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## The Adult Moral Injury Scale: An Initial Validation Study

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**The Adult Moral Injury Scale: An Initial Validation Study**

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Presented to the Faculty of the

Graduate School of Clinical Psychology

George Fox University

in partial fulfillment

of the requirements for the degree of

Doctor of Psychology

in Clinical Psychology, for the first author

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**Approval Page**

**The Adult Moral Injury Scale: An Initial Validation Study**

by

Robert Wingerter, MA

has been approved

at the

Graduate School of Clinical Psychology

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### **Abstract**

Moral injury (MI) is a construct that has gained significant traction over the past decade and holds great implications for the etiology, nosology, and treatment of trauma. MI literature is currently limited by established measures of MI which share various strengths and weaknesses, and there has been a call in the literature to address measurement of MI (Griffin et al., 2019). In this study we propose a new measure of MI, the Adult Moral Injury Scale (AMIS), and will conduct initial validation of this measure. The AMIS is designed to be a content valid measure of MI symptoms in the general population of U.S. Adults (regardless of military status or occupation) and to address spiritual/existential crises that are regarded by many as primary to the development and maintenance of MI, but often ignored in previous MI measures. Though a two-factor structure was anticipated, EFA conducted in this study indicated the AMIS is a unidimensional measure in this sample with strong factor loadings across all 39 items, exceptional internal consistency, and is estimated to have strong factor replicability. Content validity analysis overall supported the AMIS as a valid measure of MI, though further analysis is required in future studies. Finally, participants identified as receiving mental health treatment were shown to have significantly higher AMIS scores than those not receiving mental health treatment, suggesting light evidence for the discriminant validity of the AMIS. Overall, this study supports the AMIS as a potentially valid measure of MI, though additional research is needed before it can be utilized as a measurement tool in research or clinical settings.

*Keywords:* moral injury, measurement, initial validation

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### **The Adult Moral Injury Scale: An Initial Validation Study**

Moral injury (MI) is a relatively new construct that has continued to gain attention within the field of psychology and ancillary disciplines (Griffin et al., 2019). It is a trauma syndrome that is significantly correlated with posttraumatic stress disorder (PTSD) in etiology and symptomatology, yet evidence suggests these are distinct conditions (Bryan et al., 2018; Litz et al., 2018; Ramage et al., 2016), making MI a vital construct in furthering our etiology and nosology of trauma, and therefore trauma treatment (Held et al., 2018; Farnsworth et al., 2017).

Despite gaining significant attention, MI literature continues to struggle with cohesion in the construct's theoretical basis with several authors proposing divergent conceptualizations of MI etiology. There is consensus among researchers that MI results from exposure to an act violating one's understanding of what is moral. However, the means of exposure is not agreed upon. Litz et al. (2009) defined MI as "perpetrating, failing to prevent, bearing witness to, or learning about acts that transgress deeply held moral beliefs and expectations" (p. 697). Shay's (2014) definition includes "a betrayal of what's right by someone who holds legitimate authority (e.g., in the military—a leader) in a high stakes situation" (p. 183). Some researchers have integrated these definitions to describe MI as a dimensional construct (e.g., Farnsworth et al., 2017) that often includes perpetration- (i.e., self-inflicted) and betrayal-based (i.e., inflicted by others) MI.

As summarized by Jinkerson (2016), most descriptions of MI include primary symptoms of excessive guilt and shame, loss of trust in self, others, or deity, and a spiritual crisis is also often described or implied. These primary symptoms are theorized to lead to a host of secondary symptoms, including depression, anxiety, re-experiencing, social withdrawal, substance abuse,



self-handicapping, and suicidality (Jinkerson, 2016) and there is some support for this theory regarding substance abuse (Battles, et al., 2019).

The etiological events for MI have been shown to have distinct symptom profiles associated with perpetration-based MI and betrayal/other-based MI. Litz et al., (2018) examined MI in a population of servicemembers and found perpetrator-based MI (i.e., “MI-self”; Stein et al., 2012, p. 789), was associated with greater guilt and self-blame, sadness, negative cognitions about the self, and more severe re-experiencing in relation to a life-threat trauma. These results were consistent with Stein and colleagues’ (2012) findings. “MI by Others” (Stein et al., 2012, p. 789) which included witnessing and falling victim to morally injurious events, was more greatly associated with feelings of betrayal/humiliation and more frequent aggressive behaviors. Indeed, Jordan et al. (2017) found mild evidence of perpetration-based MI being mediated by guilt/shame while betrayal-based MI was mediated by anger. However, it should be noted that both dimensions of MI had nearly identical correlations with guilt/shame and anger. While we later discuss MI measures in more depth, we mention here that there has been mixed evidence of MI measures reflecting a single versus two-dimensional construct.

We speculate the mixed evidence suggesting MI as a single versus two-dimensional construct may be partly due to a high co-occurrence of MI formative events (i.e., perpetration and betrayal). Instances that have a high potential for co-occurrence include, but are not limited to, coerced perpetration (e.g., being ordered to kill as a military or police personnel) or childhood abuse from a parent (i.e., betrayal trauma; Freyd, 1997; Delker & Freyd, 2017). In the first scenario, an individual may suffer the effect of perpetration, but under the pressures of an authority which opens a door for perceived betrayal. In the second scenario, while in an “objective” sense betrayal is occurring, perpetration may be perceived as a means of securing an

idealized image of a parent at the price of taking on blame for the betrayal (a phenomena identified as “betrayal blindness”; Delker & Freyd, 2017, p. 702). Additionally, the existential/spiritual crisis theoretically involved in MI may result from either perpetration or betrayal, but perhaps the consequential questioning of one’s own human nature (resulting from perpetration) leads to a generalized questioning of humanity. Inversely, questioning humanity after a betrayal may lead to questioning one’s own moral nature.

We offer the above speculations, not as hypotheses to be tested in the current study, but to illustrate the complex nature of conceptualizing MI as a dimensional construct.

