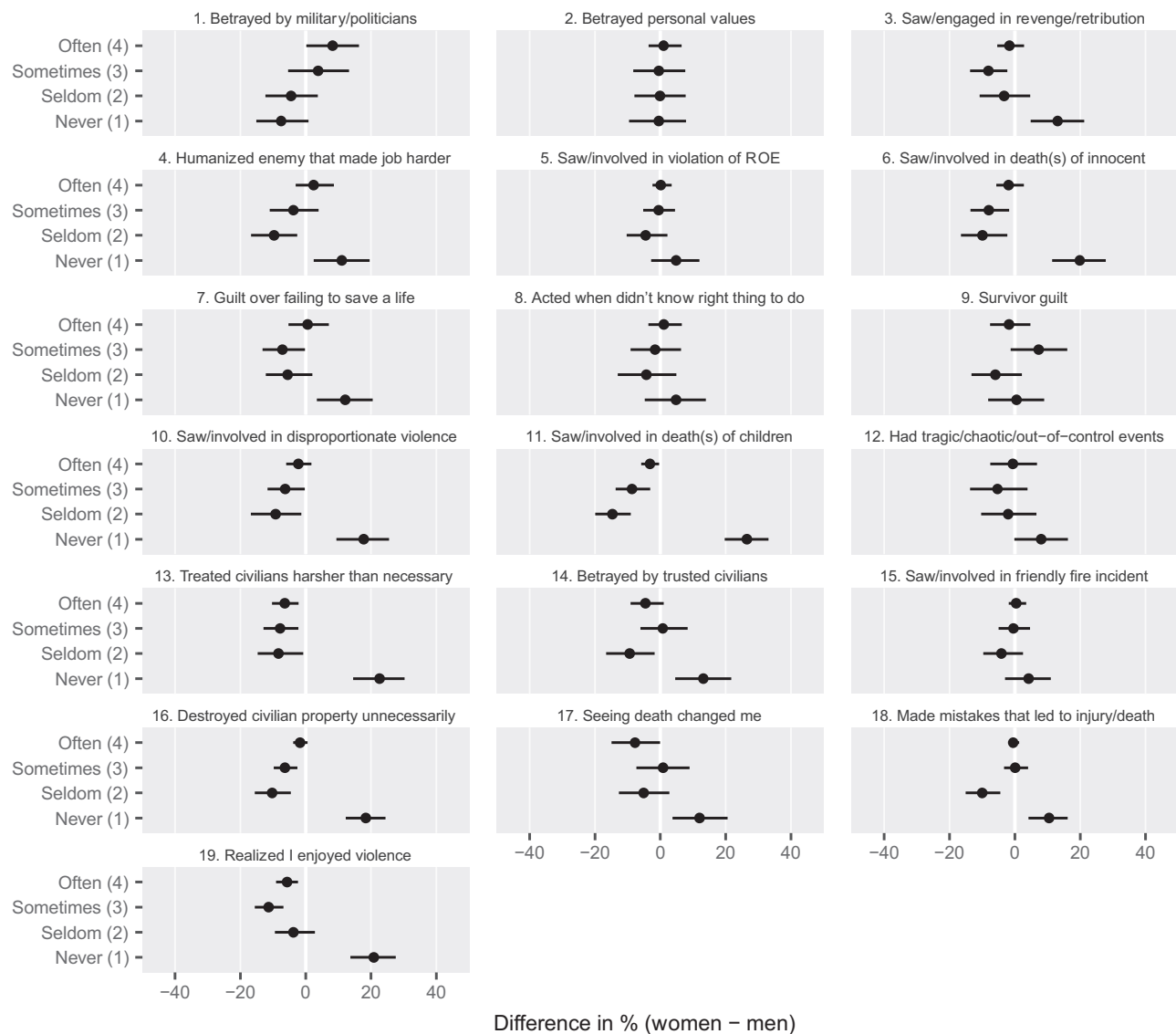
Despite growing interest in moral injury as a clinical construct and the increasing presence of women in the U.S. military, relatively little is known about gender differences in reported occurrences of moral injury events. We used Bayesian multilevel cumulative logit IRT models to estimate population differences in the proportions of male and female veterans' item responses to two published measures of moral injury events, the MIES (Nash et al., 2013) and MIQ-M (Currier et al., 2015). On both the MIQ-M and MIES, we found gender differences for at least one response level of most items; specifically, gender differences greater than 10% at the item level were identified for two of the nine items of the MIES and five of the 19 items on the MIQ-M, with differences observed in both the frequency and infrequency of reported moral injury experiences.

