

Multidimensional Suicide Inventory-28 (MSI-28) Within a Sample of Military Basic Trainees: An Examination of Psychometric Properties

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Suicide and suicidal ideation are serious public health concerns. Accurate detection and assessment are critical first steps in addressing this challenging issue. The present study examined self-reported suicidal ideation in a sample of United States Air Force enlisted active duty basic trainees ($N = 470$) using the Multidimensional Suicide Inventory (MSI-28). Exploratory factor analyses revealed a 4-factor structure for the MSI-28 in this sample. Together, these 4 factors explained approximately 72% of the variance in the MSI-28. The MSI-28 evidenced moderate to strong associations with measures of resilience (Dispositional Resilience Scale-15; DRS-15) and psychological distress (Outcome Questionnaire; OQ-30.2). These findings demonstrate that the MSI-28 is a promising tool for clinical measurement of self-reported suicidality. Future directions for further validation of the MSI-28 are discussed.

Keywords: factor analyses, military basic trainees, MSI-28, suicidal ideation, young adults

Suicide and suicidal ideation are serious public health concerns across ages and cultures. Although rates vary across groups, the risk for suicidality is not limited to a specific age group

or population (Soloff, Lynch, Kelly, Malone, & Mann, 2000; Tang & Crane, 2006). Risk of suicide poses a particular concern within military populations because of rising suicide rates among Service members (Nock et al., 2014) and younger Veterans (Kemp & Bossarte, 2012). Previous studies have shown that suicide rates among active-duty U.S. military personnel increased by more than 50% between 2005 and 2008 (Ramchand, Acosta, Burns, Jaycox, & Pernin, 2011). LeardMann et al. (2013) investigated reasons for this substantial increase in a sample of former and current U.S. military personnel and found that deployment-related factors (e.g., combat experience, number of deployments, number of days deployed) were not associated with this increased risk of suicide within their sample. However, several other studies have found an association between combat exposure and subsequent suicidal ideation (Pietrzak et al., 2010; Thoresen & Mehlum, 2008). Fontana, Rosenheck, & Brett (1992)

This article was published Online First September 7, 2015.
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We wish to acknowledge the outstanding work of our programmer/analysts, Deborah Eitelberg, Les Willis, Bill King, and Armando Lara, in this endeavor, as well as the efforts made by the men and women who staff the Behavioral Analysis Services program at Joint Base San Antonio, Lackland, TX. The views expressed in this article are those of the authors and do not reflect the official policy or position of the United States Air Force, Department of Defense, or the U.S. Government.

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found that killing or failing to prevent a death or injury during deployment was associated with a later suicide attempt. They determined that experiences involving high personal responsibility might be an important risk factor for suicidality (Fontana, Rosenheck, & Brett, 1992). Thus, increased combat exposure, particularly when associated with a negative outcome for which a Service member feels personally responsible, may play an important role in the increased prevalence of suicidality among U.S. military personnel over the past decade. Additional studies are needed to comprehensively investigate risk and protective factors associated with suicide and suicidal ideation, particularly within military samples.

Recent efforts have increasingly focused on reducing the prevalence rate of suicidal behaviors, particularly among young adults. To address this public health crisis, it is essential to develop reliable assessment tools. Clinicians and researchers have focused their efforts on the conceptualization, assessment, and evaluation of the psychometric properties of suicide assessment instruments (Gutierrez & Osman, 2008).

Growing evidence within clinical and non-clinical settings suggests that risk and protective factors are interactive and should be considered together (Edwards & Holden, 2003; Gutierrez & Osman, 2008). Risk factors for suicidality—such as the presence of a mental health disorder, low self-esteem, or feelings of worthlessness—increase the chance that an individual will engage in suicidal behavior, whereas identified protective factors include resilience, emotional stability, and family cohesion (LeardMann et al., 2013; Gutierrez & Osman, 2008). Numerous self-report instruments assess risk factors, but only a few have been developed and validated to concurrently assess risk and protective factors. One of the most utilized measures of risk and protective factors is the Multi-Attitude Suicide Tendency (MAST; Orbach et al., 1991) scale, which is a 30-item measure assessing attitudes toward life and death. However, to the best of our knowledge, initial factor analytic validation studies conducted by Osman and colleagues using U.S. samples indicated that a number of the MAST items were not strongly associated with *attraction to life*, *repulsion by life*, *attraction to death*, or *repulsion by death*, the attitudes and constructs it purportedly measured (Osman et al., 1994; Osman, Barrios,

Grittmann, & Osman, 1993). As a result, Osman and colleagues developed a relatively short-form multidimensional inventory that assessed suicidal ideation and related constructs for use with U.S. samples (Emmerich, 2012; Osman, Gutierrez, Kopper, Barrios, & Chiro, 1998).

