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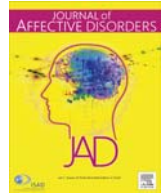
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Research paper

Development and psychometric evaluation of the Military Suicide Attitudes Questionnaire (MSAQ)



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ABSTRACT

Background: To date, a culturally-sensitive psychological instrument has not been developed to evaluate military attitudes toward suicide. Understanding these attitudes can inform suicide prevention research, clinical practice, and policy. We aimed to develop such an instrument and to evaluate its psychometric properties using an active-duty military sample.

Methods: A team of military personnel, suicidologists, and researchers assisted with item development. A cross-sectional design was used to evaluate the psychometric properties of the Military Suicide Attitudes Questionnaire (MSAQ) via an online survey battery. Exploratory and confirmatory factor analyses were conducted. Results: A total of 317 military service members met eligibility criteria and completed the online surveys. A four-factor model that explained 46.4% of the variance was identified: (1) Individual-Based Rejection versus Acceptance; (2) Psychache versus Pathological; (3) Unit-Based Rejection versus Acceptance; (4) Moral versus Immoral. The MSAQ demonstrated high partial validity and test-retest reliability.

Limitations: The study used a convenience sample and did not control for social desirability.

Conclusions: The newly developed MSAQ is a promising measure that fills a notable gap in the assessment of suicide attitudes within the United States military. The MSAQ has the potential for future use in evaluating suicide prevention and stigma reduction programs within the Department of Defense. Additionally, the MSAQ may serve as a useful tool for leadership in the evaluation of command climates. In clinical settings, the MSAQ could be used along with other cognitive and attitudinal measures to track suicidal patients' attitude towards suicide over the course of treatment.

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1. Introduction

Suicide remains a preventable public health problem globally, as well as within the United States (U.S.) and the U.S. Department of Defense (DoD). Suicide is currently the tenth leading cause of death for all Americans and the third leading cause of death for those between the ages of 18 and 45 years old (National Center for Injury Prevention and Control, 2014). In recent years, suicide has become the leading cause of death for U.S. military service members, claiming more lives than combat and transportation accidents (Armed Forces Health Surveillance Center, 2014). In 2012, there were 304 confirmed suicides within the DoD, a rate of 22.7 per 100,000. Of the military branches, active duty Army reported

the highest rate at 29.7 per 100,000 and the Air Force reported the lowest rate at 15.0 per 100,000 in 2012 (Smolenski et al., 2012). Notably, only 13.5% of the suicide decedents across all branches were known to have had direct exposure to combat and only 7.5% of suicide deaths occurred while deployed. Approximately 42% of those who died by suicide had a behavioral health diagnosis, with the majority of these individuals having mood or anxiety disorders. The primary psychosocial stressor that was reported within a 90-day period prior to the event was family/relationship issues (40.6%) (Smolenski et al., 2012).

While the rates of suicides within the DoD appear higher than civilian rates, given the demographic composition of the armed services, military rates are actually lower than civilian rates when controlling for demographic variables such as age and gender (Ramchand et al., 2011). That stated, this gap has continued to narrow, and given the team environment existing within the military, there is an increased risk for clustering of suicides, presenting an increased need for efforts aimed at suicide prevention within the military (Ramchand et al., 2011).

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A highly utilized suicide prevention strategy within the DoD has involved a stigma reduction campaign, aimed at decreasing stigma and perceived barriers to care among service members and their families (Ramchand et al., 2011). Attitudes toward suicide held by community members, family members, health care providers, and co-workers, of course, including one's own personal attitudes, largely impact one's desire to seek assistance (Pompili et al., 2003). Negative attitudes toward suicide (e.g., considering it as weak, shameful, sinful, or selfish) from community members, leadership, and/or healthcare professionals further stigmatize individuals considering suicide, limiting their perceived options for assistance and increasing their acceptance of suicide as their "only option" (Pompili et al., 2003). Conversely, accepting attitudes (i.e., non-stigmatizing) toward suicide behaviors have been demonstrated to reduce stigma and therefore increase help-seeking behaviors and decrease suicide incidents (Reynders et al., 2014).

By promoting more accepting attitudes towards suicide, these prevention programs may aid individuals who are experiencing suicidal thoughts and behaviors to overcome the stigma associated with suicide and to seek help from appropriate sources, including medical professionals. Additionally, this attitude change can lead to those who are approached for help being more likely to promote acceptance and a non-stigmatizing stance toward suicidal individuals (Hoge et al., 2004). If these stigma prevention programs are proven effective, military personnel may be more likely to seek mental health treatment and feel less stigmatized for doing so. In order to determine if the programs are effective, attitude change must be systematically measured and tracked to show progress. To this end, a psychometrically sound, culturally-sensitive, and a culturally meaningful set of outcome measures need to be identified in order to track progress from the time of pre- to post-implementation for various suicide prevention programmatic efforts.

