Combat Exposure and Suicide Risk in Two Samples of Military Personnel

Craig J. Bryan,[1] Ann Marie Hernandez,[2] Sybil Allison,[2] and Tracy Clemans[2]

[1] *The University of Utah*
[2] *University of Texas Health Science Center at San Antonio*

Objective: In light of increased suicidal behaviors among military personnel and veterans since the initiation of combat operations in Afghanistan and Iraq, questions have been raised about the potential causal role of combat. The objective of the current study was to identify any direct or indirect effects of combat exposure on suicide risk through depression symptom severity, posttraumatic stress disorder (PTSD) symptom severity, thwarted belongingness, perceived burdensomeness, and fearlessness about death, consistent with the interpersonal-psychological theory of suicide (Joiner, 2005). **Method:** Structural equation modeling was utilized with two separate samples of deployed military personnel, 1 nonclinical (n = 348; 89.7% male, mean age = 24.50) and 1 clinical (n = 219; 91.8% male, mean age = 27.88), to test the effects of combat exposure on suicide risk. **Results:** Greater combat exposure was directly associated with fearlessness about death and PTSD symptom severity in both samples, but failed to show either a direct or indirect effect on suicide risk. PTSD symptom severity was strongly associated with depression symptom severity, which in turn was related to suicide risk directly (in the nonclinical sample) or indirectly through low belongingness and perceived burdensomeness (in the clinical sample). **Conclusions:** In both samples of deployed active duty military personnel, combat exposure was either unrelated to suicide risk or was too distally related to have a measurable effect. Results do not support the interpersonal-psychological theory's hypothesis that combat exposure should be indirectly related to suicide risk through acquired fearlessness of death. J. Clin. Psychol. 69:64–77, 2013.

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Suicide is the second leading cause of death in the U.S. military, with rates ranging between 9 to 15 deaths per 100,000 service members (Ritchie, Keppler, & Rothberg, 2003; U.S. Department of Defense, 2007). Rising suicide rates among military personnel from 2005 to 2011 have raised public and professional concerns, with estimates suggesting that a service member dies by suicide at a rate of approximately one every 36 hours (Department of Defense, 2010). Although there are insufficient data to accurately determine the suicide rate among veterans, recent reports suggest that male veterans are twice as likely to die by suicide as male nonveterans in the U.S. general population (Kaplan, Huguet, McFarland, & Newson, 2007), with the Department of Veterans Affairs (VA) estimating that a veteran dies by suicide every 80 minutes (Department of Veterans Affairs, 2010). Suicide attempts also appear to be increasing in frequency among military personnel and veterans, although estimates of this behavioral pattern are less reliable (Ramchand, Acosta, Burns, Jaycox, & Pernin, 2011). Particularly frustrating and confusing is the fact that the military suicide rate has steadily risen to an all-time high since the start of combat operations in Afghanistan and Iraq, in sharp contrast to historical trends for *decreased* military suicide rates during times of war, raising questions about the potential effect of combat exposure on suicide risk.

For example, recent theoretical work based on the *interpersonal-psychological theory of suicide* (IPTS; Joiner, 2005) has posited a link between combat exposure and suicide risk (Anestis,

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Please address correspondence to: Dr. Craig Bryan, 260 S. Central Campus Dr., Salt Lake City, Utah 84112. E-mail: craig.bryan@utah.edu

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Bryan, Cornette, & Joiner, 2009; Selby et al., 2010). According to this theory, three separate variables must be present for a service member to die by suicide: perceived burdensomeness, thwarted belongingness, and acquired capability. Perceived burdensomeness is the perception that one is a burden on others and is a liability to others' well-being. Thwarted belongingness is the perception that one lacks important connections and meaningful relationships with others. Acquired capability is the degree to which one is able to enact a lethal suicide attempt, and primarily comprises fearlessness of death and pain tolerance. It is only in the combined presence of all three factors that suicidal behavior is proposed to occur. The IPTS has become a popular model for understanding military suicide due in large part to its conceptualization of acquired capability, which is the proposed mechanism by which combat exposure is believed to be connected to suicide risk. Specifically, the IPTS proposes that combat increases suicide risk because repeated exposure to painful and provocative experiences such as aggression, violence, severe injury, and death dampens service members' fear of death and increases their capacity to tolerate painful stimuli (Anestis et al., 2009; Selby et al., 2010).

The proposed mechanisms of increased suicide risk due to combat exposure have been bolstered by the findings of several studies, each of which warrant some discussion. Bryan, Morrow, Anestis, and Joiner (2009) provided the first empirical investigation of the IPTS with a military sample. Although acquired capability was found to be significantly associated with suicide risk and was significantly higher in this sample of active duty personnel than in nonmilitary samples, this study did not consider the role of combat exposure. Indeed, this study's participants had just recently graduated from basic training and had therefore never deployed. In a subsequent evaluation of combat exposure and the IPTS among military personnel (Bryan, Cukrowicz, West, & Morrow, 2010), combat exposure was directly associated with acquired capability (i.e., fearlessness of death and pain tolerance) but not perceived burdensomeness or thwarted belongingness, consistent with the IPTS's proposed mechanism of risk (Selby et al., 2010; Van Orden, Witte, Cukrowicz, & Joiner, 2012). In a follow-up study, Bryan and Cukrowicz (2011) demonstrated that although acquired capability was associated with all forms of combat exposure, it was most strongly linked to combat experiences marked by the highest levels of aggression and violence. In both of these studies, combat exposure accounted for only 5% of the variance in acquired capability, indicating that the vast majority of the variance in fearlessness of death and pain tolerance was due to factors that remained unexplained. Even more critically, neither of these studies considered suicide risk as an outcome, thereby precluding any firm conclusions about the direct or indirect link between combat and suicide risk.