Broad patterns of gender differences varied between the MIQ-M and MIES, with a tendency for men to have higher probabilities of

item endorsement on the MIQ-M and women to have higher probabilities of item endorsement on the MIES. On the MIQ-M, men reported higher rates of involvement/exposure to deaths of children, treating civilians more harshly than necessary, learning that they enjoyed violence, involvement in the death of an "innocent," and unnecessarily destroying civilian property. Conversely, women demonstrated higher probabilities of "never" having such experiences. Gender-based differences on the MIQ-M may reflect differential risk of exposure to potentially traumatic combat events or gender-based differences in likelihood of exposure to heavy combat.

The general pattern on the MIQ-M of high endorsement of any positive item response level by veteran men could be due to item wording and the historical role of veteran women on combat deployments. MIQ-M items provide descriptions of specific deployment-related events rather than evaluative appraisals of the events (Frankfurt & Coady, 2019). Until 2015, female-identified service members were banned from serving in direct

Figure 3
MIQ-M Population Contrasts by Gender



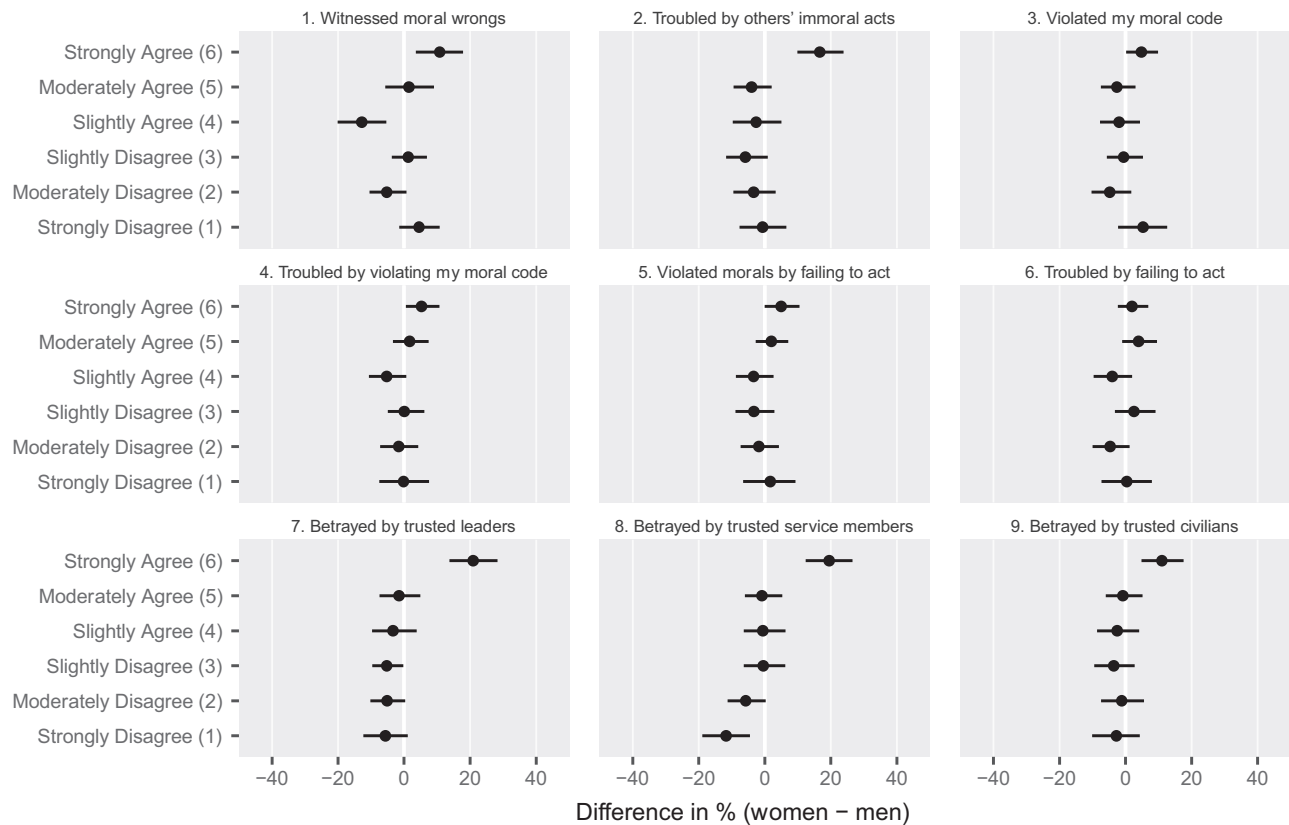
Note. The dots mark the posterior means (point estimates) for the percentage point contrasts, and the horizontal lines mark the 95% CIs. Positive values mean larger percentage point values for women, and negative values mean larger percentage point values for men. MIQ-M = Moral Injury Questionnaire–Military Version; CI = credible interval; ROE = rules of engagement.