Assessing attitudes related to suicide has largely been focused on non-clinical populations, with a primary focus on health care providers. A recently published review of more than 2200 articles (Kodaka et al., 2011) found that the most widely used psychological scale to measure suicide attitudes and opinions is the Suicide Opinion Questionnaire (SOQ). The SOQ is a 100-item self-report measure used to assess attitudes towards suicide and is composed of 65 attitudinal items and 35 "factual" items (Domino et al., 1982). It was developed using a sample of college students and health professionals (Kodaka et al., 2011). In order to test its appropriateness for use in evaluations of military suicide prevention programs, the SOQ was administered to a large sample (N=1758) of U.S. Marine Corps non-commissioned officers. Results showed that the variance accounted for by the 15-factor model of the SOQ dropped from 77% in the original sample (Domino et al., 1982) to 30% in the military sample (VanSickle, 2013).

Hence, the existing civilian-focused psychological instruments (e.g., SOQ) that assess attitude change towards suicide may not be effective and culturally-sensitive tools for program evaluation studies within the DoD (VanSickle, 2013). However, none of the existing psychological measures of suicide attitudes were specifically developed with consideration of the military culture. Such a measure would serve multiple purposes within the U.S. military (e.g., research, command climate evaluation, leader assessment and selection) and would be essential for evaluating the efficacy of military suicide prevention programs, particularly those aimed at changing attitudes and producing cultural change as well as reducing the stigma associated with suicide (Ramchand et al., 2011). For example, the MSAQ could be given to a specific unit as a brief assessment of the members' general attitudes towards suicide to determine if there is a critical need for psychoeducation regarding suicide. Additionally, providers and medical leaders can utilize data derived from the MSAQ for the tracking of attitudes towards

suicide among patients as well as providers within military treatment facilities.

2. Development of the MSAQ

2.1. Organizing themes for item development

A review of the literature on attitudes toward suicide revealed that these attitudes generally reflect three prevailing themes, which can be expressed as the following continua: (1) moral versus immoral, (2) psychache versus pathological, and (3) acceptance versus rejection. The moral versus immoral continuum addresses the content of attitudes. Factors identified on the Suicide Opinion Questionnaire (SOQ) that capture attitudes along this continuum include Social Disintegration (e.g., "The higher incidence of suicide is due to the lesser influence of religion") and Suicide is Morally Bad (e.g., "Suicide is a very serious moral transgression") (Domino et al., 1982; Rogers and DeShon, 1995).

The psychache versus pathological continuum addresses attitudes related to the reasons for suicide (e.g., function). Psychache refers to an extreme and unbearable psychological pain (Shneidman, 1993) while pathology refers to mental illness or problems with mental health. Within the SOQ, the factors of Personal Defect (e.g., "I would feel ashamed if a member of my family committed suicide") and Emotional Perturbation (e.g., "Most persons who attempt suicide are lonely or depressed") capture attitudes on this continuum (Rogers and DeShon, 1995).

The acceptance versus rejection continuum addresses the structure of attitudes toward suicide. Attitudes along this continuum can be found in the Acceptability (e.g., "People with incurable diseases should be allowed to commit suicide in a dignified manner"), Right to Die (e.g., "Suicide prevention centers actually infringe on a person's right to take his life"), and Suicide is Normal (e.g., "Almost everyone has at one time or another thought about suicide") factors of the SOQ (Domino et al., 1988).

2.2. Method of scale development

A theoretical-rational deductive method of scale development (Clark and Watson, 1995) was used for the MSAQ. Using this method, questionnaire items are borne out of personal experiences, relevant theories, and consultations with experts, target audience members, and focus groups in order to achieve the highest possible levels of construct validity (Holmbeck and Devine, 2009). This method allowed for language and concepts unique to a military population to be written into the MSAQ items, which increased the measure's targeted cultural appropriateness and face validity.

2.3. Item generation

MSAQ items were generated by two groups. The first group consisted of members of the Laboratory for the Treatment of Suicide-Related Ideation and Behavior at the Uniformed Services University of the Health Sciences (USUHS; N=11). The civilians in this group (n=8) had three months to ten years of experience in military suicide prevention. Three individuals in the group were both military service members and graduate students at USUHS, two with no prior military experience and one (first author, MVS) with ten years of service in the U.S. Marine Corps and four years in the U.S. Navy.