Indirect evidence of the proposed link between combat exposure and suicide risk arise from studies investigating the link among posttraumatic stress disorder (PTSD) and suicide risk. Civilian studies support a linear relationship among PTSD, suicidal ideation, suicide attempts, and death by suicide, with particularly heightened risk occurring with comorbid depression (Gradus et al., 2010; Marshall et al., 2001; Oquendo et al., 2003). Specific to the military, when compared to combat veterans without PTSD, those with PTSD have significantly higher rates of death by suicide (Boscarino, 2006; Drescher, Rosen, Burling, & Foy, 2003; Farberow, Kang, & Bullman, 1990), suicide attempts (Freeman, Roca, & Moore, 2000; Krammer, Lindy, Green, Grace, & Leonard, 1994; Nad, Marcinko, Vuksan-Eusa, Jakovljevic, & Jakovljevic, 2008), and suicidal ideation (Butterfield et al., 2005), with comorbid psychological problems, especially depression, heightening risk even further (Clemans, Bryan, Hernandez, & Rudd, 2012; Lehmann, McCormick, & McCracken, 1995; Rudd, Goulding, & Bryan, 2011; Waller, Lyons, & Constantini-Ferrando, 1999).

These data do not, however, support a *direct* link between combat and suicide risk, but rather suggest an *indirect* link via the emotional and cognitive reactions *in response to* combat exposure. According to the IPTS, this indirect link can be explained via two primary mechanisms. First, re-experiencing symptoms of PTSD are believed to contribute to the acquired capability because mental rehearsal of violent and/or traumatic events could habituate service members to the fear of death and elevate pain tolerance just as actual, repeated exposure to such events can (Selby et al., 2010). Supporting this claim include findings that re-experiencing symptoms are more predictive of suicidal ideation (Nye & Bell, 2007) and acquired capability (Bryan & Anestis, 2011) than other symptom clusters of PTSD. For instance, violent daydreaming (Selby,

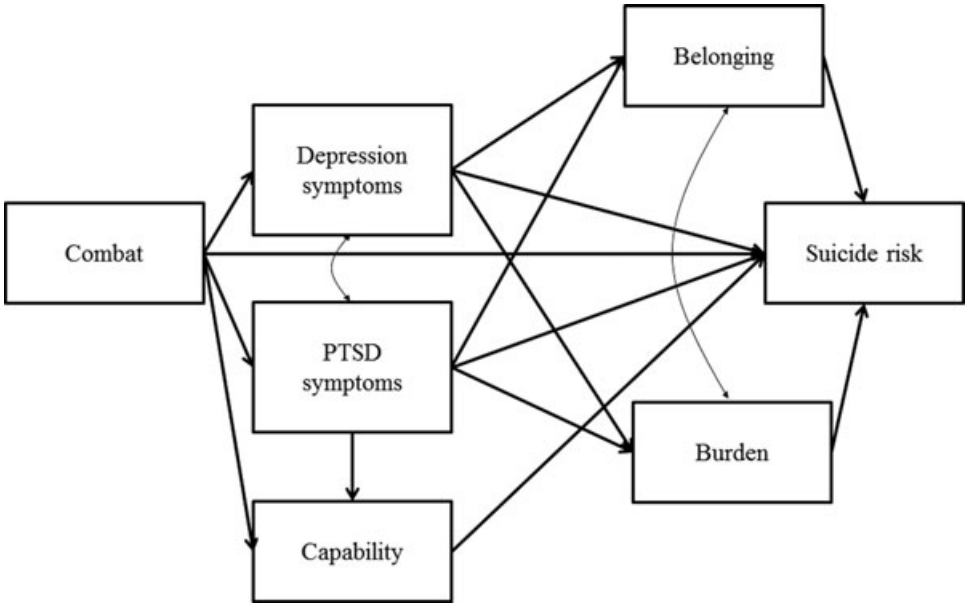

Figure 1. Initial, hypothesized model.

Anestis, & Joiner, 2007) and repetitive nightmares (Agargun et al., 1998) significantly predict suicide risk. Second, thwarted belongingness and perceived burdensomeness are proposed to be the "common threads" that underlie suicidal desire across all forms of psychopathology (Van Orden et al., 2012). Service members suffering from PTSD and depression (and any other cognitive-affective state) secondary to combat exposure are more likely to believe they are a burden on others and do not contribute to others' well-being, which would increase suicide risk. Consistent with this claim, positive correlations among thwarted belongingness and perceived burdensomeness with PTSD symptom severity (Bryan, 2011) and moodsymptoms (Bryan et al., 2009) have been reported. Here, again, it is important to note that no studies have explicitly tested the full chain believed to connect combat exposure to suicide risk through these various constructs.