In recent years, researchers with wide-ranging interests in risk and protective factors have underscored the importance of a multidimensional self-report assessment for identifying specific correlates for suicidality (see Emmerich, 2012). Efforts by Osman and colleagues to conceptualize risk and protective factors associated with suicidality in young adults resulted in the development of several instruments including the Multidimensional Suicide Inventory-28 (MSI-28; Osman, Gutierrez, Freedenthal, Wong, & Bagge, 2010), which is a reformulation of the Positive and Negative Suicide Ideation (PANSI) inventory (Osman et al., 1998) and constructed to be a more psychometrically advanced measure. Although the PANSI has demonstrated sound psychometric properties (see Muehlenkamp, Gutierrez, Osman, & Barrios, 2005; Osman et al., 2003), the psychometric properties of the MSI-28 have not been comprehensively investigated.

The MSI-28 was developed to be a brief multidimensional self-report measure assessing suicidal ideation using both positive (protective) and negative (risk) factors. From an initial pool of 75 items, the MSI-28 was ultimately reduced to a 28-item version through a series of exploratory factor analyses assessing four purported dimensions. Using a sample of approximately 300 college-aged adults to explore and assess the psychometric properties and factor structure of the MSI-28, Emmerich (2012) found a four-factor structure: Family Connectedness, Suicidal Ideation, Positive Self-Perception, and Negative Affect.

The present study aims to further our understanding of the MSI-28 and its underlying constructs within a sample of Air Force basic trainees who were seen at a mental health clinic during basic military training at Joint Base San Antonio, Lackland, Texas, and reported recent or current suicidal ideation. The present study is the first to investigate the psychometric properties of the Multidimensional Suicide Inventory-28 (MSI-28) in an at-risk military sample who self-reported suicidal ideation on screening measures. Because the MSI-28, a relatively new

measure, was developed as a multidimensional instrument using a sample of undergraduate college students, it was important to first understand the underlying dimensions of the MSI-28 instrument by conducting exploratory factor analyses within the present basic trainee sample to determine how the measure performs. Specifically, we investigate MSI-28 item characteristics, conduct exploratory factor analyses to assess the underlying dimensions of the MSI-28, and examine intercorrelations among the MSI-28 dimensions within a basic military trainee sample. Secondary analyses explore the construct validity of the MSI-28 by examining its associations with measures of resilience (Dispositional Resilience Scale-15; DRS-15, [Bartone, 2007](#)) and psychological distress (Outcome Questionnaire-30.2; OQ-30.2, [Lambert, Finch, Okiishi, & Burlingame, 2005](#)). Based on previous literature, we hypothesized that the MSI-28 protective factors Family Connectedness and Positive Self-Perception would emerge and be positively associated with resilience and inversely associated with psychological distress, whereas the MSI-28 risk factors Suicidal Ideation and Negative Affect would emerge and be positively associated with psychological distress and inversely associated with resilience ([Pietrzak et al., 2010](#)).

Method

Participants

Between June 2011 and July 2012, the MSI-28 was administered to 470 enlisted Air Force personnel who were referred to the Behavioral Analysis Services (BAS) clinic at Joint Base San Antonio, Lackland, Texas for a psychological evaluation during basic military training. The instrument was administered to trainees who reported current or recent suicidal ideation during the clinical interview, reported current or recent suicidal ideation on Item 7 of the Outcome Questionnaire-30.2 ([Lambert et al., 2005](#)), or whose referral to the clinic indicated current or recent suicidal ideation or behavior. All analyses were conducted on de-identified data sets ensuring the confidentiality of participant responses. The mean age of the participants was 19.67 years ($SD = 1.93$). Approximately 76% of the sample was between the ages 17 and 21, and most were male (80.4%)

and single (92.3%). Approximately 79% of participants identified as White, whereas 9.6% were Black, 5.1% were Hispanic, and 2.3% were Asian, with the remaining 4.3% identifying as being from other racial groups.