The second group consisted of six active duty U.S. service members (2 Army, 2 Navy, 1 Marine, and 1 Air Force) who had three to fifteen years of military service and ranks ranging from E-4 (enlisted level 4) to O-4 (officer level 4). This group was used

Table 1.
Suicide attitude themes and associated domains.

Moral vs. Immoral	Psychache vs. Pathological	Acceptance vs. Rejection
Right vs. Wrong Ethical vs. Unethical	Distress vs. Malingering Resilience vs. Weakness	Respect vs. Disrespect Association vs. Avoidance Inclusion vs. Exclusion
Goodness vs. Evil	Help-seeking vs. Attention-seeking	
Rewarded vs. Punished	Rational vs. Secondary gain	Empathy vs. Blame
Accepted vs. Rejected (by religion)	Stoicism vs. Cowardice	Help vs. Ignore

Note. This table lists the three organizing themes and their corresponding five domains used for MSAQ item development.

in lieu of a formal focus group.

Items were constructed so as to capture attitudes within each of the three most prominent themes in the suicide attitude literature. Furthermore, items were created to reflect each of the five specific domains created for each theme. See Table 1 for themes and domains.

Group members were asked to independently create questionnaire items based on the fifteen domains. A total of 277 potential items were generated, with 17 of those items relegated to an “other” category that consisted of attitudes that were relevant, but not encompassed by the target domains. After group members independently rated each item on a Likert-type scale according to how well it represented its designated domain, the first author (MVS) collected the ratings, summed the ratings score for each item, and discarded the items with the lowest summed scores for each domain. Through this process, the pool of potential items was reduced to the 25 most representative items for each theme and the 17 “other” items (for a total of 92 preliminary items).

2.4. Expert panel review

A panel of five expert reviewers was consulted to further refine the item pool of the MSAQ. Reviewers consisted of members of the academic and military communities who all held an advanced degree in psychology and were considered subject matter experts in the fields of clinical psychology, suicidology, military psychology, and/or health psychology. The reviewers were asked to rate the importance and fit (to the three themes) of each of the 92 preliminary MSAQ items using a Likert scale ranging from 1 (Strongly Agree) to 5 (Strongly Disagree).

2.5. Final version of the MSAQ

Using the ratings provided by the expert panel, the first author selected the ten highest rated items for each theme and the five highest rated “other” items for inclusion in the MSAQ. Hence, the final complete version of the MSAQ contained 35 items that were evenly distributed across the main suicide attitude themes.

3. Methods for MSAQ validation

3.1. Study design and sample

Respondents were recruited via snowball (i.e., word of mouth) and nonprobability sampling techniques using social media websites (e.g., personal Facebook pages, and military-specific Facebook pages, Reddit). Inclusion criteria for respondents were: (1) active duty status in the U.S. Army, Navy, Air Force, or Marines, (2) aged 18 years or older, and (3) ability to read and comprehend English.

A total sample of 300 service members was sought in order to achieve adequate statistical power for the factor analyses.

Respondents who provided their email addresses and agreed to participate in a follow-up assessment were contacted via email two weeks after their initial assessment in order to complete test-retest procedures for the study. A total sample of 29 respondents was sought in order to be able to detect a medium effect size for test-retest reliability.

3.2. Procedure and instruments

Data collection occurred through a survey hosting website, www.surveymoz.com, for a period of approximately five weeks. Following electronic informed consent using an IRB-approved document, respondents were presented with demographic questions, the MSAQ, the Stigma of Suicide Scale, and the Suicide Opinions Questionnaire, in that order.

3.2.1. MSAQ

As described in the previous section, the MSAQ is composed of 35 statements aimed at measuring attitudes toward suicide in a military population. The scale uses a five-point Likert-type scale where 1=Strongly Disagree and 5=Strongly Agree. Three factors are expected to emerge from the scale in the analyses: (1) Moral versus Immoral; (2) Psychache versus Pathological; and (3) Acceptance versus Rejection.

3.2.2. Stigma of Suicide Scale (SOSS; Batterham et al., 2013)

The SOSS is a 58-item measure to assess stigma toward suicide in the general community. Each item is a single word where participants are asked to rate its relevance to suicide using a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The SOSS takes approximately 10 min to complete. It has demonstrated strong internal consistency overall ($\alpha=.90$) and for each of its identified components: stigma ($\alpha=.95$), isolation/depression ($\alpha=.88$), and normalization/glorification ($\alpha=.86$). These three components account for 59% of the total variance in responses and were used to assess concurrent validity against identified factors for the SOQ (SOSS; Batterham et al., 2013).