The primary aim of the current studies was therefore to explore the relationships among combat exposure and suicide risk in two military samples. In each of the samples, we sought to identify any direct effect of combat exposure and suicide risk, as well as any indirect effects of combat exposure and suicide risk through depression symptom severity, PTSD symptom severity, thwarted belongingness, perceived burdensomeness, and fearlessness about death (i.e., acquired capability).

Data Analytic Approach

Structural equation modeling (SEM) with maximum likelihood estimation was utilized to test the relationships among variables. SEM was selected because it allows for the simultaneous calculation of regression equations and generates fit statistics to determine the adequacy of the model. Indirect and direct effects of the variables on suicide risk were also calculated to better understand relationships among variables. The initial, hypothesized model is displayed in Figure 1; this model was tested within each sample to determine its stability across groups. Using SAS 9.2, a series of models were constructed and compared to one another using the following indices of "good" fit: nonsignificant χ^2 value, comparative fit index (CFI) $> .90$, root mean square error of approximation (RMSEA) $< .10$, and standardized root mean square residual (SRMSR) $< .08$. Standardized regression coefficients are presented and discussed.

Study 1: Nonclinical Sample

Participants

Participants included 348 (312 male, 36 female) active duty Air Force Security Forces personnel deployed to a base in Iraq. Racial distribution was 221 (63.5%) Caucasian, 50 (14.4%) African American, 42 (12.1%) Hispanic/Latino, 12 (3.4%) Asian or Pacific Islander, 18 (5.2%) other, and 5 (1.4%) unknown. Mean age was 24.50 years (standard deviation [*SD*] = 4.84). Nearly all participants were either junior enlisted (66.4%) or noncommissioned officer (28.7%), with a smaller number of senior noncommissioned officers (2.3%) and officers (2.6%). Approximately half (52.3%) had deployed at least once previously, with number of previous deployments ranging from zero (47.4%) to nine (0.3%).

Procedures

Participants completed a self-report questionnaire packet as a part of routine psychological and neurocognitive screening and assessment conducted within the first 2 weeks of arrival in Iraq. The purpose of the screening was to provide baseline functional data in the event of subsequent head injury or blast exposure while deployed. Data were stored in the clinic database and then de-identified by reassigning randomly generated participant codes prior to analysis. Study approval was obtained from the Brooke Army Medical Center Institutional Review Board, the U.S. Army Medical Research and Materiel Command's Office of Research Protection, and the Multi-National Force-Iraq Institutional Official.

Materials and Measures

Combat exposure. Combat exposure was measured using the Combat Experiences Scale (CES), which is a 23-item checklist of common events that occur during deployments (e.g., being attacked or ambushed, shooting or directing fire at the enemy, seeing dead or seriously injured people, handling or uncovering dead bodies or body parts, etc.). Respondents were asked to indicate which events they had experienced during the current or any previous deployment ("yes" or "no"). These 23 items were summed to provide an indicator of the extent of combat exposure. Internal consistency for the CES was .94 in the current sample.

Trauma symptoms. Trauma symptoms were measured using the PTSD Checklist Military Version (PCL-M; Weathers, Litz, Herman, Huska, & Keane, 1993), which is a 17-item self-report inventory that assesses the severity of each DSM-IV-defined PTSD symptom. Participants were directed to think about their most stressful deployment experience while responding to the items in order to ensure responses were directly related to deployment-related traumas. The PCL-M has excellent reliability and validity (Weathers et al., 1993). Internal consistency for the PCL-M was .95 in the current sample.

Depression symptoms. Depression symptoms were measured using the 5-item depression subscale of the Behavioral Health Measure-20 (BHM; Kopta & Lowry, 2002), which is a brief self-report questionnaire that uses a 5-point Likert scale to assess mental health symptoms and functioning. The depression subscale comprises items that ask about the frequency of low energy and motivation, not liking oneself, difficulty concentrating, sadness, and hopelessness during the preceding 2 weeks. The depression scale is constructed such that higher scores indicate better health (i.e., lower levels of depression), and its scale score correlates with validated measures of depression ($r_s > -.51$) and happiness ($r = .46$) in both clinical and nonclinical samples (Blount et al., 2010). Internal consistency for the Depression subscale has been found to exceed .82 across several clinical samples (Blount et al., 2010; Kopta & Lowry, 2002), including the current sample (.82). To aid in interpretation, this scale was reverse-keyed such that scores ranged from 0 (*low depression*) to 4 (*severe depression*).

Thwarted belongingness. Thwarted belongingness was measured using five items from the thwarted belongingness subscale of the Interpersonal Needs Questionnaire (INQ-10; Van Orden et al., 2012). The belongingness items of the INQ correlate in the expected directions with measures of loneliness and mood (Van Orden et al., 2012). Respondents indicated the degree to which each item (e.g., "These days I feel disconnected from other people") was true for them on a 7-point Likert scale, with higher scores reflecting a stronger sense of thwarted belongingness. The 5-item scale used in the current study has shown good factor structure (Bryan, 2010), and its internal consistency for the current sample was .83.

Perceived burdensomeness. Perceived burdensomeness was measured using five items from the perceived burdensomeness subscale of the INQ-10. The burdensomeness items of the INQ correlate in the expected directions with measures of competence, social worth, and responsibility to family (Van Orden et al., 2012). Respondents indicated the degree to which each item (e.g., "These days the people in my life would be better off if I were gone") was true for them on a 7-point Likert scale, with higher scores reflecting a stronger sense of burdensomeness. The 5-item scale used in the current study has shown good factor structure(Bryan, 2010), and its internal consistency for the current sample was .71.