### **Measurement Issues in MI Literature**

More examination is needed to clearly distinguish the nature of MI dimensions. However, despite empirical evidence suggesting distinct symptom profiles for MI dimensions, most studies of MI do not nuance measurement of MI to differentiate between dimensions. Rather, an aggregate pool of items that appraise both MI symptoms and potentially etiological events are often used for measurement, even in studies utilizing measures of MI that have been shown to have a two-dimensional structure. This is potentially problematic as true effects may be masked if MI is not a unidimensional construct, though the degree this may be problematic is not conclusive given the minority of literature examining MI dimensions.

Of the six currently established MI scales, two scales (Nash et al., 2013; Currier et al., 2015) measure exposure to potentially morally injurious events (PMIE) but not expressions of MI. This is problematic as mere exposure to a PMIE does not ensure the presence of MI (Griffin et al., 2019), just as potentially traumatic events do not ensure the onset of PTSD (e.g., Kilpatrick et al., 2013). Additionally, measuring exposure does not allow for meaningful reassessment over

time (aside from measuring additional exposures that occur between measurements) as exposure is a static occurrence while expressions of MI are dynamic.

Despite strong and widespread arguments for spiritual/existential-related symptoms playing an important role in the development of MI (Drescher et al., 2011; Litz et al., 2009; Koenig, 2017) and empirical evidence supporting this (Battles et al., 2019), only one scale (Koenig, et al., 2018) addresses spiritual/existential symptoms; this is perhaps one of the more glaring limitations of current scales.

Four scales (Nash et al., 2013; Currier et al., 2015; Currier et al., 2018; Koenig et al., 2018) are designed specifically for military populations. MI is a construct originating from observations in the context of war, so it is understandable most scales would be tailored to military populations. However, many have speculated the presence of MI in civilian contexts (e.g., Haight et al., 2017; Currier et al., 2015) and two scales have been designed for use in civilian populations, though these scales are not without issue.

The Perpetration-Induced Distress Scale (PIDS; Steinmetz et al., 2019) appears to do well in measuring shame and guilt associated with perpetrator-based MI, but does not address spiritual/existential symptoms, nor does it consider betrayal-based MI. In studies reporting the correlation between MI dimensions, perpetrator- and betrayal-based MI are consistently correlated to a degree that suggests a single, but possibly dimensional, construct (e.g., Levi-Belz & Zerach, 2018. Currier et al, 2019). Therefore, it appears prudent to consider both perpetrator- and betrayal-based MI for measurement.

Though contrary to the authors' claims, initial validation of the Moral Injury Scale for Youth (Chaplo et al., 2019) did not reveal this scale to have adequate construct, convergent, or divergent validity. There are several potential reasons for this result, and the Moral Injury Scale

for Youth may have redeeming qualities, but it does not at this time show to be a quality measure of MI.

MI is most often conceptualized as the result of the most egregious moral violations. As mentioned previously, it is no wonder MI was first conceived within the context of war as service members inhabit a clear hierarchy of authority (making room for betrayal-based MI) and are constantly involved in high stakes situations in which killing, a behavior considered immoral in other contexts, is accepted. It may be that MI can result from less intense moral violations with a similar but less pronounced sequelae of symptoms, meaning MI expressions could exist on a spectrum related to the degree of moral violation. Alternatively, MI may result from surpassing a certain threshold of experienced moral transgression resulting from singular, intense moral violations, as is commonly thought, or perhaps also the cumulative effects of less severe violations. This idea is supported by the similarities observed between MI and burnout (Kopacz et al., 2019; Dean et al., 2020; Murray et al., 2018), a syndrome characterized by “increased mental distance from one’s job, or feelings of negativism or cynicism related to one's job” (World Health Organization, 2020, QD85 Burnout section).

### **Current Study**

Given its implications for nosology and treatment of trauma, MI is a massively important phenomenon for study in the field of clinical psychology, yet measurement issues are pervasive in its literature. No current measure captures the spiritual/existential symptoms theoretically and empirically associated with MI, addresses both perpetrator- and betrayal-based MI, measures expressions of MI (as opposed to mere exposure to PMIE), and is suited for civilian populations—these qualities appear necessary for a construct and content valid measure of MI.

In this study we seek to address the need for a valid MI measure and conduct initial validation of the Adult Moral Injury Scale (AMIS). The AMIS is designed to be content valid in terms of expressions of MI, addresses both perpetrator- and betrayal-based MI, and to be suitable for adult, civilian populations.

## **Methods**

### **Sampling Procedure and Participants**

Upon institutional review board approval (GFU #2212003), the study sample was recruited via Qualtrics. Exploratory factor analysis (EFA) was the most sample size intensive analysis for this study. Sample size suggestions for EFA often include participant to item ratios or a cutoff for total *N*, however no clearly superior guidelines exist (Boateng et al., 2018). We drew insights from Osborne and Costello's (2004) findings and conclusions to use a participant to item ratio of 10:1; we chose this criterion because it will most likely result in an adequate sample size based on the number of items that will be included in the EFA and anticipated strength of factor loadings, while also accommodating funding restraints. The number of items to be included in the EFA was 39, thus our participant recruitment goal was a minimum 390 U.S. adults stratified by gender (female: 51%; male: 49%), with limited stratification of age (18–34 years: 30%; 35–54 years: 32 %; 55+years: 38%) and education (High school, GED, or less: 40%; Some college/Associate's: 25%; 4-year degree or higher: 35%). These stratification groupings were informed by the most recently available U.S. census data (U.S. Census Bureau, 2019; 2020).

Exclusionary criteria for the study included being under the age of 18 years, holding primary residence in territory other than one of the 50 United States, refusal to provide consent to participation in the study, and refusal to respond in the affirmative to an item asking participants

to respond genuinely to survey items. Additionally, participants were excluded if they were flagged by Qualtrics' scrubbing procedures used to identify low quality responses due to response styles and/or time spent on the survey. One deviation from standard Qualtrics scrubbing procedures used in this study was the cutoff for time spent on the survey. Typically, Qualtrics sets its cutoff to half the median response time (based on soft launch data of ~50 participants) which would have set this cutoff to 492.3 seconds (or 8.2 minutes) for this study based on  $n = 46$ . We found concern with this cutoff point given the length of the survey and amount of deliberation needed for many of its items, therefore we set this cutoff time to 12 minutes.