3.2.3. Suicide Opinions Questionnaire (SOQ; Domino et al., 1980)

The SOQ is a 100-item self-report measure used to assess attitudes towards suicide and is composed of 65 attitudinal items and 35 “factual” items. The SOQ uses a 5-point Likert scale where 1 (Strongly Agree) and 5 (Strongly Disagree). For this study, the SOQ’s four-factor model, which was confirmed using a military sample, was used for comparison purposes. The four factors were labeled Erroneous Assumptions about Suicide ($\alpha=.93$), Emotional Perturbation (which attributes suicide to emotional problems; $\alpha=.83$), Acceptability (which indicates that suicide is an acceptable option; $\alpha=.54$), and Stigma Associated with Suicide ($\alpha=.68$; VanSickle, 2013).

3.3. Statistical analyses

In order to conduct both exploratory and confirmatory factor analyses on the MSAQ, the sample was randomized into two equal groups (groups A and B, one for each analysis). The exploratory factor analysis of the MSAQ data as well as tests for psychometric properties (i.e., concurrent, discriminant, and incremental validity; test-retest reliability) were conducted using SPSS v.22. A VARIMAX rotation (assuming an orthogonal solution) was used after no significant correlations between emerging factors were found using an oblique rotation. SPSS v.22 was also used to test the psychometric properties (i.e., concurrent, discriminant, and incremental validity; test-retest reliability) of the MSAQ. A confirmatory factor analysis of

the factors identified in the exploratory analysis was conducted using STATA v.12.

Pearson's product-moment correlation coefficient analyses were conducted to evaluate the concurrent validity of the MSAQ with the SOSS, the discriminant validity between the MSAQ and the SOQ, and the test-retest reliability of the MSAQ. Partial correlation analyses were conducted to evaluate the incremental validity of the MSAQ with the SOSS while controlling for the SOQ.

4. Results

4.1. Respondent recruitment

Of 545 potential respondents who visited the survey link online, 317 (58%) respondents met eligibility criteria and completed at least the MSAQ. Group A (n=158) was used for the exploratory factor analysis while group B (n=159) was used for the confirmatory analysis. A self-selected subset (n=51) of respondents was used for test-retest procedures.

4.2. Sample characteristics (N=317)

The sample was largely male (71%), Caucasian (83%), and held either a Bachelor's degree (29%) or a Graduate/Professional degree (26.2%). With respect to marital status, 48% of the sample was married while 42% was single. Four branches of the U.S. Armed Forces were represented: Air Force (41%), Navy (29%), Army (15%), and Marines (15%). With respect to rank, the sample was evenly split between the enlisted pay grades (E1-E9; 51%) and the officer pay grades (O1-O6; 47%). Over half of the sample (55%) reported prior exposure to suicide in their military unit, 52% reported prior exposure in family or friends, and 20% of the sample reported no prior exposure to suicide. See Table 2 for demographic characteristics of the sample. A comparison of groups A and B revealed no discernible differences on demographic factors or exposure to suicide.

4.3. Factor structure of the MSAQ

The latent factor structure of the MSAQ was expected to reflect the three themes of item generation: moral vs. immoral, psychache vs. pathological, and acceptance vs. rejection. A principal components analysis (PCA) using a VARIMAX rotation was conducted on the data from group A (n=158). Four distinct factors with eigenvalues > 1 were identified in the scree plot and accounted for 46.4% of the variance. The Kaiser-Meyer-Olkin measure of sampling adequacy was .85 (recommended value is .6) and the Bartlett's test of sphericity was significant, [$\chi^2(595)=2350.11$, $p < .01$].

The highest loading items on the first factor, which accounted for 24.8% of the variance, indicated attitudes of individual-based rejection versus acceptance of suicide (e.g., I do not want to be in a unit with someone who has a history of a suicide attempt or suicidal thoughts.). For the second factor, which accounted for 11.5% of the variance, the highest loading items indicated that suicide was related to psychopathology (e.g., Only cowards commit suicide.). The third factor reflected attitudes related to unit-based rejection versus acceptance of suicide (e.g., Unit support can help prevent suicide.) and accounted for 5.2% of the variance. The items that loaded strongly on the fourth factor, which accounted for 4.9% of the variance, reflected the attitude that suicide is immoral (e.g., Choosing suicide is morally wrong.). Note that item #14 was dropped from the measure at this stage as it did not load adequately ($\geq .35$) on any factor. See Table 3 for item loadings on all four factors from the PCA.