Acquired capability. Acquired capability was measured using the 5-item Acquired Capability for Suicide Scale (ACSS; Van Orden, Witte, Gordon, Bender, & Joiner, 2008), which assesses the respondent's fearlessness about death (e.g., "I am not at all afraid to die") and pain tolerance (e.g., "I can tolerate a lot more pain than most people") on 7-point Likert scale, with higher scores indicating less fear of death and greater pain tolerance. The scale is negatively correlated with the Fear of Suicide subscale of the Reasons for Living Inventory (Linehan, Goodstein, Nielsen, & Chiles, 1983), and one's perceived courage to attempt suicide (Bender, Gordon, & Joiner, 2011). Internal consistency for the ACSS was .66 in the current sample.

Suicide risk. Suicide risk was measured using the 4-item Suicidal Behaviors Questionnaire-Revised (SBQ-R; Osman et al., 2001), which is a brief self-report measure of previous suicide attempts, frequency of suicidal ideation, suicidal communication, and subjective likelihood of future suicide attempt. The SBQ-R has been found to reliably differentiate between suicidal and nonsuicidal subgroups in both clinical and nonclinical settings (Osman et al., 2001). SBQ-R total scores range from 3 to 18, but for the current study we transformed these values by subtracting a value of 3 such that "no suicide risk" was reflected by a score of 0; total scores therefore ranged from 0 to 15. Internal consistency for the SBQ-R was .78 in the current sample.

Results

Preliminary analyses. Means, standard deviations, and zero-order correlations for all variables were first calculated to describe the sample, and are presented in Table 1. As would be expected in a nonclinical sample, a low proportion (6.6%) of suicide risk and low levels of depression and PTSD symptom severity (depression: mean [*M*] = .35, *SD* = .36; PTSD: *M* = 19.30, *SD* = 4.41) were observed. Suicide risk was positively correlated with depression ($r = .24$, $p < .001$) and PTSD ($r = .12$, $p = .025$) symptoms, and thwarted belongingness ($r = .18$, $p = .001$), but was negatively correlated with acquired capability ($r = -.12$, $p = .025$). Participants reported experiencing an average of 2.97 (*SD* = 4.55, range: 0 to 23) distinct combat experiences. Combat exposure did not correlate with suicide risk ($r = -.04$, $p = .518$), but did correlate with PTSD symptom severity ($r = .40$, $p < .001$) and acquired capability ($r = .22$, $p < .001$). As expected, depression and PTSD symptoms were positively correlated with each other ($r = .43$, $p < .001$), as were perceived burdensomeness and thwarted belongingness ($r = .21$, $p < .001$), but acquired capability was not correlated with any of these other variables.

Structural equation modeling predicting suicide risk. The initial, full model (see Figure 1) demonstrated good fit, χ^2 (5) = 7.314, $p = .198$; SRMSR = .027; RMSEA = .037 (90% confidence interval [CI]: .000–.089); CFI = .990. Standardized regression coefficients

Table 1
Means, Standard Deviations, and Intercorrelations of All Variables for the Nonclinical Sample (N = 348)

	1.	2.	3.	4.	5.	6.	7.
1. Suicidality	–						
2. Combat	−.04	–					
3. Depression	.24**	.03	–				
4. PTSD	.12*	.40**	.35**	–			
5. Burden	.09	−.03	.18**	−.03	–		
6. Belong	.18**	.00	.43**	.23**	.21**	–	
7. Capability	−.12*	.22*	−.02	.10	.02	−.10	–
M	.09	2.97	.35	19.30	1.02	1.90	4.45
SD	.35	4.55	.36	4.41	.10	1.09	1.24

Note. PTSD = posttraumatic stress disorder; m = mean; SD = standard deviation; burden = perceived burdensomeness; belong = thwarted belongingness; capability = acquired capability.
*$p < .05$. **$p < .01$.

are summarized in Table 2. As can be seen, combat exposure demonstrated neither a direct (β = −.046, standard error [*SE*] = .058, $p = .424$) nor an indirect (β = .000, $SE = .029$, $p = .989$) relationship with suicide risk. The only other variables directly associated with suicide risk were depression (β = .190, $SE = .059$, $p < .001$) and acquired capability (β = −.101, $SE = .053$, $p = .056$). Interestingly, higher levels of acquired capability were associated with *less* suicide risk. No variables were indirectly related to suicide risk.