combat operational roles. Although events described in items on the MIQ-M likely could have been experienced outside the context of direct combat service, it seems likely that the veteran men and women in this sample had systematically different roles/jobs in the military and subsequently types of deployment-related experiences. Women are no longer excluded from serving in combat roles, and as such, future research will be needed to track whether the gender differences observed in the present study shift over time.

On the MIES, women were more likely to report experiencing betrayal by military leaders and fellow service members. Veteran men and women reported similar item-level rates of PMIEs that involved

one's actions/inactions of moral wrongs on the MIES. These findings are largely consistent with [Maugen et al. \(2020\)](#), which as noted is the only previous study to examine gender differences at the item level. [Maugen et al. \(2020\)](#) found that veteran women were more likely to report betrayal by military leaders and other service members to small albeit significant effect; in that sample, veteran women were also more likely to report witnessing and being troubled by witnessing others' moral violations. Gender differences in rates of betrayal-based MIES item endorsement may be due, in part, to gender differences in experiences of MST. Of note, neither the MIES nor the 19-item version of the MIQ-M administered in this study directly assesses experiences of MST. [Currier et al. \(2015\)](#) included the item "I was

Figure 4
MIES Population Contrasts by Gender



Note. The dots mark the posterior means (point estimates) for the percentage point contrasts, and the horizontal lines mark the 95% CIs. Positive values mean larger percentage point values for women, and negative values mean larger percentage point values for men. MIES = Moral Injury Events Scale; CI = credible interval.

sexually assaulted” in their original version of the MIQ-M, but this item was removed during initial validation analyses due to very low rates of endorsement among male and female participants. Including the MIQ-M sexual assault item in future research may help to determine if gender differences in the occurrence of MST offer a potential explanation for differences in experiences of betrayal between veteran men and women. Furthermore, although some research has demonstrated a relationship between experiences of MST and perceptions of institutional betrayal (Monteith et al., 2016), it remains unclear to what extent veteran men and women themselves would nominate MST as a PMIE or endorse moral injury following MST. Future person-centered research on whether veterans and service members construe their experiences of MST in terms of moral injury is needed to clarify the boundaries of the PMIE category.

Our study is marked by some limitations. First, the study was a secondary data analysis and so was not designed to test causal relations among demographic characteristics, military experiences, and PMIEs. Second, the study was not powered or designed to directly assess the experiences of transgender veterans, and as such, our conclusions are constrained to cis-identifying veterans. Future research will be needed to explore gender differences in the occurrence of moral injury across all those who serve, including transgender, nonbinary, and gender-nonconforming service members

and veterans, in a study designed to test causal relations among demographic variables, military experiences, and PMIEs. Examination of relationships between PMIEs, deployment-related experiences, and experience of masculinist social norms within military culture may also be a worthwhile avenue for future research.

A third limitation relates to the measurement of moral injury by both the MIQ-M and MIES. Given the wording of the items, it is difficult to disentangle the frequency of experiencing PMIEs from the magnitude or impact of such events. This leads to uncertainty regarding how to interpret scale responses, as gender differences could be due to differences in the number of events experienced or in the severity of the experiences, regardless of frequency. Future work that disaggregates the frequency and severity of morally injurious experiences is needed to better understand the sources of gender differences in moral injury experience. Differential item functioning analyses may also be beneficial to determine the extent to which item bias might be influencing gender differences at the item response level.