Table 2.

Demographic, educational, occupational, and suicide exposure characteristics of the sample (N=317).

Characteristic	Military respondents (N = 317)	
	n	%
Sex		
Male	225	71
Female	92	29
Marital Status		
Single	132	41.6
Married	153	48.3
Divorced	29	9.1
Separated	3	.9
Race-Ethnicity		
Caucasian (Non-Latino/a)	262	82.6
Hispanic or Latino/a	22	6.9
Asian	12	3.8
Other	11	3.5
African American	6	1.9
Native Hawaiian or Pacific Islander	2	.6
American Indian or Alaska Native	2	.6
Military Rank		
E1 – E3	41	12.9
E4 – E5	83	26.2
E6 – E7	30	9.5
E8 – E9	9	2.8
W1 – W5	4	1.3
O1 – O3	117	36.9
O4 – O6	33	10.4
Military Branch		
Army	48	15.1
Navy	93	29.3
Air Force	130	41
Marine Corps	46	14.5
Education		
Less than High School Diploma	2	.6
High School Diploma or Equivalent	26	8.2
Some College, No Degree	76	24
Associate Degree	38	12
Bachelor's Degree	92	29
Graduate or Professional Degree	83	26.2
Exposure to Suicide		
Exposure via Military Unit	173	54.6
Exposure via Family or Friend	164	51.7
Exposure Total (Endorsed Either Unit, Family/Friend, or Both)	253	79.8
No Exposure	64	20.2

Note: E1–E9 are Enlisted ranks, W1–W5 are Warrant Officer ranks, and O1–O6 are Officer ranks.

Following the PCA, it was necessary to reverse-score certain items in order to ensure that higher factor scores reflected the negative attitudinal themes of the measure. For example, a higher score on factor 1 represented greater endorsement of individual-based rejection of suicide.

A confirmatory factor analysis (via structural equation modeling with STATA v.12) was conducted using the data from group B (n=159) of the sample. An additional two items were dropped from the measure at this stage due to inadequate loading. For factor 1, labeled Individual-based Rejection versus Acceptance, error variance was covaried for responses to items 18 and 34, 31 and 33, 15 and 18, and 18 and 25. The overall model was a good fit with $\chi^2(23, 159)=39.49$, RMSEA = .07, CFI = .95, and TLI = .92.

For factor 2, labeled Psychache versus Pathological, error variance was covaried for responses to items 7 and 20. The overall model was a good fit with $\chi^2(26, 159)=40.16$, RMSEA = .06, CFI = .94, and TLI = .92.

Table 3.
Factor Loadings by Factor based on Principal Components Analysis with VARIMAX Rotation for the MSAQ (items < .35 not shown).

Item Number	Item Wording	Factor Loading
Factor I: Individual-Based Rejection versus Acceptance, 9 Items ($\alpha=.85$)		
33	People who attempt suicide should not be eligible for promotion or leadership billets.	.78
31	Admitting thoughts of suicide should not harm someone's career.	-.71
34	I would feel uncomfortable if I learned someone I was working with was suicidal.	.71
24	I do not want to be in a unit with someone who has a history of a suicide attempt or suicidal thoughts.	.71
15	I would not respect my leader if I knew he/she had expressed suicidal thoughts.	.65
25	Suicide violates our military core values.	.50
18	People who attempt suicide should be given time to receive help.	-.46
4	Seeking help for suicide requires courage.	-.43
32	A person who attempts suicide must be in a lot of pain.	-.41
Factor II: Psychache versus Pathological, 9 Items ($\alpha=.82$)		
17	Those who attempt suicide just want attention.	.76
6	Only cowards commit suicide.	.67
20	Suicidal individuals were not strong enough for the military in the first place.	.66
19	Claiming to be suicidal is done to get out of duty.	.56
30	I do not have any respect for those who wish to kill themselves.	.56
5	Suicide is selfish.	.52
16	If a service member dies by suicide, he or she did it so that their family can get benefits/money.	.48
7	The best way to deal with psychological problems is to "man-up" and tough it out.	.46
1	The names of those who commit suicide should be removed from military memorials.	.45
Factor III: Unit-Based Acceptance versus Rejection, 8 Items ($\alpha=.80$)		
13	A service member who attempts suicide requires help and support from his military unit as well as leadership.	.76
12	Suicide hurts unit functioning.	.71
27	People who attempt suicide would benefit from support from their unit members.	.71
11	Unit support can help prevent suicide.	.62
22	I have a duty to help those who are feeling suicidal.	.60
35	Suicide hurts unit morale.	.52
2	Military duty requires us to help those who are struggling with suicidal thoughts.	.51
10	A service member who attempts suicide deserves understanding and empathy.	.50
Factor IV: Moral versus Immoral, 8 Items ($\alpha=.72$)		
21	Suicide is not acceptable to my religious beliefs.	.72
9	Choosing suicide is morally wrong.	.70
3	It is wrong for a service member to attempt suicide.	.48
8	I would trust a service member who has made a suicide attempt to make ethical decisions.	-.47
26	Those who commit suicide do not think about how it will affect their unit.	.44
29	I can understand how the stressors of military life can lead someone to think about suicide.	-.42
23	A service member who dies by suicide must have thought it was the only way out of their pain.	.39
28	Avoiding people who are suicidal may make them more likely to kill themselves.	-.38