Table 2
Standardized Regression Coefficients and Standard Errors for All Pathways in Studies 1 and 2

Path		Study 1: Nonclinical sample ($n = 348$)				Study 2: Clinical sample ($n = 219$)			
		Initial model		Final model		Initial model		Final model	
Variable 1	Variable 2	β	*SE*	β	*SE*	β	*SE*	β	*SE*
Combat	Depression	0.033	0.053			0.055	0.068		
Combat	PTSD	0.383	0.046	0.383	0.046	0.389	0.057	0.389	0.057
Combat	Capability	0.225	0.055	0.232	0.051	0.270	0.067	0.321	0.061
Combat	Suicidality	−0.046	0.057			0.102	0.070		
Depression	Belong	0.386	0.048	0.379	0.048	0.713	0.047	0.733	0.031
Depression	Burden	0.210	0.055	0.174	0.052	0.538	0.064	0.551	0.047
Depression	Suicidality	0.190	0.059	0.240	0.051	0.081	0.105		
PTSD	Capability	0.016	0.056			0.130	0.069		
PTSD	Belong	0.110	0.051	0.125	0.051	0.033	0.058		
PTSD	Burden	−0.102	0.056			0.023	0.070		
PTSD	Suicidality	0.040	0.061			−0.015	0.086		
Capability	Suicidality	−0.101	0.053			−0.019	0.065		
Belong	Suicidality	0.069	0.058			0.259	0.091	0.304	0.071
Burden	Suicidality	0.043	0.053			0.143	0.075		
Covariates									
Depression	PTSD	0.340	0.044	0.340	0.044	0.576	0.043	0.576	0.043
Burden	Belong	0.147	0.046	0.148	0.046	0.129	0.038	0.129	0.038

Note. PTSD = posttraumatic stress disorder; SE = standard error; burden = perceived burdensomeness; belong = thwarted belongingness; capability = acquired capability.

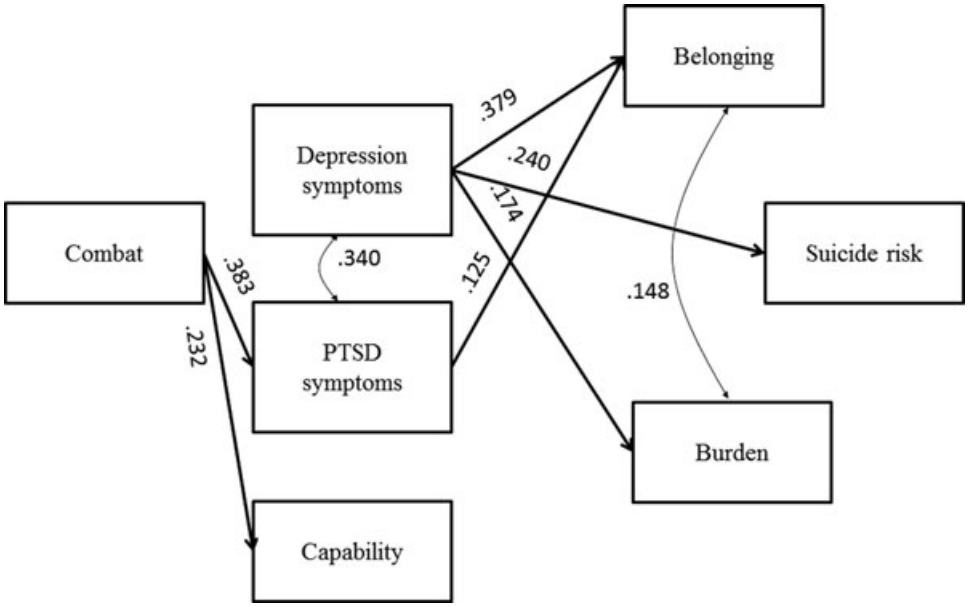

Figure 2. Final model for nonclinical sample, with standardized beta weights. Fit statistics: χ^2 (12) = 18.801, p = .093; SRMSR = .044; RMSEA = .040 (90% CI: .000–.074); CFI = .971.

Subsequent models were constructed and trimmed by comparing standardized beta coefficients and fit indices; the final simplified model demonstrated very good fit, χ^2 [12] = 18.801, $p = .093$; SRMSR = .044; RMSEA = .040 (90% CI: .000–.074); CFI = .971, and is displayed in Figure 2. In the final model, combat exposure was associated with more severe PTSD symptoms ($\beta = .383$, $SE = .046$) and higher acquired capability ($\beta = .232$, $SE = .051$). PTSD symptoms covaried significantly with depression symptoms ($\beta = .340$, $SE = .044$) and were directly associated with thwarted belongingness ($\beta = .125$, $SE = .051$). Depression was also significantly associated with thwarted belongingness ($\beta = .379$, $SE = .048$), as well as perceived burdensomeness ($\beta = .174$, $SE = .055$) and suicide risk ($\beta = .240$, $SE = .051$). Thwarted belongingness and perceived burdensomeness significantly covaried ($\beta = .148$, $SE = .046$), but neither were associated with suicide risk. In this final model, no pathways from combat exposure to suicide risk existed, as none of the tested models resulted in significant findings. Only depression was directly associated with suicide risk ($\beta = .240$, $SE = .051$, $p < .001$); no variables demonstrated an indirect relationship. Standardized regression coefficients for the final model are summarized in Table 2, and direct and indirect effects are summarized in Table 3.