Measures

Multidimensional Suicide Inventory-28. The Multidimensional Suicide Inventory-28 (MSI-28; [Osman et al., 2010](#)) item scores range from 1 (*not at all true*) to 5 (*absolutely true*). Two positive constructs (Family Connectedness and Positive Self-Perception) and two negative constructs (Suicidal Ideation and Negative Affect) are assessed using seven-item subscales. Reported scale means and standard deviations from the [Emmerich \(2012\)](#) study were as follows: Family Connectedness ($M = 27.05$, $SD = 7.37$), Suicidal Ideation ($M = 8.04$, $SD = 3.34$), Positive Self-Perception ($M = 27.14$, $SD = 6.28$), and Negative Affect ($M = 14.79$, $SD = 6.60$). Reported scale reliabilities (Rho estimates) were as follows: $\rho = .94$ for Family Connectedness, $\rho = .94$ for Positive Self-Perception, $\rho = .93$ for Suicidal Ideation, and $\rho = .90$ for Negative Affect ([Emmerich, 2012](#)).

Outcome Questionnaire-30.2. The Outcome Questionnaire (OQ-30.2; [Lambert et al., 2005](#)) comprises 30 items and assesses self-reported severity of mental health symptoms in patients within the previous week. The measure is designed for repeated administration to track patient progress over time. OQ-30.2 item responses range from 0 (*never*) to 4 (*almost always*). The Total Score ranges from 0 to 120, with higher scores reflecting more self-reported psychological distress. Based on previous factor analytic studies, the test authors recommend use of a Total Score rather than utilizing subscales ([Lambert et al., 2005](#)). According to the test manual, patients who score 44 or higher are likely to be “more disturbed than the general population” ([Lambert et al., 2005](#)). In the current sample, the OQ-30.2 was used as a screening measure; thus, trainees who endorsed OQ-30.2 Item 7, which assesses for suicidal thoughts, with any response other than 0 (*never*) were administered the MSI-28 (as were trainees who reported suicidal ideation directly to a clinician) and were considered to be “high-risk” because of endorsement of suicidal ideation. Thus, the MSI-28 was administered subsequent

to the OQ-30.2, but on the same day. Approximately 85% of the current sample had an OQ-30.2 Total Score of 44 or higher. The internal consistency (Cronbach's alpha) for the OQ-30.2 Total Score items in the current sample was $\alpha = .94$.

Dispositional Resilience Scale-15. The Dispositional Resilience Scale (DRS-15; [Bartone, 2007](#)) is a 15-item self-report hardiness scale that was developed from the longer Dispositional Resilience Scale (DRS). Items are scored using a Likert-type scale, with responses ranging from 0 (*not at all true*) to 3 (*completely true*) and higher scores reflecting higher overall levels of Hardiness-Resilience. Research has suggested that hardiness buffers stress in various samples, such as in working adults ([Funk, 1992](#)). Moreover, the DRS-15 has been used extensively to measure resilience in U.S. military samples (e.g., [Bartone, Roland, Picano, & Williams, 2008](#)). The DRS-15 items purportedly measure three factors of hardiness: Commitment, Control, and Challenge. Cronbach's alpha reliability coefficients for the 15-item DRS have been reported at $\alpha = .82$ for the total Hardiness scale ([Bartone et al., 2008](#)). In a sample of 141 military academy cadets administered the DRS-15, the three week test-retest reliability coefficient was $r_{xx} = .78$ ([Bartone, 2007](#)). In the present study, the DRS-15 was administered to all trainees seen at the mental health clinic at Lackland AFB on the same day as the MSI-28. Internal consistency for the 15-item total Hardiness scale in the current sample was $\alpha = .90$.