For factor 3, labeled Unit-based Rejection versus Acceptance, error variance was covaried for responses to items 12 and 35. The overall model was again a good fit with $\chi^2(19, 159)=26.76$, RMSEA =.05, CFI =.97, and TLI =.95.

For the fourth factor, labeled Moral versus Immoral, items 23 and 28 were removed prior to the analysis. The overall model was a good fit, $\chi^2(17, 159)=25.25$, RMSEA =.06, CFI =.96, and TLI =.93. See Table 4 for item loadings from the confirmatory factor analysis.

4.4. Psychometric properties of the MSAQ

Psychometric properties of the MSAQ were calculated using the final 32-item, four-factor MSAQ. For these calculations, it was necessary to restrict the dataset to data obtained from respondents who completed at least 95% of all items ($n=265$; 84% of entire sample).

With respect to validity, only partial validity analyses could be conducted for the MSAQ because the SOQ and SOSS did not contain subscales with themes comparable to the Psychache versus Pathological and Moral versus Immoral factors. For factor 1 (Individual-based Rejection versus Acceptance; $M = 2.15$, $SD = .60$) and the stigma factor of the SOSS ($M = 2.32$, $SD = .59$), a correlation coefficient analysis yielded significant results [$r(265)=.63$, $p < .001$] with a large positive correlation between the two subscales that indicated good concurrent validity. A comparison of responses on the third MSAQ factor (Unit-based Rejection versus

Acceptance; $M = 4.30$, $SD = .49$) with responses on the stigma factor of the SOQ ($M = 2.32$, $SD = .64$) yielded a weak negative correlation [$r(263)=-.15$, $p < .05$] that indicated some discriminant validity.

Responses to the MSAQ factor 1 (Individual-based Rejection versus Acceptance; $M = 2.15$, $SD = .60$) were compared to responses to the SOSS stigma factor ($M = 2.32$, $SD = .59$) while controlling for the stigma factor of the SOQ ($M = 2.31$, $SD = .65$) to assess for incremental validity. The partial correlation analysis yielded a significant, moderately strong positive correlation [$r(263)=.42$, $p < .001$] that indicated adequate incremental validity.

To assess for test-retest reliability, 51 respondents completed the MSAQ a second time with an average of 14 days between the two administrations (time 1 total score: $M = 3.22$, $SD = .28$; time 2 total score: $M = 3.20$, $SD = .27$). A correlation coefficient analysis indicated adequate test-retest reliability for the measure [$r(49)=.76$, $p < .001$]. Additional test-retest calculations were conducted for each of the four factors with significant results ($p < .001$). The strength of the correlations ranged from .59 for factor 3 (Unit-based Rejection versus Acceptance) to .89 for factor 1 (Individual-based Rejection versus Acceptance).

5. Discussion

This manuscript described the need for, development of, and initial empirical evaluation of the 32-item Military Suicide

Table 4.
Confirmatory Factor Analysis Results for the MSAQ (items < .35 not shown).