One final limitation is the possibility that these findings may be influenced by the effects of socially desirable responding. The most frequently endorsed responses on the MIQ-M and MIES were “never” and “strongly disagree,” respectively, suggesting that the majority of veterans did not endorse having experienced the PMIEs

assessed by these measures. However, it is possible that these results underestimate the true occurrence rates of these PMIEs, particularly for PMIEs which might involve one's own moral wrongdoings and be more susceptible to socially desirable responding. Some research has further suggested that women are more prone to social desirability bias than men, a phenomenon which has been attributed to differences in gender socialization (Chung & Monroe, 2003). Future research in this area might consider the inclusion of social desirability measures to determine the extent to which reporting of PMIEs is susceptible to social desirability effects.

Our findings have important clinical implications for continued efforts to better assess and treat moral injury. First, these findings suggest that PMIEs occur at a relatively high prevalence rate among both men and women, thus highlighting the importance of assessment of moral injury in addition to standard screening practices for PTSD. Furthermore, if men and women are differentially affected by distinct types of moral injury exposure, and if exposure to PMIEs may differentially affect mental health outcomes in men and women (Maugen et al., 2020, 2022), moral injury interventions may need to be tailored differently to meet individual treatment needs. Although treatment decisions should not be based on gender identity alone, awareness of common gender differences in the likelihood of experiencing a given PMIE and associated mental health outcomes may help inform mental health treatment providers' initial assessments and case conceptualizations. As moral injury continues to gain traction as a target of research and intervention, it is imperative that future research efforts recognize the diverse nature of the military population in attempting to better understand this clinical phenomenon.