Study 2: Clinical sample

Participants

Participants included 219 (201 male, 18 female) deployed military personnel presenting to an outpatient mental health clinic in Iraq for routine psychological treatment and/or neuropsychological evaluation for suspected traumatic brain injury. Racial distribution was 158 (72.1%) Caucasian, 31 (14.2%) African American, 18 (8.2%) Hispanic/Latino, 2 (2.7%) Asian or Pacific Islander, 1 (.5%) other, and 5 (2.3%) unknown. Mean age was 27.88 years ($SD = 7.49$). Rank distribution was predominantly junior enlisted (51.6%) or noncommissioned officer (32.9%), with a smaller number of senior noncommissioned officers (6.4%), warrant officers (.5%), and officers (5.5%). Participants represented all Branches of service, although Soldiers and Airmen comprised the vast majority of the sample: 135 (61.6%) Army, 70 (32.0%) Air Force, 8 (3.7%) Marines, 1 (0.5%) Navy, and 5 (2.3%) civilian contractors. Approximately half (49.3%) had

Table 3
Direct and Indirect Effects of Variables on Suicidality for Studies 1 and 2

	Initial model				Final model			
	Direct effect		Indirect effect		Direct effect		Indirect effecgt	
	β	*SE*	β	*SE*	β	*SE*	β	*SE*
				Study 1: Nonclinical sample ($n = 348$)				
Combat	−0.046	0.058	0.000	0.029	–	–	–	–
Depression	**0.190**	**0.059**	0.036	0.024	**0.240**	**0.051**	**–**	**–**
PTSD	0.040	0.061	0.002	0.012	–	–	–	–
Capability	−0.101	0.053	–	–	–	–	–	–
Belong	0.069	0.058	–	–	**–**	**–**	–	–
Burden	0.043	0.053	–	–	**–**	**–**	–	–
				Study 2: Clinical sample ($n = 219$)				
Combat	0.102	0.071	0.012	0.043	–	–	–	–
Depression	0.081	0.105	**0.261**	**0.070**	–	–	**0.309**	**0.046**
PTSD	−0.015	0.086	0.009	0.022	–	–	–	–
Capability	−0.019	0.065	–	–	–	–	–	–
Belong	**0.259**	**0.091**	–	–	**0.304**	**0.071**	–	–
Burden	0.143	0.075	–	–	**0.157**	**0.072**	–	–

Note. PTSD = posttraumatic stress disorder; SE = standard error. Bold values are statistically significant at $p < .05$.

deployed at least once previously, with number of previous deployments ranging from zero (50.7%) to eight (0.5%).

Procedure

Participants presented to the clinic to access outpatient mental health services and/or to undergo evaluation for suspected traumatic brain injury. Because of the overlap among psychological and traumatic brain injury (TBI)-related health concerns (e.g., PTSD, depression, insomnia), most patients received psychological treatment of some kind (e.g., cognitive processing therapy, solution-focused therapy, behavioral sleep medicine), even if the primary reason for visit was solely for TBI evaluation and management. Participants completed a self-report questionnaire packet as a part of their intake evaluation. Data were stored in a clinic database and then de-identified by reassigning randomly generated participant codes prior to analysis. Study approval was obtained from the Brooke Army Medical Center Institutional Review Board, the U.S. Army Medical Research and Materiel Command's Office of Research Protection, and the Multi-National Force-Iraq Institutional Official.

Materials and Measures

Measures in the current study were the same as in Study 1, and are described above. Internal consistencies for each measure in the current sample were as follows: CES (.90), PCL-M (.95), BHM depression scale (.83), INQ-10 thwarted belongingness scale (.86), INQ-10 perceived burdensomeness scale (.81), ACSS (.69), and SBQ-R (.79).

Results

Preliminary analyses. Means, standard deviations, and zero-order correlations for all variables were first calculated to describe the sample, and are presented in Table 4. Just less than one quarter (22.4%) of the sample reported some level of suicide risk, and both depression and PTSD symptom severity were somewhat elevated (depression: $M = 1.10$, $SD = .96$; PTSD:

Table 4
Means, Standard Deviations, and Intercorrelations of All Variables for Clinical Sample (n = 219)

	1.	2.	3.	4.	5.	6.	7.
1. Suicidality	–						
2. Combat	.10	–					
3. Depression	.36**	.06	–				
4. PTSD	.17*	.40**	.58**	–			
5. Burden	.36**	.00	.54**	.31**	–		
6. Belong	.38**	.00	.74**	.44**	.50**	–	
7. Capability	.03	.32**	−.01	.23**	.04	.00	–
M	.71	7.66	1.10	30.60	1.30	2.73	4.31
SD	1.78	6.80	.96	13.87	.65	1.56	1.36

Note. PTSD = posttraumatic stress disorder; m = mean; SD = standard deviation; burden = perceived burdensomeness; belong = thwarted belongingness; capability = acquired capability.
*$p < .05$. **$p < .01$.

$M = 30.60$, $SD = 13.87$). Suicide risk was positively correlated with depression ($r = .36$, $p < .001$), PTSD symptoms ($r = .17$, $p = .014$), thwarted belongingness ($r = .38$, $p < .001$), and perceived burdensomeness ($r = .36$, $p < .001$) but was not correlated with acquired capability ($r = .03$, $p = .618$). Participants reported experiencing an average of 7.66 ($SD = 6.80$, range: 0 to 22) distinct combat experiences. Combat exposure did not correlate with suicide risk ($r = .10$, $p = .169$), but did correlate with PTSD symptom severity ($r = .40$, $p < .001$) and acquired capability ($r = .32$, $p < .001$). As expected, depression and PTSD symptoms were positively correlated with each other ($r = .58$, $p < .001$), as were perceived burdensomeness and thwarted belongingness ($r = .50$, $p < .001$), but acquired capability was not correlated with any of these other variables.