Results

MSI-28 item and subscale characteristics are presented in [Table 1](#). MSI-28 item responses range from 1 (*not at all true*) to 5 (*absolutely true*). Within the group of 470 basic trainees who completed the MSI-28 following self-disclosure of current or recent suicidal ideation, the MSI-28 item means ranged from 1.92 ($SD = 1.04$) for Item 3 (*Angrily thought about killing myself*) to 4.41 ($SD = 0.87$) for Item 7 (*Have had strong emotions*). Overall, trainees reported the highest mean scores on Family Connectedness and Negative Affect items. As shown in [Table 1](#), each subscale exhibited strong internal reliabilities ([Cronbach, 1951](#)), with Cronbach's alphas ranging from .86 for

Negative Affect to .96 for Family Connectedness. Item and scale means and standard deviations for Family Connectedness were comparable to those reported by [Emmerich \(2012\)](#) for a college sample; however, item and scale means and standard deviations for Suicidal Ideation and Negative Affect were higher in the current sample. Not surprisingly, item and scale means and standard deviations were lower for Positive Self-Perception in the present sample of trainees who had endorsed suicidal ideation compared to the reported results from the [Emmerich \(2012\)](#) study, which examined a non-clinical undergraduate college sample.

Exploratory factor analyses (EFAs) were conducted to assess the underlying factor structure of the MSI-28 within this sample of high-risk basic military trainees (see [Table 1](#)). Consistent with previous MSI-28 literature ([Emmerich, 2012](#)), we implemented Principal Axis Factoring using an oblique rotation. Because we expected the factors to be correlated, we used the Promax rotation method for correlated factors. Eigenvalues and a Scree plot were examined as first indications of the number of factors to extract from the data using principal components analysis. Then principal axis factoring was employed on the rotated factors ([Kline, 1994](#)). Results demonstrated the emergence of a clear four-factor solution where each factor was comprised of seven items. Notably, the four factors that emerged within the present dataset were identical to the factor structure reported by [Emmerich \(2012\)](#) in a very different population. In general, factor loadings for the MSI-28 items from the current analyses were also comparable to the factor loadings reported by [Emmerich \(2012\)](#). Together, these four factors explained approximately 72% of the variance in the MSI-28.

Factor 1 (Family Connectedness) comprises seven items assessing positive relationships with family members. Factor 1 loadings ranged from 0.94 (Item 25: *Get emotional support from my family*) to 0.87 (Item 12: *Feel close to my family*). Item 16 (*Family will not let me down*) and Item 20 (*Satisfied with my family*) cross-loaded onto the Positive Self-Perception factor (Factor 3) with a factor loading of 0.37 and 0.35, respectively. Factor loadings for items indicate the strength of association between an item and the factor. Thus, Item 25 is more strongly associated with Family Connectedness

Table 1
MSI-28 Four-Factor Solution ($N = 470$)