**Table 1***Descriptive Statistics of Participant Demographic Variables*

Demographic	<i>n</i>	%	Demographic	<i>n</i>	%
Gender			Ethnicity		
Male	229	49.0	American Indian/Alaskan Native	7	1.5
Female	233	49.9	Asian/Pacific Islander	22	4.7
Non-binary	5	1.1	Black/ African American	50	10.7
Age (years)			Hispanic/Latino	40	8.6
18–34	139	29.8	White/ European heritage	343	73.4
35–54	150	32.1	Other	6	1.3
+55	178	38.1	Education		
U.S. region			>High school or equivalent	22	4.7
Northeast	80	17.1	High school or equivalent	165	35.3
Midwest	94	20.1	Attended college	90	19.3
West	81	17.3	Associate's	35	7.5
South	212	45.4	Bachelor's	86	18.4
Religion			Some grad school	17	3.6
Catholic	110	23.6	Master's	41	8.8
Protestant	114	24.4	Doctorate	11	2.4
Christian (other)	82	17.6	Military/veteran		
Mormon	3	0.6	Total	78	16.7

Demographic	<i>n</i>	%	Demographic	<i>n</i>	%
Jehovah's Witness	1	0.2	Combat exposure	43	9.2
Jewish	9	1.9	Witnessed bodily injury/death in military	44	9.4
Muslim	13	2.8	Clinical subsample		
Buddhist	5	1.1	Total	157	33.6
Hindu	2	0.4	Receiving therapy only	40	8.6
Atheist	18	3.9	Receiving medication only	56	12.0
Agnostic	20	4.3	Receiving both	61	13.1
None	79	16.9	--	--	--
Other	11	2.4	--	--	--

Note. *N* = 467

Our final sample included 467 participants. The sample was about half female, half representing the southern region of the U.S., predominantly Christian, and predominantly of White/European heritage. Approximately one third of the sample represented our three age brackets of 18–34 years, 35–54 years, and 55 + years (see Table 1 for additional demographic information). Data collection occurred between February 9 and March 16, 2022. Survey questions allowed for clinical group (CG) and non-clinical group (NCG) subsamples. Participants were also asked about their military status and 29.5% (*n* = 23) of participants with military history were also in the CG. Therefore, we decided not to conduct any comparisons of military and non-military participants due to the highly correlated nature of military group and CG.

### Scale Development

The AMIS was developed under the theoretical assumption of MI as a two-dimensional construct composed of perpetration and betrayal dimensions. Content domains were identified for each dimension and this identification was informed by review of MI and other trauma literature followed by examination of existing MI scales and other relevant constructs. MI

symptom domains were additionally parsed into theoretically informed primary and secondary symptoms. Items were generated to correspond specifically or generally with most of the identified content domains, with a few exceptions (see Table 2). Some candidate items were borrowed and modified from existing scales while others were generated considering existing literature. Content was excluded primarily due to problems in creating meaningful self-report items related to a given domain. It should be noted that many identified content domains are not mutually exclusive and likely contain many complex relationships. For example, social withdrawal related to perpetration may be the result of self-punishment and could also be viewed as a form of self-handicapping; alternatively, it could involve motivations to protect others from oneself. It may also result from one or more causal pathways for a given individual.

**Table 2***Identified Content Domains of the Moral Injury*

Level	Moral Injury Symptoms	
	Perpetration	Betrayal
Primary	Spiritual/existential crisis <ul style="list-style-type: none"> <li>• Loss of meaning/purpose</li> <li>• Doubt in God's existence/benevolent nature</li> <li>• Doubting own moral nature/moral decision making</li> <li>• Loss of trust in self</li> <li>• Difficulty forgiving self</li> <li>• Feeling unforgivable by God OR deserving bad karma</li> <li>• Difficulty forgiving self</li> </ul>	Spiritual/existential crisis <ul style="list-style-type: none"> <li>• Loss of meaning/purpose</li> <li>• Doubt in God's existence/benevolent nature</li> <li>• Doubting moral nature/goodness of others</li> <li>• Loss of trust in others (specific group, institution, or deity).</li> <li>• *Difficulty forgiving others</li> </ul>
	Guilt	Anger
	Shame	Feelings of betrayal and humiliation



Level	Moral Injury Symptoms	
	Perpetration	Betrayal
Secondary	Social withdrawal	Social withdrawal
	<ul style="list-style-type: none"> <li>• Self-punishment</li> <li>• Need to protect others from self</li> <li>• Related to shame</li> </ul>	<ul style="list-style-type: none"> <li>• Related to loss of trust in others*</li> <li>• To maintain emotional/ relational safety</li> </ul>
	Self-Handicapping	Aggression
	<ul style="list-style-type: none"> <li>• Neglecting self-care/safety</li> <li>• Sabotaging relationships and life goals/ opportunities</li> <li>• *Substance abuse</li> </ul>	<ul style="list-style-type: none"> <li>• Related to emotional distress and limited perceived social support*</li> <li>• Diminished empathy for others</li> </ul>
--		Desire/impulse for revenge
	General distress*	General distress*
	<ul style="list-style-type: none"> <li>• Depression</li> <li>• Anxiety</li> <li>• Suicidality</li> </ul>	<ul style="list-style-type: none"> <li>• Depression</li> <li>• Anxiety</li> <li>• Suicidality</li> </ul>

\* Denotes content domains for which AMIS items were not designed to directly measure.

The AMIS contains 39 items rated on a 5-point scale (*strongly disagree* to *strongly agree*) with the following instructions: “Below are several statements about thoughts and feelings/emotions you may have experienced in the past month (i.e., 30 days). Please choose the response that best describes your level of agreement with each statement as they relate to the past month (i.e., 30 days). There are no right or wrong answers, just try your best to choose the most accurate response as it applies to your experience.” See Appendix A for the AMIS’s initial item pool and instructions.

The initial item pool was reviewed by professors and doctoral candidates of clinical psychology to gain insight for potential item wording issues and general criticism. Following review, items were appropriately modified for clarity and content validity. A pilot survey was

then distributed using convenience sampling on social media. This contained the full study survey in addition to qualitative response options for feedback with the goal of identifying other potential issues with the AMIS items/structure and full survey. This pilot included  $n = 42$  participants and following review, items were appropriately modified for clarity and content validity.