References

- Bryan, C. J., Bryan, A. O., Anestis, M. D., Anestis, J. C., Green, B. A., Etienne, N., Morrow, C. E., & Ray-Sannerud, B. (2016). Measuring moral injury: Psychometric properties of the Moral Injury Events Scale in two military samples. *Assessment*, 23(5), 557–570. <https://doi.org/10.1177/1073191115590855>
- Burkman, K., Gloria, R., Mehlman, H., & Maguen, S. (2022). Treatment for moral injury: Impact of killing in war. *Current Treatment Options in Psychiatry*, 9(3), 101–114. <https://doi.org/10.1007/s40501-022-00262-6>
- Bürkner, P.-C. (2017). brms: An R package for Bayesian multilevel models using Stan. *Journal of Statistical Software*, 80(1), 1–28. <https://doi.org/10.18637/jss.v080.i01>
- Bürkner, P.-C. (2021). Bayesian item response modeling in R with brms and Stan. *Journal of Statistical Software*, 100(5), 1–54. <https://doi.org/10.18637/jss.v100.i05>
- Chung, J., & Monroe, G. S. (2003). Exploring social desirability bias. *Journal of Business Ethics*, 44(4), 291–302. <https://doi.org/10.1023/A:1023648703356>
- Clever, M., & Segal, D. R. (2013). The demographics of military children and families. *The Future of Children*, 23(2), 13–39. <https://doi.org/10.1353/foc.2013.0018>
- Currier, J. M., Holland, J. M., Drescher, K., & Foy, D. (2015). Initial psychometric evaluation of the Moral Injury Questionnaire—Military Version. *Clinical Psychology & Psychotherapy*, 22(1), 54–63. <https://doi.org/10.1002/cpp.1866>
- De Boeck, P., Bakker, M., Zwitser, R., Nivard, M., Hofman, A., Tuerlinckx, F., & Partchev, I. (2011). The estimation of item response models with the lmer function from the lme4 package in R. *Journal of Statistical Software*, 39(12), 1–28. <https://doi.org/10.18637/jss.v039.i12>
- Gelman, A., & Hill, J. (2006). *Data analysis using regression and multilevel/hierarchical models*. Cambridge University Press. <https://doi.org/10.1017/CBO9780511790942>
- Griffin, B. J., Purcell, N., Burkman, K., Litz, B. T., Bryan, C. J., Schmitz, M., Villierme, C., Walsh, J., & Maguen, S. (2019). Moral injury: An integrative review. *Journal of Traumatic Stress*, 32(3), 350–362. <https://doi.org/10.1002/jts.22362>
- Hall, N. A., Everson, A. T., Billingsley, M. R., & Miller, M. B. (2022). Moral injury, mental health and behavioural health outcomes: A systematic review of the literature. *Clinical Psychology & Psychotherapy*, 29(1), 92–110. <https://doi.org/10.1002/cpp.2607>
- Kelley, M. L., Braitman, A. L., White, T. D., & Ehlke, S. J. (2019). Sex differences in mental health symptoms and substance use and their association with moral injury in veterans. *Psychological Trauma: Theory, Research, Practice, and Policy*, 11(3), 337–344. <https://doi.org/10.1037/tra0000407>
- Kruschke, J. K. (2018). Rejecting or accepting parameter values in Bayesian estimation. *Advances in Methods and Practices in Psychological Science*, 1(2), 270–280. <https://doi.org/10.1177/2515245918771304>
- Kruschke, J. K., & Liddell, T. M. (2018). The Bayesian New Statistics: Hypothesis testing, estimation, meta-analysis, and power analysis from a Bayesian perspective. *Psychonomic Bulletin & Review*, 25(1), 178–206. <https://doi.org/10.3758/s13423-016-1221-4>
- Litz, B. T., Stein, N., Delaney, E., Lebowitz, L., Nash, W. P., Silva, C., & Maguen, S. (2009). Moral injury and moral repair in war veterans: A preliminary model and intervention strategy. *Clinical Psychology Review*, 29(8), 695–706. <https://doi.org/10.1016/j.cpr.2009.07.003>
- Maugen, S., Griffin, B. J., Copeland, L. A., Perkins, D. F., Finley, E. P., & Vogt, D. (2020). Gender differences in prevalence and outcomes of exposure to potentially morally injurious events among post-9/11 veterans. *Journal of Psychiatric Research*, 130, 97–103. <https://doi.org/10.1016/j.jpsychires.2020.06.020>
- Maugen, S., Griffin, B. J., Vogt, D., Hoffmire, C. A., Blossnich, J. R., Bernhard, P. A., Akhtar, F. Z., Cypel, Y. S., & Schneiderman, A. I. (2022). Moral injury and peri- and post-military suicide attempts among post-9/11 veterans. *Psychological Medicine*, 53(7), 3200–3209. <https://doi.org/10.1017/S0033291721005274>
- McElreath, R. (2020). *Statistical rethinking: A Bayesian course with examples in R and STAN* (2nd ed.). Chapman and Hall/CRC. <https://doi.org/10.1201/9780429029608>
- Miller, L. J., & Ghadiali, N. Y. (2015). Gender-specific mental health care needs of women veterans treated for psychiatric disorders in a Veterans Administration Women's Health Clinic. *Medical Care*, 53(4, Suppl. 1), S93–S96. <https://doi.org/10.1097/MLR.0000000000000282>
- Monteith, L. L., Bahraini, N. H., Matarazzo, B. B., Soberay, K. A., & Smith, C. P. (2016). Perceptions of institutional betrayal predict suicidal self-directed violence among veterans exposed to military sexual trauma. *Journal of Clinical Psychology*, 72(7), 743–755. <https://doi.org/10.1002/jclp.22292>
- Nash, W. P., Marino Carper, T. L., Mills, M. A., Au, T., Goldsmith, A., & Litz, B. T. (2013). Psychometric evaluation of the Moral Injury Events Scale. *Military Medicine*, 178(6), 646–652. <https://doi.org/10.7205/MILMED-D-13-00017>
- Nichter, B., Norman, S. B., Maguen, S., & Pietrzak, R. H. (2021). Moral injury and suicidal behavior among U.S. combat veterans: Results from the 2019–2020 National Health and Resilience in Veterans Study. *Depression and Anxiety*, 38(6), 606–614. <https://doi.org/10.1002/da.23145>
- O'Brien, S. F., & Coady, A. (2019). Bringing philosophy to bear on moral injury and posttraumatic stress disorder construct validation: Commentary on Farnsworth (2019). *Journal of Traumatic Stress*, 32(4), 639–641. <https://doi.org/10.1002/jts.22423>
- O'Brien, S. F., DeBeer, B. B., Morissette, S. B., Kimbrel, N. A., La Bash, H., & Meyer, E. C. (2018). Mechanisms of moral injury following military