Abbreviated item descriptions	Factors				<i>M</i>	<i>SD</i>	α if deleted
	1 FC	2 SI	3 PSP	4 NA			
Family connectedness (FC; <i>M</i> = 28.00, <i>SD</i> = 7.94; Cronbach's α = .96)							
25. Get emotional support from my family	.94	−.07	.33	.04	4.00	1.26	.95
21. Easy to talk to my family	.90	−.05	.30	.08	3.83	1.35	.95
5. Can depend on my family	.89	−.06	.32	.06	4.06	1.26	.95
20. Satisfied with my family	.88	−.10	.35	.01	3.90	1.25	.96
6. Family will be there for me	.87	−.07	.32	.03	4.25	1.13	.96
16. Family will not let me down	.87	−.12	.37	.01	4.00	1.24	.96
12. Feel close to my family	.87	−.08	.33	.07	4.01	1.29	.96
Suicidal ideation (SI; <i>M</i> = 14.59, <i>SD</i> = 7.03; Cronbach's α = .94)							
27. Thoughts pop up frequently into my head	−.14	.91	−.42	.29	2.24	1.28	.93
17. Think about ways to kill myself	−.03	.91	−.32	.23	2.01	1.17	.93
13. Think about how to kill myself	−.08	.90	−.36	.29	1.94	1.09	.93
18. Think about death or suicide	−.11	.85	−.37	.34	2.20	1.18	.93
4. Frequent thoughts of killing myself	−.00	.84	−.31	.33	2.34	1.24	.93
11. Think about specific plans	−.03	.83	−.27	.24	1.97	1.14	.93
3. Angrily thought about killing myself	−.18	.67	−.33	.18	1.92	1.04	.95
Positive self-perception (PSP; <i>M</i> = 18.93, <i>SD</i> = 6.42; Cronbach's α = .93)							
19. Believe in myself	.33	−.33	.88	−.36	2.64	1.12	.92
15. Feel good about myself	.35	−.38	.88	−.42	2.59	1.05	.92
1. Feel confident and determined	.35	−.34	.85	−.37	2.78	1.10	.92
8. Proud of myself	.35	−.32	.83	−.34	2.52	1.07	.92
23. Am happy	.35	−.39	.80	−.45	2.44	1.05	.92
2. Think of myself as a strong person	.19	−.29	.75	−.32	2.79	1.09	.93
24. Value my personal strengths	.29	−.28	.74	−.27	3.19	1.14	.93
Negative affect (NA; <i>M</i> = 28.00, <i>SD</i> = 5.87; Cronbach's α = .86)							
22. Recently feeling upset	.06	.24	−.28	.79	3.91	1.19	.83
9. Mood has been down	.06	.31	−.38	.74	4.18	1.07	.84
28. Have had recent difficulties	−.01	.20	−.36	.72	4.09	1.07	.84
14. Been feeling hopeless	−.18	.39	−.53	.71	3.92	1.17	.85
10. More irritable or annoyed than usual	.06	.18	−.19	.70	3.77	1.23	.84
7. Have had strong emotions	.04	.22	−.32	.70	4.41	.87	.84
26. Feeling discouraged	.14	.08	−.16	.54	3.78	1.20	.86
Eigenvalues	9.06	5.71	3.38	2.08			
Percent Variance Explained	32.35%	20.38%	12.08%	7.43%			

Note. The MSI-28 was developed by Osman et al. (2010). Highest loadings for each respective factor are presented in bold. Eigenvalues for the fifth and sixth components were .75 and .64, explaining an additional 2.69% and 2.29% of the variance, respectively.

than is Item 12. Factor 1 yielded an eigenvalue of 9.06, explaining 32.35% of the variance in the MSI-28.

Factor 2 (Suicidal Ideation) comprises seven items assessing current and recent suicidal thoughts. Factor 2 loadings ranged from 0.91 (Item 27: *Thoughts pop up frequently into my head*) to 0.67 (Item 3: *Angrily thought about killing myself*). Items 13, 18, and 27 cross-loaded onto the Positive Self-Perception factor with factor loadings from -0.36 (for Item 13) to -0.42 (for Item 27), suggesting an association between the two factors. The Suicidal Ide-

ation factor exhibited an eigenvalue of 5.71, explaining an additional 20.38% of the variance in the MSI-28.

Factor 3 (Positive Self-Perception) comprises seven items assessing self-perception. Factor 3 loadings ranged from 0.88 (Item 19: *Believe in myself*) to 0.72 (Item 24: *Value my personal strengths*). Positive Self-Perception items exhibited moderate cross-loadings with all other factors, suggesting some overlapping variance among all four factors. For instance, Item 23 (*Am happy*) exhibited cross-loadings of -0.45 with Negative Affect (Factor 4), -0.39 with

Suicidal Ideation (Factor 2), and 0.35 with Family Connectedness (Factor 1). Positive Self-Perception (Factor 3) had an eigenvalue of 3.38, explaining 12.08% of the variance in the MSI-28.

Factor 4 (Negative Affect) comprises seven items assessing current emotional instability. These items assessed negative affect during the past 2 to 3 weeks. Factor 4 loadings ranged from 0.79 for Item 22 (*Recently feeling upset*) to 0.54 for Item 26 (*Feeling discouraged*). Item 14 (*Been feeling hopeless*) displayed cross-loadings of -0.53 with Positive Self-Perception (Factor 3) and 0.39 with Suicidal Ideation (Factor 2). Item 9 (*Mood has been down*) also displayed a cross-loading of -0.38 with Positive Self-Perception, suggesting some degree of association between the Negative Affect and Positive Self-Perception factors. Factor 4 generated an eigenvalue of 2.08 and explained an additional 7.43% of the variance within this factor structure (see Table 1).