### **Validating Measures**

Several measures of theoretically related constructs were administered to participants to examine content validity for the AMIS.

#### ***Post-Traumatic Stress***

The optimized 12-item version of the International Trauma Questionnaire (ITQ) is a valid measure of PTSD and complex PTSD symptoms (Cloitre et al., 2018). The ITQ is a self-report measure (5-point Likert scaling, total score ranging 0–48) containing six 2-item subscales measuring ICD-11 defined clusters of PTSD (i.e., Re-experiencing in the here and now, Avoidance, and Sense of current threat) and Disturbance of Self-Organization (i.e., Affective dysregulation, Negative self-concept, and Disturbances in relationships). A symptom is considered present if at least one item in the respective subscale is  $\geq 2$ . The ITQ historically showed Cronbach's  $\alpha$  coefficients  $\geq 0.77$  (with the exception of the Avoidance subscale which equaled .67; Cloitre et al., 2018). Cronbach's  $\alpha$  for each subscale in this sample is as follows: Re-experiencing in the here and now = .78; Avoidance = .80; Sense of current threat = .72; Affective dysregulation = .67; Negative self-concept = .91; Disturbances in relationship = .84.

#### ***Interpersonal Trust***

The Propensity to Trust Scale (PTS) is a valid self-report measure of an individual's dispositional proclivity toward interpersonal trust (Frazier et al., 2013). It contains four items (5-

point Likert scaling, total score 0–16). The PTS historically showed a Cronbach's  $\alpha = .88-.89$  (Frazier et al., 2013). Cronbach's  $\alpha = .82$  for this sample.

### ***Anger***

The Dimensions of Anger Reactions (DAR-5; Forbes et al., 2014) is a valid, brief self-report measure of anger and has demonstrated sensitivity to changes related to clinical treatment of PTSD and strongly correlates with the State-Trait Anger Expression Inventory-2 (considered the gold standard for measuring anger) Trait ( $r = .67$ ) and State ( $r = .47$ ) subscales (Forbes, et al., 2014). The DAR-5 contains five items (5-point Likert scaling, total score 0–20) with a score  $\geq 12$  suggesting psychological distress and functional impairment related to anger (Forbes et al., 2014). The DAR-5 historically showed a Cronbach's  $\alpha = .88$  (Forbes et al., 2014). Cronbach's  $\alpha = .91$  for this sample.

### ***Guilt/Shame***

The State Shame and Guilt Scale (SSGS) is a valid self-report measure of state feelings of shame and guilt (Marschall, 1994). The Shame and Guilt subscales contain five items each (5-point Likert scaling, total score 1–25). Both scales showed a historical Cronbach's  $\alpha = .86$  (Ghatavi et al., 2002). Both subscales for this sample showed Cronbach's  $\alpha = .91$ . The SSGS was the second measure administered in this study's survey, preceded by the AMIS. We reason this ordering of measures would best capture state experiences of shame and guilt related to MI due to a priming effect that may occur from contemplation of AMIS items.

The Guilt and Shame Proneness (GASP) is a self-report measure of propensity toward experiences of shame and guilt in relation to personal transgressions (Cohen et al., 2011). It contains 4 subscales: Guilt-Negative Behavior Evaluation (e.g., "I did something wrong"), Guilt-Repair (e.g., apologizing), Shame-Negative Self-Evaluation (e.g., "I am a bad person"), and

Shame-Withdraw (e.g., tendency to isolate and avoid dealing with consequences of transgression following shameful experiences). Subscale scores range from 4–28 (7-point Likert scaling). The GASP historically showed the following Cronbach's  $\alpha$  coefficients: Guilt-Negative Behavior Evaluation = .69-.71; Guilt-Repair = .61-.62; Shame-Negative Self-Evaluation = .63-.67; Shame-Withdraw = .63-.66. (Cohen et al., 2011). Cronbach's  $\alpha$  for each subscale in this sample are as follows: Guilt-Negative Behavior Evaluation = .74; Guilt-Repair = .74; Shame-Negative Self-Evaluation = .75; Shame-Withdraw = .70.

### *Religious and Spiritual Struggles*

The Religious and Spiritual Struggles Scale (RSSS; Exeline et al., 2014) assesses multiple areas of religious and spiritual (r/s) struggles. Participants will rate their experiences over the past month pertaining to five of the six RSSS subscales (totaling 22 items; 5-point Likert scaling) including Divine (“negative emotion or conflict centered on beliefs about a deity or perceived relationship with a deity”); Interpersonal (“negative experiences with religious people or institutions or conflict with others around religious issues”); Moral (degree a person “wrestles with attempts to follow moral principles or feels intense guilt in response to perceived transgressions”); Doubt (degree of being troubled by doubts or questions about one's r/s beliefs); and Ultimate meaning (degree of concern regarding “a lack of perceived deep meaning in life”; this subscale does not require a belief in the supernatural). The RSSS subscales historically showed the following Cronbach's  $\alpha$  for each subscale: Divine = .89; Interpersonal = .82; Moral = .88; Doubt = .89 = Meaning = .87 (Exeline et al., 2014). Cronbach's  $\alpha$  for each subscale in this sample is as follows: Divine = .94; Interpersonal = .91; Moral = .93; Doubt = .94 = Meaning = .93.

### **Analytic Plan**

The internal structure of the AMIS was analyzed in FACTOR (Ferrando & Lorenzo-Seva, 2017) using exploratory factor analysis (EFA). A polychoric correlation matrix was used in the EFA. To assess dimensionality, we implemented a parallel analysis using minimum rank factor analysis (Timmermerman & Lorenzo-Seva, 2011), with 500 randomly generated correlation matrices following a normal distribution. Additionally, we used indices of unidimensionality, (i.e., the Explained Common Variance), and departure from unidimensionality, (i.e., the Mean of Item Residual Absolute Loadings). Using the Bias-corrected and Accelerated percentile method (Efron, 1987), 95% bootstrap CIs are reported to provide a robust factor analysis.