Item Number	B	SE B	z
Factor I: Individual-Based Rejection versus Acceptance, $\chi^2=(23, 159)=39.49$, RMSEA = .07, CFI = .95, TLI = .92			
4	1	(constrained)	
15	3.72	1.09	3.43***
18	1.92	.82	3.12**
24	3.46	1.02	3.39***
25	2.87	.95	3.03**
31	2.07	.67	3.11**
32	1.95	.66	2.97**
33	3.88	1.13	3.45***
34	4.07	1.24	3.29***
Factor II: Psychache versus Pathological, $\chi^2=(26, 159)=40.16$, RMSEA = .06, CFI = .94, TLI = .92			
1	1	(constrained)	
5	1.69	.48	3.53***
6	1.60	.41	3.95***
7	1.13	.34	3.30***
16	.62	.24	2.55**
17	1.06	.29	3.60***
19	1.29	.38	3.36***
20	1.43	.39	3.70***
30	1.67	.42	3.99***
Factor III: Unit-Based Acceptance versus Rejection, $\chi^2=(19, 159)=26.76$, RMSEA = .05, CFI = .97, TLI = .95			
2	1	(constrained)	
10	.67	.21	3.12**
11	1.71	.39	4.33***
12	.91	.24	3.87***
13	1.11	.27	4.08***
22	1.18	.25	4.76***
27	1.37	.30	4.55***
35	.72	.22	3.37***
Factor IV: Moral versus Immoral, $\chi^2=(17, 159)=25.25$, RMSEA = .06, CFI = .96, TLI = .93			
3	1	(constrained)	
9	1.75	.26	6.80***
8	.50	.14	3.57***
21	1.28	.20	6.46***
23	-.19	.12	-1.60
26	.54	.15	3.61***
28	-.01	.11	-.11
29	.35	.13	2.66**

Note:
* $p < .05$.
** $p < .01$.
*** $p < .001$.

Attitudes Questionnaire, the first measure of attitudes toward suicide designed for use with military service members. A four-factor structure accounting for 46% of the variance and reflecting themes of acceptability and morality of suicide as well as motivations for suicide was supported by exploratory and confirmatory factor analyses of data from 317 U.S. military service members. Strong levels of test-retest reliability were found for the entire questionnaire as well as for each of the four factors. As each factor of the MSAQ did not have a corresponding factor from either the SOQ or the SOSS, both included in this study's survey battery, validity could only be partially measured. Results from analyses supported adequate levels of concurrent and incremental validity for the Individual-based Rejection versus Acceptance factor and an adequate level of discriminant validity for the Unit-based Rejection versus Acceptance factor.

5.1. Limitations and strengths

This study had several limitations. First, this study used a convenience sample, which limited respondents to those with computer access who visited the sites through which the survey battery was linked (e.g., Facebook, Reddit). Furthermore, using self-selected test-retest respondents may have skewed the sample toward individuals who had more interest in and/or knowledge of suicide.

Second, the study's sample contained a higher percentage of officers, females, and Caucasians and was more educated than the general military population. Additionally, the lack of inclusion of National Guard, reserve, and retired service members limits the generalizability of our findings to the active-duty population. Future research with the measure should include more heterogeneous samples.

Third, due to the length of the survey battery, an assessment for social desirability in responding was not included in the battery. While it is common practice when developing attitudinal measures toward suicide or military-specific measures to not include controls for social desirability (Batterham et al., 2013; Domino et al., 1982; Hoge et al., 2004), a substantial body of literature suggests that social desirability affects survey responses. Future research with the MSAQ could investigate whether social desirability affects responses to the measure.

Despite the noted limitations, the strengths of the study are important to mention. Most importantly, the MSAQ is the first attitudinal measure toward suicide designed specifically for use with a military population and developed through a rigorous scientific process involving experts in the fields of suicidology and military psychology. In addition to being developed with military-specific language, the MSAQ was tested with a military sample that included active duty service members from the four major branches of the U.S. armed forces. The sample was composed of members from diverse occupational fields and nearly every pay grade or rank. The use of a military sample allowed for findings unique to the active force, such as the factor Unit-based Acceptance versus Rejection, which underscores previous findings on organizational barriers to mental health care in an active-duty sample (VanSickle, 2013). The cultural specificity of the MSAQ is its most important attribute, rendering it fit for use with military personnel.

The strengths of this study also include highly favorable results from factor analyses and psychometric tests. The four-factor structure of the MSAQ was replicated with a high degree of integrity and stability and 32 of the original 35 items were retained in the final version of the measure.

5.2. Research and practice implications

While the MSAQ performed well in its initial psychometric examinations, further testing is needed in order to verify and substantiate the present findings. If the measure continues to perform well in terms of psychometrics, it would be recommended for future use by researchers conducting DoD suicide prevention program evaluation studies and military anti-stigma suicide campaigns that require tracking of attitudes toward suicide.

Additionally, the MSAQ may be used to help tailor suicide prevention programs. Currently, all service branches are using the number of suicide deaths as an outcome variable for the effectiveness of their suicide prevention programs. This is a problematic outcome variable to use because, despite the increased number of suicide deaths in military and veteran populations in

recent years, death by suicide remains a rare event. The MSAQ may serve as a proxy measure for effectiveness by providing data on changes in attitudes toward suicide from pre- to post-training.