Structural equation modeling predicting suicide risk. The initial, full model (see Figure 1) demonstrated good fit, χ^2 [3] = 6.532, $p = .088$; SRMSR = .025; RMSEA = .038 (90% CI: .000−.107); CFI = .997. Standardized regression coefficients are summarized in Table 2. As can be seen, combat exposure demonstrated neither a direct ($\beta = .102$, $SE = .071$, $p = .147$) nor an indirect ($\beta = .012$, $SE = .043$, $p = .787$) relationship with suicide risk. Depression was indirectly associated with suicide risk ($\beta = .261$, $SE = .070$, $p < .001$) through perceived burdensomeness and thwarted belongingness, each of which were directly associated with suicide risk (perceived burdensomeness: $\beta = .143$, $SE = .143$, $p = .057$; thwarted belongingness: $\beta = .259$, $SE = .091$, $p = .005$).

Subsequent models were constructed and trimmed by comparing standardized beta coefficients and fit indices; the final, simplified model demonstrated very good fit, χ^2 [12] = 13.548, $p = .331$; SRMSR = .031; RMSEA = .024 (90% CI: .000−.075); CFI = .997, and is displayed in Figure 3. In the final model, combat exposure was associated with more severe PTSD symptoms ($\beta = .389$, $SE = .057$) and higher acquired capability ($\beta = .321$, $SE = .061$). PTSD symptoms significantly covaried with depression symptoms ($\beta = .341$, $SE = .044$), but only depression was significantly associated with thwarted belongingness ($\beta = .733$, $SE = .031$) and perceived burdensomeness ($\beta = .551$, $SE = .047$). Both thwarted belongingness ($\beta = .304$, $SE = .071$) and perceived burdensomeness ($\beta = .157$, $SE = .072$) were significantly associated with suicide risk. In this final model, no pathways from combat exposure to suicide risk existed, as none of the tested models resulted in significant findings. Only thwarted belongingness ($\beta = .304$, $SE = .071$, $p < .001$) and perceived burdensomeness ($\beta = .157$, $SE = .072$, $p < .030$) were directly associated with suicide risk, with depression being indirectly associated with suicide risk ($\beta = .309$, $SE = .046$, $p < .001$) through these two pathways.

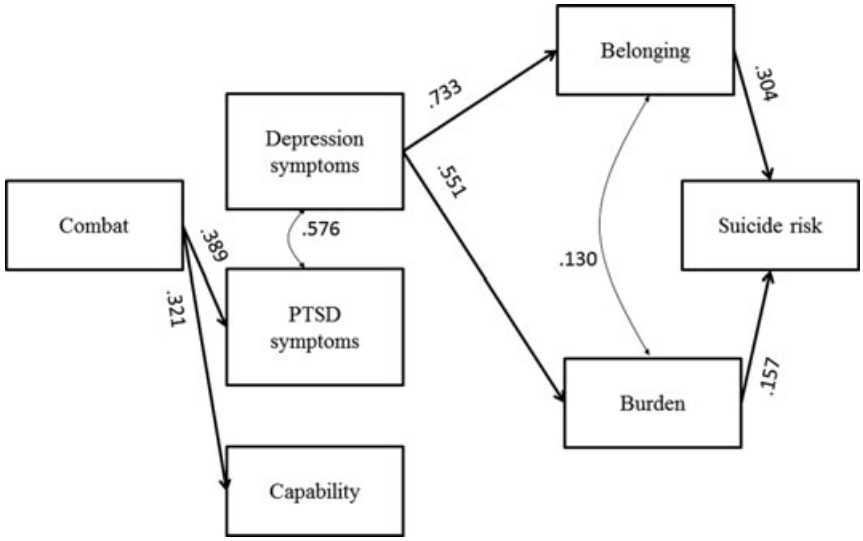

Figure 3. Final model for clinical sample, with standardized beta weights. Fit statistics: χ^2 (12) = 13.547, p = .331; SRMSR = .031; RMSEA = .024 (90% CI: .000–.075); CFI = .997.

Discussion

The current study used two samples of active duty military personnel—one clinical and one nonclinical—to model the potential pathways from combat exposure to suicide risk. In both samples, combat exposure was neither directly nor indirectly related to suicide risk, although combat was directly associated with other variables previously shown to contribute to suicide risk either directly (i.e., fearlessness about death) or indirectly (i.e., PTSD symptoms). These findings are consistent with population-based military data, which similarly have found no association among deployments, combat exposure, and death by suicide (Department of the Army, 2010; Department of Defense, 2010). The current study expands upon the military's data from suicide deaths in particular to a much broader spectrum of suicide risk.

Confidence in our results is enhanced by the similarities in outcomes across both studies, as well as by findings that align with general knowledge about, and the extant literature on, trauma, mood disturbance, and suicide risk. For example, greater combat exposure was associated with increased PTSD symptom severity, PTSD symptoms were strongly associated with depression symptoms, and depression symptoms were either directly or indirectly related to suicide risk.