The remaining analyses were conducted in SPSS Version 28.0.0. Once a factor solution was chosen, items corresponding to each AMIS factor were summed to produce a total factor score and then correlated with validating measures. Internal consistency of each AMIS factor was examined using Cronbach's  $\alpha$ . Results of content validation and internal consistency were used for further consideration of final item selection. Finally, a  $t$ -test was implemented to compare mean total scores of the AMIS in the CG and NCG.

## Results

### EFA

The polychoric matrix was examined for appropriateness for factor analysis. The determinant of the matrix was appropriate ( $< 0.000001$ ), Bartlett's test of sphericity gave evidence the matrix was not statistically different from an identity matrix,  $\chi^2(741) = 5205.8, p < .0001$ ; and the Kaiser-Meyer-Olkin test of sampling adequacy coefficient was .96 ("very good"; Kaiser & Rice, 1974). Therefore, the 39 variables were considered suitable for factor analysis.

### Table 3

*MIS Eigenvalues of the Reduced Correlation Matrix and PA*

Factor	Eigenvalues		PA based on MRFA		
	Eigenvalue variance	Proportion of variance	Observed % of variance	Mean of random % of variance	95 <sup>th</sup> Percentile of random % of variance
1	18.938	0.567	50.386	5.335	5.707
2	3.144	0.094	8.579	5.039	5.313
3	1.684	0.050	4.814	4.825	5.099
4	0.944	0.028	3.051	4.638	4.896

*Note.* PA = Parallel Analysis; MRFA = Minimum Rank Factor Analysis.

Results of the parallel analysis (see Table 3) indicated a two-factor solution. However, we also examined the explained common variance and mean of item residual absolute loadings which resulted in values of .86 and .24, respectively, suggesting the data can be treated as essentially unidimensional (Ferrando & Lorenzo-Seva, 2018). Looking at the eigenvalues of the reduced correlation matrix, the initial factor accounted for 56.7% of the overall variance while the second factor accounted for only 9.4%. Given these results, we decided to treat the AMIS as a unidimensional measure and specified the EFA accordingly. As seen in Table 4, communalities among items were strong and had a range of .623–.983. Factor loadings were also strong with a range of .534–.850.

**Table 4**

*AMIS Descriptive Statistics, Factor Loadings, and Communalities*

Item	<i>M</i>	Skewness	Kurtosis	Loading	95% CI*		Communality
					<i>LL</i>	<i>UL</i>	
1	2.23	.67	-.78	.547	(.467	.638)	.803
2	3.52	-.60	-.63	.561	(.479	.624)	.806
3	2.12	.75	-.63	.666	(.598	.732)	.907
4	2.28	.68	-.87	.599	(.517	.670)	.836
5	1.89	1.16	.33	.728	(.654	.790)	.932
6	2.08	.83	-.37	.777	(.724	.823)	.964
7	3.17	-.24	-.92	.597	(.517	.664)	.737

Item	<i>M</i>	Skewness	Kurtosis	Loading	95% CI*		Communality
					<i>LL</i>	<i>UL</i>	
8	2.65	.24	-1.10	.773	(.723	.818)	.900
9	2.33	.50	-.93	.659	(.593	.716)	.788
10	2.45	.46	-.90	.650	(.536	.713)	.764
11	2.06	.97	-.03	.699	(.629	.762)	.871
12	2.23	.73	-.69	.550	(.466	.633)	.889
13	2.14	.79	-.44	.640	(.568	.707)	.900
14	2.79	.18	-1.27	.668	(.587	.722)	.723
15	3.16	-.27	-1.04	.561	(.459	.630)	.731
16	2.43	.39	-.98	.724	(.655	.778)	.872
17	3.11	-.18	-1.21	.719	(.652	.771)	.868
18	2.30	.63	-.80	.823	(.773	.859)	.881
19	2.62	.21	-1.24	.761	(.701	.807)	.862
20	2.78	.26	-.72	.659	(.599	.711)	.758
21	2.94	.00	-1.06	.693	(.628	.740)	.934
22	2.83	.14	-1.00	.716	(.661	.768)	.962
23	3.22	-.26	-1.15	.684	(.600	.737)	.871
24	3.20	-.24	-.96	.712	(.651	.757)	.912
25	3.06	-.16	-1.10	.588	(.503	.653)	.730
26	2.42	.47	-.89	.661	(.586	.729)	.763
27	2.55	.37	-1.12	.770	(.723	.821)	.926
28	2.40	.51	-.95	.763	(.706	.805)	.877
29	3.15	-.32	-1.08	.625	(.560	.686)	.770
30	2.91	.04	-1.29	.736	(.676	.783)	.948
31	2.64	.32	-.99	.534	(.435	.604)	.623
32	2.32	.65	-.41	.707	(.648	.761)	.882
33	2.51	.42	-.86	.804	(.752	.837)	.860
34	1.99	.99	-.23	.737	(.654	.789)	.948
35	2.39	.54	-.90	.850	(.814	.880)	.862
36	2.47	.42	-1.08	.800	(.744	.839)	.983
37	2.15	.84	-.36	.754	(.679	.801)	.910
38	2.15	.81	-.49	.755	(.705	.803)	.928
39	2.68	.28	-1.10	.744	(.693	.791)	.917

Note. *N* = 467. CI = confidence interval; *LL* = lower limit; *UL* = upper limit.

\*Confidence intervals are calculated using the Bias-corrected and Accelerated (BCa) percentile method.

“Construct reliability” (Hancock & Mueller, 2000, p. 200) or “construct replicability” (Rodriguez et al., 2015, p. 223) regard the degree to which items represent a latent common factor and its likelihood of remaining stable across studies (Ferrando & Lorenzo-Seva,

2018). Construct replicability was assessed using the *H*-Latent index, which assesses how well the factor can be identified by the continuous latent response variables that underlie the observed item scores, and the *H*-Observed index, which assesses how well the factor can be identified from the observed item scores (Ferrando & Lorenzo-Seva, 2017; 2018). *H* indices range from 0–1 and Rodriguez et al. (2015) proposed a minimum value of .80 and Ferrando and Lorenzo-Seva (2018) agreed with this value. The corresponding *H*-Latent index and *H*-Observed index values for the estimated AMIS factor were .976 and .986, respectively, indicating a well-defined latent variable underlying the AMIS item scores.