Intercorrelations of MSI-28 subscales are presented in Table 2. Positive Self-Perception was inversely associated with Negative Affect ($r = -.40$) and Suicidal Ideation ($r = -.37$) and positively associated with Family Connectedness ($r = .35$). Suicidal Ideation was also modestly associated with Negative Affect ($r = .28$). Family Connectedness was generally unrelated to Negative Affect ($r = .05$) or Suicidal Ideation ($r = -.08$).

Table 2 also presents intercorrelations between the MSI-28 subscales and the DRS-15 and OQ-30.2. The strongest associations between the MSI-28 subscales and OQ-30.2 Total Score were observed for Positive Self-Perception ($r = -.53$) and Negative Affect ($r = .52$), followed by Suicidal Ideation ($r = .27$) and

Family Connectedness ($r = -.17$). Although opposite in direction, a similar pattern held for associations between the MSI-28 subscales and the Dispositional Resilience Scale (DRS-15), with the strongest associations observed for Positive Self-Perception ($r = .67$) and Negative Affect ($r = -.39$), followed by Suicidal Ideation ($r = -.32$) and Family Connectedness ($r = -.17$).

These findings demonstrate the convergent validity of the MSI-28 subscales, with Positive Self-Perception and Negative Affect especially associated with measures of resilience and general mental health distress. Of note, the Family Connectedness subscale evidenced weaker associations with the OQ-30.2 or DRS-15 scales.

To gain a better understanding of the relationship between the MSI-28 and the frequency of suicidal thoughts reported on Item 7 of the OQ-30.2, we examined the mean levels (and SDs) for the MSI-28 subscales for trainees who responded with *rarely*, *sometimes*, *frequently*, and *almost always* on Item 7 of the OQ-30.2 (which assesses frequency of suicidal thoughts). Table 3 presents these results. The reported mean levels for Suicidal Ideation (and Negative Affect) increase as trainees report a higher frequency of experiencing suicidal thoughts on Item 7 of the OQ-30.2, suggesting positive associations between Suicidal Ideation and Negative Affect and a higher frequency of suicidal thoughts. Additionally, reported mean levels of Positive Self-Perception decrease as trainees report a higher frequency of suicidal thoughts on OQ-30.2 Item 7, suggesting a negative association between Positive Self-Perception and the frequency of suicidal thoughts. These findings further support the convergent validity of the MSI-28 and its subscales.

Table 2
Intercorrelations of MSI-28 Dimensions, OQ-30.2, and DRS-15

Factor	Factor 1	Factor 2	Factor 3	Factor 4
Factor 1: Family connectedness ($N = 470$)	1.00			
Factor 2: Suicidal ideation ($N = 470$)	-.08	1.00		
Factor 3: Positive self-perception ($N = 470$)	.35*	-.37*	1.00	
Factor 4: Negative affect ($N = 470$)	.05	.28*	-.40*	1.00
Outcome Questionnaire-30.2 ($n = 466$)	-.17*	.27*	-.53*	.52*
Dispositional Resilience Scale-15 ($n = 303$)	.31*	-.32*	.67*	-.39*

Note. Sample sizes for the OQ-30.2 and DRS-15 are smaller because of variations in the administration of these measures.

* Significant at $p < .01$.

Table 3
MSI-28 Subscale Means and Standard Deviations for Trainees Who Reported Suicidal Thoughts on Item 7 of the OQ-30.2 (n = 466)

MSI-28 subscales	OQ-30.2 Item 7 responses							
	Rarely (1)		Sometimes (2)		Frequently (3)		Almost always (4)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Family connectedness	28.95	7.16	26.60	8.52	27.58	8.31	28.21	7.70
Suicidal ideation	10.25	3.69	16.14	5.62	22.58	6.44	25.79	7.22
Positive self-perception	20.61	6.47	18.52	5.72	15.73	4.46	14.95	7.49
Negative affect	27.06	6.31	28.13	5.14	29.83	4.49	31.16	4.05