- sexual trauma and combat in post-9/11 U.S. war veterans. *Frontiers in Psychiatry*, 9, Article 520. <https://doi.org/10.3389/fpsy.2018.00520>
- O'Brien, S. F., & Frazier, P. (2016). A review of research on moral injury in combat veterans. *Military Psychology*, 28(5), 318–330. <https://doi.org/10.1037/mil0000132>
- Pernicano, P. U., Wortmann, J., & Haynes, K. (2022). Acceptance and forgiveness therapy for veterans with moral injury: Spiritual and psychological collaboration in group treatment. *Journal of Health Care Chaplaincy*, 28(sup1), S57–S78. <https://doi.org/10.1080/08854726.2022.2032982>
- Plouffe, R. A., Easterbrook, B., Liu, A., McKinnon, M. C., Richardson, J. D., & Nazarov, A. (2023). Psychometric evaluation of the Moral Injury Events Scale in two Canadian armed forces samples. *Assessment*, 30(1), 111–123. <https://doi.org/10.1177/10731911211044198>
- R Core Team. (2023). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing. <https://www.R-project.org/>
- Robbins, A. T., Kelley, M. L., Hamrick, H. C., Bravo, A. J., & White, T. D. (2017). *Modified Moral Injury Questionnaire—Military Version (MIQ-M)* [Database record]. APA PsycTests. <https://doi.org/10.1037/t67142-000>
- Samejima, F. (1997). Graded response model. In W. J. van der Linden & R. K. Hambleton (Eds.), *Handbook of modern item response theory* (pp. 85–100). Springer-Verlag. https://doi.org/10.1007/978-1-4757-2691-6_5
- Texas Workforce Investment Council. (2021). *Veterans in Texas: A demographic study*. <https://gov.texas.gov/uploads/files/organization/twic/Veterans-in-Texas-2021.pdf>
- Thomas, K. H., McDaniel, J. T., Haring, E. L., Albright, D. L., & Fletcher, K. L. (2018). Mental health needs of military and veteran women: An assessment conducted by the Service Women's Action Network. *Traumatology*, 24, 104–112. <https://doi.org/10.1037/trm0000132>
- U.S. Department of Defense. (2022). *Demographics: Profile of the military community*. <https://download.militaryonesource.mil/12038/MOS/Reports/2022-demographics-report.pdf>
- Wickham, H., Averick, M., Bryan, J., Chang, W., McGowan, L. D., François, R., Grolemund, G., Hayes, A., Henry, L., Hester, J., Kuhn, M., Pedersen, T. L., Miller, E., Bache, S. M., Müller, K., Ooms, J., Robinson, D., Seidel, D. P., Spinu, V., ... Yutani, H. (2019). Welcome to the tidyverse. *Journal of Open Source Software*, 4(43), Article 1686. <https://doi.org/10.21105/joss.01686>
- Wilson, L. C. (2018). The prevalence of military sexual trauma: A meta-analysis. *Trauma, Violence, & Abuse*, 19(5), 584–597. <https://doi.org/10.1177/1524838016683459>
- Wisco, B. E., Marx, B. P., May, C. L., Martini, B., Krystal, J. H., Southwick, S. M., & Pietrzak, R. H. (2017). Moral injury in U.S. combat veterans: Results from the National Health and Resilience in Veterans Study. *Depression and Anxiety*, 34(4), 340–347. <https://doi.org/10.1002/da.22614>
- Yahalom, J., O'Brien, S. F., & Hamilton, A. B. (2023). Between moral injury and moral agency: Exploring treatment for men with histories of military sexual trauma. *Medicine Anthropology Theory*, 10(1), 1–21. <https://doi.org/10.17157/mat.10.1.6876>

Received October 17, 2023

Revision received June 14, 2024

Accepted July 8, 2024 ■