The MSAQ may also help suicide prevention programs be better tailored for various military communities. As discussed previously, the relationship between community attitudes toward suicide has an effect on suicide incidence. The MSAQ may provide insight on what attitudes need to be specifically addressed in a certain community, resulting in suicide prevention programs that are adjusted to fit the needs of a specific military community.

Pending further evaluation, the MSAQ may also be useful with clinical populations in the U.S. Military. Suicide attitude research has traditionally evaluated the attitudes of individuals regarding suicide in non-clinical samples. Recently, however, significant research has been investigating implicit attitudes toward suicide to identify individuals at risk for future suicide behaviors (Nock et al., 2010). Future research may serve to establish a baseline of attitudes for use in identifying change in this group or identifying individuals who may be at risk for suicidal behaviors.

Additionally, future research may consider identifying any potential attitudinal differences towards suicide between clinical versus community samples. This process may serve to establish normative responses for potential cut-off points when used within a clinical population. However, at this point, the use of the MSAQ with clinical populations is considered premature and providers are urged to be cautious in their science-to-practice implementation until additional research on the MSAQ has been performed.

6. Conclusions

In summary, this study resulted in the development and the empirical evaluation of the Military Suicide Attitude Questionnaire using primary data collected online. The MSAQ is the first of its kind and has the potential of meeting significant research, clinical, and policy needs within the U.S. military. The analyses conducted served to demonstrate the interpretability, reliability, and validity of the MSAQ which has now been partially validated. The MSAQ appears to be a promising measure for future use within military populations but requires additional testing and evaluation.

Appendix A.1. Military Suicide Attitudes Questionnaire

A.1.1 Additional Information

For questions in reference to this attitudinal measure, please contact LT Marcus VanSickle at marcus.r.vansickle.mil@mail.mil. Please note that this measure was developed as part of a dissertation project completed at Uniformed Services University of the Health Sciences, Department of Medical and Clinical Psychology, Laboratory for the Treatment of Suicide-Related Ideation and Behavior (Director: Dr. Marjan G. Holloway). This measure is not copyrighted. However, permission for use must be obtained from LT VanSickle.

See [Table A1](#) for instructions.

Table A1.

Military Suicide Attitudes Questionnaire.

Instructions: This is not a test but a survey of your opinions. There are no right or wrong answers – only your honest opinion counts. Please select the box that most closely describes your opinion.

1. The names of those who commit suicide should be removed from military memorials.
 2. Military duty requires us to help those who are struggling with suicidal thoughts.
 3. It is wrong for a service member to attempt suicide.
 4. Seeking help for suicide requires courage.
 5. Suicide is selfish.
 6. Only cowards commit suicide.
 7. The best way to deal with psychological problems is to 'man-up' and tough it out.
 8. I would trust a service member who has made a suicide attempt to make ethical decisions.
 9. Choosing suicide is morally wrong.
 10. A service member who attempts suicide deserves understanding and empathy.
 11. Unit support can help prevent suicide.
 12. Suicide hurts unit functioning.
 13. A service member who attempts suicide requires help and support from his military unit as well as leadership.
 14. I would not respect my leader if I knew he/she had expressed suicidal thoughts.
 15. If a service member dies by suicide, he or she did it so that their family can get the survivor benefits/money.
 16. Those who attempt suicide just want attention.
 17. People who attempt suicide should be given time to receive help.
 18. Claiming to be suicidal is done to get out of duty.
 19. Suicidal individuals were not strong enough for the military in the first place.
 20. Suicide is not acceptable to my religious beliefs.
 21. I have a duty to help those who are feeling suicidal.
 22. I do not want to be in a unit with someone who has a history of a suicide attempt or suicidal thoughts.
 23. Suicide violates our military core values.
 24. Those who commit suicide do not think about how it will affect their unit.
 25. People who attempt suicide would benefit from support from their unit members.
 26. I can understand how the stressors of military life can lead someone to think about suicide.
 27. I do not have any respect for those who wish to kill themselves.
 28. Admitting thoughts of suicide should not harm someone's career.
 29. A person who attempts suicide must be in a lot of pain.
 30. People who attempt suicide should not be eligible for promotion or leadership billets.
 31. I would feel uncomfortable if I learned someone I was working with was suicidal.
 32. Suicide hurts unit morale.
-

Strongly Disagree Disagree Neutral Agree Strongly Agree

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