Discussion

The present study was the first to investigate the psychometric properties of the Multidimensional Suicide Inventory (MSI-28) in an at-risk military sample who self-reported suicidal ideation on screening measures. One of the primary goals of the present study was to establish the factor structure of this measure within an Air Force sample with self-reported current or recent suicidality. Consistent with previous work on the MSI-28, results demonstrated the emergence of four MSI-28 factors: two protective factors labeled “Family Connectedness” and “Positive Self-Perception” and two risk factors labeled “Suicidal Ideation” and “Negative Affect” (Emmerich, 2012). The Family Connectedness factor comprised items pertaining to family relationships, whereas the Positive Self-Perception factor consisted of items pertaining to one’s self-view. Suicidal Ideation and Negative Affect included items pertaining to thoughts of suicide and recent negative emotional states, respectively. Together, these four factors explained approximately 72% of the variance in the MSI-28. Items displayed relatively strong factor loadings, indicating a strong association between the items and their respective factors. Although trainees in this sample self-reported suicidal thoughts, they also reported high rates of family and emotional support, being able to depend on their families, and believing in themselves.

Intercorrelations among the four MSI-28 subscales revealed moderate associations. A noteworthy association was observed between the Suicidal Ideation and Positive Self-Perception subscales, $r = -.37$, $p < .01$, suggesting that trainees who reported higher levels of suicidal

ideation also tended to report lower levels of positive self-perception within this sample. Not surprisingly, Positive Self-Perception and Negative Affect showcased a moderate inverse association, $r = -.40$, $p < .01$, suggesting that these two dimensions are related but distinct constructs. Interestingly, Family Connectedness was generally unrelated to Suicidal Ideation ($r = -.08$) or Negative Affect ($r = .05$). Given previous work (Emmerich, 2012), we might have expected that these would be at least moderately and negatively associated with one another. Although the direction of this finding was relatively consistent with the Emmerich (2012) study, the magnitude of the association was unexpectedly low. This discrepancy may be due to a lack of variance, with most trainees indicating highly positive relationships with their family members, or it may be attributable to the fact that the sample consisted of basic military trainees, many of whom were experiencing their first period of extended separation from their family support system. The Family Connectedness items may be too narrowly written and may benefit from a greater variety of items being included in this subscale.

These findings may also suggest that Family Connectedness may not be as useful within a basic military training environment in which family support is not readily available. The basic military training context does not allow for much family connection and is a highly strict and regulated environment. Instead, perhaps items tapping into connections made within a military unit would be more suitable. For instance, consistent with the military culture of leadership responsibility, is the concept that fellow Service members should look out for one

another. This notion of teamwork is first instilled at basic military training and repeatedly reinforced through the concept of battle buddies (McGurk, Cotting, Britt, & Adler, 2006). Adler and Castro (2013) note that the battle buddy concept is an overall attitude of supporting one another through tough times (e.g., occupational demands, mental strain caused by personal stressors, or monitoring and intervening when buddies engage in self-destructive behavior).

Associations between the MSI-28 factors and Hardiness-Resilience (DRS-15) were moderate to strong, indicating that strong emotional and family support as well as positive self-perception were positively related to aspects of resilience, whereas negative affect and suicidality were inversely related to resilience. Within this sample, participants who reported higher rates of family and emotional support tended to report higher rates of hardiness-resilience, highlighting the convergent validity of the MSI-28 subscales. Likewise, participants who reported higher rates of discouragement or reported having recent thoughts of suicide tended to report lower rates of resilience, which is what we would have expected in this high-risk sample of trainees who reported current or recent suicidal ideation.

Two associations between the construct of psychological distress (as measured by the OQ-30.2 Total Score) and the MSI-28 were moderate and ranged from $-.53$ (between OQ-30.2 Total Score and Positive Self-Perception) to $.52$ (between OQ-30.2 Total Score and Negative Affect), displaying convergent validity between the MSI-28 subscales and other mental health and well-being measures. The other two MSI-28 subscales, Family Connectedness and Social Ideation, evidenced modest associations with OQ-30.2 Total Score ($r_s = -.17$ and $.27$, respectively). These correlations suggest that trainees who reported higher rates of psychological distress on the OQ-30.2 tended to report higher rates of negative affect and suicidal thoughts on the MSI-28, whereas trainees who reported lower rates of psychological distress tended to report higher rates of positive self-perception. Associations between the MSI-28 and the DRS-15 and OQ-30.2 suggest that the MSI-28 may be a useful tool for clinicians in assessing risk factors related to psychological distress as well as protective factors related to hardiness-resilience.