We estimated factor score indeterminacy of the estimated AMIS factor using the Factor Determinacy Index (FDI; see Ferrando & Lorenzo-Seva, 2018; Beauducel & Hilger, 2017). Given we used a polychoric matrix for our EFA, the FDI was estimated using the estimated a priori FDI approach described by Ferrando and Lorenzo-Seva (2018) for use with categorical-variables methodology factor analysis as opposed to the regression-based approach for linear factor analysis models also described in their article. The FDI for the estimated MIS factor was .998, indicating a high degree of determinacy. FDI values range from 0–1 and according to Gorsuch (1983), FDI estimates around .80 are acceptable for research purposes while Grice (2001) and Rodriguez et al. (2016) consider an FDI score may need to be  $> .90$  for assessing individual scores. By squaring an FDI estimate, a marginal reliability estimate of the factor score can be obtained (Ferrando & Lorenzo-Seva, 2018), and the marginal reliability estimate for the estimated MIS factor is .996.

### **Internal Consistency**

Cronbach's  $\alpha$  for the AMIS was .96, indicating good internal consistency. Deletion of any given AMIS item resulted in no increase to Cronbach's  $\alpha$  and no decrease greater than .002.



**Content Validity****Table 5***Descriptive Statistics of the AMIS and Validity Scales*

Scale	<i>N</i>	<i>M</i>	( <i>SE</i> )	<i>SD</i>	Skew.	( <i>SE</i> )	Kurt.	( <i>SE</i> )	$\alpha$
AMIS	467	100.3	(1.48)	32.1	.23	(.11)	-.58	(.23)	.96
ITQ - PTSD	461	10.6	(.29)	6.3	.06	(.11)	-.90	(.23)	--
ITQ - Re	466	3.3	(.11)	2.4	.19	(.11)	-.97	(.23)	.78
ITQ - Av	464	3.5	(.11)	2.4	.17	(.11)	-.92	(.23)	.80
ITQ - Th	462	3.8	(.11)	2.3	.03	(.11)	-.91	(.23)	.72
ITQ - DSO	464	9.7	(.31)	6.8	.40	(.11)	-.82	(.23)	--
ITQ - AD	466	3.3	(.10)	2.3	.34	(.11)	-.71	(.23)	.67
ITQ - NSC	466	3.0	(.13)	2.7	.51	(.11)	-1.03	(.23)	.91
ITQ - DR	466	3.4	(.12)	2.5	.29	(.11)	-1.04	(.23)	.84
PTS	466	13.7	(.18)	3.8	-.49	(.11)	.04	(.23)	.82
DAR - 5	466	10.9	(.24)	5.2	.75	(.11)	-.28	(.23)	.91
SSGS - Shame	464	11.0	(.28)	6.0	.71	(.11)	-.65	(.23)	.91
SSGS - Guilt	460	11.2	(.27)	5.8	.64	(.11)	-.74	(.23)	.91
GASP - NBE	465	20.4	(.27)	5.8	-.69	(.11)	.03	(.23)	.74
GASP - GR	463	20.9	(.24)	5.1	-.81	(.11)	.61	(.23)	.74
GASP - NSE	464	19.5	(.26)	5.6	-.54	(.11)	-.15	(.23)	.75
GASP - SW	461	13.6	(.26)	5.5	.24	(.11)	-.42	(.23)	.70
RSSS - Div	466	2.0	(.06)	1.2	.96	(.11)	-.36	(.23)	.94
RSSS - Int	465	2.1	(.05)	1.2	.89	(.11)	-.38	(.23)	.91
RSSS - Mor	463	2.2	(.05)	1.2	.77	(.11)	-.51	(.23)	.93
RSSS - Mea	463	2.5	(.06)	1.3	.46	(.11)	-1.01	(.23)	.93
RSSS - Dou	464	2.1	(.06)	1.2	.80	(.11)	-.59	(.23)	.94

*Note.* AMIS = Adult Moral Injury Scale; ITQ = International Trauma Questionnaire (PTSD =

Posttraumatic Stress Disorder; Re = Re-experiencing; Av = Avoidance; Th = Sense of Threat; DSO =

Disturbance of Self-Organization; AD = Affect Dysregulation; NSC = Negative Self-Concept; DR =

Disturbance in Relationships); PTS = Propensity to Trust Scale; DAR-5 = Dimensions of Anger

Reactions; SSGS = State Shame and Guilt Scale; GASP = Guilt and Shame Proneness (NBE = Negative

Behavior Evaluation; GR = Guilt-Repair; NSE = Negative Self Evaluation; SW = Shame-Withdraw)

RSSS = Religious and Spiritual Struggles Scale (Div = Divine; Int = Interpersonal; Mor = Moral; Mea = Ultimate meaning; Dou = Doubt); Skew. = skewness; Kurt. = kurtosis.

Pearson correlations were used to examine content validity of the AMIS and results can be seen in Table 6 (descriptive statistics of the AMIS and validation measures can be seen in Table 5). The AMIS was substantially correlated with the majority of content validity measures ( $r^2 = .26-.63$ ) with the exception of GASP subscales and the PTS.

**Table 6**

*AMIS Correlations with Validity Scales*

Scale	<i>r</i>	95% CI		<i>p</i> -value
		<i>LL</i>	<i>UL</i>	
ITQ - PTSD	.588	(.511	.659)	< .001
ITQ - Re	.511	(.427	.582)	< .001
ITQ - Av	.525	(.440	.603)	< .001
ITQ - Th	.513	(.437	.585)	< .001
ITQ - DSO	.766	(.720	.805)	<.001
ITQ - AD	.642	(.580	.697)	< .001
ITQ - NSC	.710	(.658	.753)	< .001
ITQ - DR	.702	(.646	.746)	< .001
PTS	-.234	(-.331	-.134)	< .001
RSSS - Div	.594	(.513	.662)	< .001
RSSS - Int	.567	(.497	.627)	< .001
RSSS - Mor	.603	(.531	.661)	< .001
RSSS - Mea	.670	(.607	.721)	< .001
RSSS - Dou	.535	(.456	.603)	< .001
DAR - 5	.678	(.621	.730)	< .001
SSGS - Shame	.791	(.751	.826)	< .001
SSGS - Guilt	.711	(.658	.757)	< .001
GASP - NBE	-.205	(-.300	-.114)	< .001
GASP - GR	-.154	(-.255	-.079)	.001
GASP - NSE	-.015	(-.112	.081)	.757
GASP - SW	.392	(.295	.472)	< .001

*Note.* CI = confidence interval; *LL* = lower limit; *UL* = upper limit.