Two possibilities might explain our findings. First, combat may be completely unrelated to suicide risk. An alternate possibility is that combat may be so distally related to suicide risk that its effects are too small to easily detect. Given the clear link between combat and other risk factors for suicide risk such as PTSD, substance abuse, depression, and relationship strain (Castro & McGurk, 2007; Sareen et al., 2007), it may be that combat increases vulnerability to suicide risk downstream *through* these other factors, in a manner that is similar to other aversive life experiences such as child abuse. Military data indicate that the overwhelming majority of military personnel who die by suicide have never deployed (Department of the Army, 2010; Department of Defense, 2010), which lends itself to support the first possibility. Even within the Army, which has the highest proportion of personnel with deployment experience (approximately 70%), deployment history is not overrepresented among soldiers who die by suicide (Department of the Army, 2010).

A recent study with a clinical sample of actively suicidal soldiers similarly found no correlation between combat exposure and suicide attempts or attempt lethality, although nondeployment stressors and traumas (e.g., sexual abuse, motor vehicle accidents) were associated with suicide attempts (Bryan & Rudd, 2011). However, more recent data from the Army has noted a "shift" towards a greater number of deployments among suicide deaths (Department of the Army,

2012), which might favor the second possibility. Although it might be premature to determine which of these two possibilities best explains the relationship of combat exposure to suicide risk, our results suggest, in the least, that combat exposure is not *proximally* related to suicidal behaviors among deployed service members. Further studies and replications are required to better understand the link between combat and suicide risk.

From a theoretical perspective, our results also provide useful information in considering the IPTS. As expected, and consistent with prior theorizing (Joiner, 2005; Selby et al., 2010; Van Orden et al., 2012), case reports (Anestis et al., 2009; Brenner et al., 2008)and preliminary empirical studies (Bryan, Cukrowicz, West, & Morrow, 2010; Bryan & Cukrowicz, 2010) with military and veteran samples, more combat exposure was directly related to higher levels of fearlessness about death and pain tolerance (i.e., acquired capability). Acquired capability was not, however, significantly associated with suicide risk in either of our samples. Although inconsistent with expectations, at least two previous studies, both conducted with mental health outpatients, have similarly found no independent effect of acquired capability on clinician-rated suicide risk (Van Orden et al., 2008) and suicidal thoughts and behaviors (Bryan, Clemans,& Hernandez, 2012).

Recent work on the IPTS (Van Orden et al., 2012) might provide some clues for understanding these findings. Van Orden and colleagues suggest that acquired capability functions to transform passive or low intensity suicidal ideation into more pernicious ideation such as planning and preparation by introducing suicidal intent into the equation. In samples with relatively low levels of suicide risk generally marked by the absence of suicidal intent (such as community samples), acquired capability therefore might not be expected to play a particularly prominent role, whereas among higher risk groups (such as clinical samples) with more severe levels of suicide risk, acquired capability might be more salient to suicide risk. In other words, acquired capability is pertinent only to suicide risk within the context of emotional distress and suicidal desire. Although this might explain our absence of a relationship in our nonclinical sample, it does not explain the absence of results in our clinical sample. The absence of results across both samples might instead be best explained by the considerable similarities between them: young, predominantly male military personnel currently deployed to a combat zone.

With respect to thwarted belongingness and perceived burdensomeness, a few notable differences were observed in the clinical versus the nonclinical samples. In the nonclinical sample, depression was significantly associated with a stronger perception of burdensomeness and a weaker sense of belonging, and was directly associated with suicide risk. PTSD symptoms were also associated with lower belongingness. Neither belongingness nor burdensomeness was directly related to suicide risk, however, which contradicts the predictions of the IPTS. Several prior studies have similarly failed to demonstrate a direct link between thwarted belongingness with suicide risk (Bryan,Clemans, & Hernandez, 2012; Bryan et al., 2009; Van Orden et al., 2008), although this is the first published study of which we are aware in which perceived burdensomeness failed to predict suicide risk. In contrast, within the clinical sample, depression was associated with both thwarted belongingness and perceived burdensomeness, each of which were directly associated with suicide risk. Critically, the relationship between depression and suicide risk occurred only indirectly through burdensomeness and belongingness, which supports one of the main predictions of the IPTS. In combination with previous findings, our data suggest that the hypothesized links among clinical variables and the various components of the IPTS might not be as straightforward as originally proposed.

Several strengths of the current study include the use of multiple samples, one clinical and one nonclinical, which resulted in similar findings specific to the question of the association between combat and suicide risk. Sample sizes were large enough to consider the primary research questions, and utilized the same measures of the same constructs. Our study is not without limitations, however. First, our study relied on self-report methodology, which could be negatively affected by response biases. Second, our samples are not necessarily representative of the military population as a whole, which could limit conclusions and generalizability of results. Replications using larger sample sizes representing all branches of service are required to further temper conclusions.

Third, our study did not include all potential pathways from combat exposure to suicide risk. For example, alcohol and substance abuse, a well-documented behavioral problem among

combat veterans that is also an important suicide risk factor, was not measured in the current study. Other potentially relevant variables that we were unable to practically assess in the current study might yield different results, and are therefore required before a definitive conclusion regarding the association of combat and suicide risk can be arrived at or ruled out.

Furthermore, due to the relatively low proportion of female participants (i.e., 10% in both samples), our ability to more rigorously test possible gender effects is also limited, and conclusions might not necessarily generalize to female military personnel. It is also possible that results might not generalize to military personnel and veterans who are not currently located in combat zones.

Conclusions

Despite these limitations, our study provides important information about one potential contributor to military suicide risk, and suggests that the link between combat exposure and suicide risk might not be as direct or robust as it is often believed to be.

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