Limitations and Future Directions

The MSI-28 was administered to a sample of Air Force basic trainees who self-reported current or recent suicidal ideation during a mental health evaluation at basic military training; thus, the present results may not generalize to other samples. Because the MSI-28 was only administered to trainees who reported suicidal ideation to a clinician or on the OQ-30.2, comparisons in MSI-28 responding could not be made between trainees who reported suicidal ideation and those who did not. The basic military training environment is generally understood to be a high-stress environment where basic trainees may experience high levels of distress. These environmental factors may be reflected in the trainees' self-reported thoughts and behaviors. For example, the mean OQ-30.2 Total Score in the subgroup of trainees who reported current or recent suicidal ideation was 64.22 points, which is notably higher than the cut score of 44 indicating clinical distress (Lambert et al., 2005). In contrast, even though the present sample is considered to be a high-risk sample because they endorsed current or recent suicidal ideation, participants reported relatively high rates of positive affect, and strong family support, reflected in the reported mean levels for the MSI-28 protective factor items. Additionally, present findings indicated moderate to strong associations between protective MSI-28 subscales and resilience as measured by the DRS-15. Future studies may expand on these findings by further examining the relationships between resilience and protective and risk factors associated with suicidal ideation. This, in turn, may provide a conceptual framework which will aid in the development of effective interventions for individuals who self-report suicidal ideation.

Previous research examining protective factors has noted that protective factors interact with stressors to reduce the likelihood of negative outcomes (Steinhardt & Dolbier, 2008). Interestingly, within the present sample, Family Connectedness was unrelated to Negative Affect or Suicidal Ideation. Given previous literature, we would have expected a moderate to strong inverse association between these constructs. A future direction may be a closer examination of the Family Connectedness dimension to see whether it measures the types of family relationship constructs that we would

expect to be related to negative affect or suicidality. Future studies should also examine the predictive utility of the MSI-28 in predicting suicidal behavior in future months (i.e., 6-month outcomes, 12-month outcomes) to assess its utility in identifying those at risk for suicidality.

Conclusions

In conclusion, the present study was the first to examine the psychometric properties of the MSI-28 in a military sample of Air Force basic trainees who reported experiencing current or recent suicidal ideation. Similar to Emmerich (2012), the present study's findings established a four-factor solution for the MSI-28 items with the following four dimensions: Family Connectedness, Suicidal Ideation, Positive Self-Perception, and Negative Affect. The MSI-28 subscales displayed moderate intercorrelations with one another, with the exception of Family Connectedness being unrelated to Suicidal Ideation and Negative Affect. As hypothesized, protective factors including Positive Self-Perception and Family Connectedness were positively and moderately correlated with hardiness-resilience. These findings suggest that it may be useful for clinicians to assess for hardiness-resilience in addition to mental health problems when assessing suicide risk. Further study on the MSI-28 in clinical and nonclinical settings is warranted to determine whether the four-factor structure is supported and confirmed across various samples.

Because suicide rates across the population of active-duty U.S. military personnel have sharply increased in recent years (LeardMann et al., 2013; Ramchand et al., 2011), and the risk increases for military personnel diagnosed with mental health disorders (Jakupcak et al., 2009; Pietrzak et al., 2010), it is critical to utilize comprehensive, multidimensional screening tools to understand and manage suicidal ideation and behaviors, especially within a sample of basic military trainees, many of whom are separated from family support for the first time. Future studies should continue to focus efforts on early identification and prevention of suicidal behaviors by utilizing multidimensional measures that assess both positive and negative factors associated with suicidal thoughts and behaviors.

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Received October 14, 2014

Revision received July 21, 2015

Accepted August 4, 2015 ■