The SW subscale of the GASP was moderately correlated with the AMIS ( $r^2 = .15$ ). While the PTS and the GR and NBE subscales of the GASP had  $p$ -values  $\leq .001$ , small  $p$ -values are more likely in larger samples and the effect size of these correlations were negligible ( $r^2 \leq .05$ ). It should be noted that the direction of the PTS correlation was negative (as would be expected) while the direction of the GR and NBE were also negative (which is unexpected). Finally, the NSE subscale of the GASP did not show statistical significance ( $p = .757$ ).

### **Comparing Clinical Group Versus Non-Clinical Group Scores**

Participants were split into the CG and NCG based on whether or not they endorsed currently receiving psychotherapy and/or psychopharmacological therapy. The CG was composed of 151 participants with an AMIS mean of 110.9 ( $SEM = 2.36$ ;  $SD = 29.0$ ) while the NCG was composed of 310 participants with an AMIS mean of 94.3 ( $SEM = 1.79$ ;  $SD = 31.5$ ). Levene's was not significant,  $F(1, 459) = 1.828$ ,  $p = .177$ ; indicating equal variances can be assumed for the comparison groups. A two-tailed, independent  $t$ -test was conducted and showed a significant difference between the groups,  $t(459) = 5.466$ ,  $p < .001$ ,  $d = .542$ ; indicating the CG had significantly higher AMIS scores than the NCG.

### **Retention of AMIS Items**

Due to the strength of communalities and factor loadings, strong internal consistency, the results of construct replicability indices, FDI results, and results of content validity analyses, we retained all items for the final MIS item pool.

## **Discussion**

The aim of this study was to conduct initial validation of the AMIS, a scale developed as a measure of the expressions of MI. Some evidence has shown MI to be a dimensional construct composed of perpetrator- and betrayal-based MI, and the AMIS item content was designed to

reflect this dimensional structure. However, while parallel analysis results indicate a two-factor solution for the AMIS, results from measures of unidimensionality and departure from unidimensionality indicated it to be an essentially unidimensional measure. Additional evidence suggesting a one-factor solution included large differences in first and second eigenvalues (which respectively accounted for 56.7% and 9.4% of total variance), strong evidence of construct replicability, and strong internal consistency. While a two-factor solution was expected for the AMIS, one other MI measure, the MIQ-M, has been shown to be unidimensional (Currier et al., 2015), making this a non-unique result for a measure of MI. As discussed previously in this paper, we speculate high co-occurrence of perpetration- and betrayal-based MI that may be partly due to one form of MI potentially leading to another. If our speculations hold any merit, this phenomenon may contribute to explaining a unidimensional result for specific measures in specific samples while two dimensions are found in other contexts as base rates and/or severity of perpetration- and betrayal-based MI may differ significantly based on population.

Overall, analysis of content validity supported the AMIS as a valid measure of MI symptomatology. The correlation between the PTSD subscale of the ITQ was substantial ( $r = .588$ ), as would be expected given the correlated nature of potentially traumatic events and PMIE, while the correlation with the DSO subscale of the ITQ was significantly stronger ( $r = .766$ ); this was also expected as two of the three symptom clusters for DSO include negative self-concept (NSC;  $r = .710$ ) and disturbances in relationships (DR;  $r = .702$ ), both of which are conceptually related to MI symptoms as intended to be measured by the AMIS. The AMIS shared a weaker (though not substantially weaker) correlation with the third DSO symptom cluster, affect dysregulation (AD;  $r = .642$ ). This symptom cluster contains two items rated for their frequency (“When I’m upset, it takes me a long time to calm down” and, “I feel numb or

emotionally shut down”), which relate to generalized distress, (i.e., difficulty with quickly regulating when in distress and emotional numbness). While AD does not directly relate to MI symptoms, it does relate to generalized distress that is anticipated as a secondary symptom of MI.

The AMIS was negatively correlated with a measure of interpersonal trust (i.e., the PTS;  $r = -.234$ ) which was an anticipated result, however this correlation had a negligible effect size. While the DR symptom cluster of the DSO is conceptually different from a measure of interpersonal trust, it is interesting they had such drastic differences in effect size when correlated with the AMIS.

The AMIS was strongly correlated with a measure of anger (i.e., the DAR-5;  $r = .678$ ) and state-shame ( $r = .791$ ) and state-guilt ( $r = .711$ ) as measured by the SSGS; however, measures of guilt and shame proneness (i.e., the GASP) did not correlate substantially with the AMIS with the exception of the Shame-Withdrawal subscale ( $r = .392$ ).

The GASP notably had poorer internal consistency with this sample (Cronbach’s  $\alpha = .70-.75$ ) compared to the SSGS (Cronbach’s  $\alpha = .91$ ), indicating greater variability in responding which may help to explain this unexpected result. The GASP has a rather unique format as it involves brief, hypothetical scenarios the participant imagines themselves in for which they rank how likely they would respond in the scenario’s indicated manner. A few of its items (e.g., “You are privately informed that you are the only one in your group that did not make the honor society because you skipped too many days of school. What is the likelihood that this would lead you to become more responsible about attending school?”) include scenarios that may not generalize easily across various groups. Therefore, the GASP’s unique formatting and potentially

low generalizability across groups may explain low internal consistency in this sample and, subsequently, the unsubstantial correlations between 3 of its 4 subscales with the AMIS.

Finally, the AMIS was strongly correlated with all subscales of the RSSS included in this study ( $r_s = .535-.670$ ). This is an important result as all but one previous measure of MI (Koenig et al., 2018) have neglected this aspect of the syndrome despite its theoretical importance as a primary mechanism that can set MI into motion following a PMIE.

The CG and NCG were found to be significantly different ( $d = .542$ ), with the CG scoring a little over half a standard deviation higher than the NCG when sum scoring the AMIS. While this result does not provide direct or strong evidence of the AMIS's ability to identify those with MI or to discriminate between psychological disorders, it does at least indicate AMIS scores were higher in a subsample that would be expected to have a higher prevalence of MI.

### **Limitations**

This study utilized crowdsourcing via Qualtrics and established an arbitrary (i.e., non-empirically supported) exclusionary criterion for minimum response time of the survey. Crowdsourcing is a sampling method that is not without criticism (e.g., Mullen et al., 2021) and by using an arbitrary criterion in this manner it is unclear how this may have biased the sample; however, we felt this was necessary and likely minimized the inclusion of negligent responding in the sample at the risk of possibly excluding a small number of participants with authentic responses. Additionally, we did not assess the percentage of individuals who declined to participate in the survey, were excluded from the study for various reasons (e.g., demographic characteristics, “straight-lining”), or dropped out of the study before finishing the survey. This is partially due to limitations of the sampling format and partially due to budget restrictions as some of these data are not accessible unless purchased from Qualtrics.

Another limitation of this study was the use of null hypothesis testing and traditional EFA (which relies on the general linear model). Yalch (2016) makes a compelling argument for using Bayesian methodologies for study of trauma-related phenomena as the general linear model relies on the asymptotic assumptions of having normally distributed errors, which is often violated by trauma-related data distributions. While Bayesian factor analysis methods exist (in addition to Bayesian methods for other inferential statistics used in this study), we did not have the experience necessary or access to statistical consultants for implementing these superior methodologies for studying trauma-related phenomena.

The final limitation we will address is the lack of measurement for exposure to PMIE within the study. This is not a unique limitation among studies of MI in non-military populations due to the lack of existing measures for PMIE in these populations. However, it is a glaring validity issue to neglect measurement of exposure to PMIE while validating a measure of MI symptomatology. However, for this study we assumed those reporting higher AMIS scores were more likely to have been exposed to PMIE than those reporting lower AMIS scores.

### **Future Research**

This study utilized EFA to explore the factor structure of the AMIS and future research should attempt to replicate these results with confirmatory factor analysis or Bayesian factor analysis. Additionally, examination of incremental validity is vital for considering the utility of the AMIS. While incremental validity analysis of the AMIS is not an impossible task, the fact that most previous MI measures are military specific and no other MI measure aimed to have content validity as wide-reaching as the AMIS, this scale is not readily comparable to other MI measures without appropriately established subsample groups. Therefore, future research examining incremental validity should consider using clinical subsamples (including general and

trauma-specific) subsamples of military and civilian populations, in addition to nonclinical subsamples for each respective group. Finally, further analysis of content validity is necessary to examine the replicability of current results.

### **Conclusion**

The AMIS was shown to measure a single construct in the present U.S., adult sample and to have strong factor loadings, internal consistency, and estimates of factor replicability. Results of this study provided support for the AMIS as a content valid measure of MI (though further content validity analysis is needed). Additionally, results of correlational analyses showed evidence of concurrent validity with a number of indices of distress as these results were generally in expected directions and with strong effect sizes. Finally, this study provided minimal support for the discriminant validity of the AMIS, though this degree of support comes from limits in methodology rather than the outcome of data analysis. Overall, this study supports the AMIS as a potentially effective measure of MI that will require further study before its utility in research is indicated.



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## Appendix A

### Adult Moral Injury Scale Instructions and Items

Below are several statements about thoughts and feelings/emotions you may have experienced in the past month (i.e., 30 days). Please choose the response that best describes your level of agreement with each statement as they relate to the past month (i.e., 30 days).

There are no right or wrong answers, just try your best to choose the most accurate response as it applies to your experience.

Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree

1. I fantasize about hurting those who hurt me.
2. Since being betrayed/double-crossed/backstabbed/hurt in the past, I am less ready to trust others.
3. Having done bad things in the past, I have less confidence in the existence of God (or other higher power).
4. I feel I must protect others from myself.
5. I no longer trust myself to know right from wrong.
6. Having done bad things in the past, I have less confidence in the goodness of humanity and/or God (or other deity/divine power).
7. After seeing people do awful things to others in the past, I now have less faith in humanity.
8. Since being betrayed/double-crossed/backstabbed/hurt in the past, I question my purpose.
9. I don't take care of myself.
10. I keep good things from happening in my life.
11. I do not view myself as a moral person.
12. I believe God (or other deity/divine power) will not forgive me for the things I've done in the past.
13. After what has happened in my past, I no longer think God (or other deity/divine power) wants what is best for me.
14. Things have happened to me in the past that are unforgivable.
15. I often think about wanting to make up for the bad things I have done.
16. I can't stop thinking about the bad things I've done.
17. I find it's better to keep my distance from others than be hurt again.
18. Having done bad things in the past, I question my purpose in life.
19. At times I feel less deserving of good things because of the things I've done.
20. I don't believe people have good intentions.
21. After being betrayed/double-crossed/backstabbed/hurt previously, I now have less confidence in the goodness of humanity.

22. I no longer trust people or society as a whole after things that have happened to me in the past.
23. I feel embarrassed or humiliated for having trusted someone/something that violated my trust.
24. Witnessing in the past how others have been betrayed/double-crossed/backstabbed/hurt makes me doubt the trustworthiness of people.
25. I often think about those who have hurt me.
26. Since being betrayed/double-crossed/backstabbed/hurt in the past, I tend to care less about offending or hurting others.
27. I have trouble believing I can forgive myself for the things I've done in the past.
28. I punish myself.
29. I feel ashamed of things I have done in the past.
30. I am less likely to socialize in order to protect myself from others.
31. I would not feel bad if something terrible happened to those who hurt me previously.
32. I don't believe I deserve forgiveness from others.
33. Since being betrayed/double-crossed/backstabbed/hurt by others in the past, I don't experience as much meaning in my life.
34. I have urges or desires to physically punish myself.
35. Doing bad things previously has led me to feel less confident in life's meaning.
36. At times I feel less worthy of love given the things I've done.
37. I consider things I've done in the past to be unforgivable.
38. Being around others makes me uncomfortable because of the things I have done.
39. I feel intense anger for the people/groups/organizations that have hurt me.