Journal of Consulting and Clinical Psychology

Non-Suicidal Self-Injury and Suicidal Thoughts and Behaviors: A Study of the Explanatory Roles of the Interpersonal Theory Variables Among Military Service Members and Veterans

Carol Chu, Melanie A. Hom, Ian H. Stanley, Anna R. Gai, Matthew K. Nock, Peter M. Gutierrez, and Thomas E. Joiner

Online First Publication, November 27, 2017. http://dx.doi.org/10.1037/ccp0000262

Journal of Consulting and Clinical Psychology

0022-006X/17/$12.00 http://dx.doi.org/10.1037/ccp0000262

Non-Suicidal Self-Injury and Suicidal Thoughts and Behaviors: A Study of the Explanatory Roles of the Interpersonal Theory Variables Among Military Service Members and Veterans

Carol Chu
Florida State University and McLean Hospital, Belmont, Massachusetts

Melanie A. Hom, Ian H. Stanley, and Anna R. Gai
Florida State University

Matthew K. Nock
Harvard University and Massachusetts General Hospital, Boston, Massachusetts

Peter M. Gutierrez
Rocky Mountain Mental Illness Research, Education and Clinical Center, Denver Veterans Affairs Medical Center, Denver, Colorado, and University of Colorado School of Medicine

Thomas E. Joiner
Florida State University

Objective: Research has identified non-suicidal self-injury (NSSI) as a robust correlate of suicidal thoughts and behaviors; however, little is known regarding why these constructs may be related. Consistent with the interpersonal theory of suicide, this study investigated thwarted belongingness (TB), perceived burdensomeness (PB), and capability for suicide (CS) as explanatory links in the association between NSSI, ideation, and suicide attempt history. ***Method:*** Military service members and veterans ($N = 973$; $age_{mean} = 29.9$ years, 78.8% male, 63.8% Caucasian/White) completed measures of lifetime NSSI and suicide attempts; current suicidal ideation; TB, PB, and CS; and related psychiatric symptoms. Bootstrap moderated mediation analyses were employed to examine whether (a) TB moderated the mediating effect of PB on NSSI and ideation, (b) PB moderated the mediating effect of TB on NSSI and ideation, and (c) CS moderated the mediating effect of TB and PB on NSSI and attempts. ***Results:*** TB and PB significantly accounted for the relationship between lifetime NSSI and current ideation. TB did not moderate the mediating effect of PB on NSSI and ideation, and PB did not moderate the mediating effect of TB. However, CS significantly moderated the mediating effects of TB and PB on NSSI and attempt history. ***Conclusions:*** The interpersonal theory of suicide hypotheses were partially supported. Consistent with the theory, the interaction of TB and PB only explained NSSI and attempt history among service members with high levels of CS. TB and PB only individually explained the association between

Carol Chu, Department of Psychology, Florida State University, and McLean Hospital, Belmont, Massachusetts; Melanie A. Hom, Ian H. Stanley, and Anna R. Gai, Department of Psychology, Florida State University; Matthew K. Nock, Department of Psychology, Harvard University, and Massachusetts General Hospital, Boston, Massachusetts; Peter M. Gutierrez, Rocky Mountain Mental Illness Research, Education and Clinical Center, Denver Veterans Affairs Medical Center, Denver, Colorado, and Department of Psychiatry, University of Colorado School of Medicine; Thomas E. Joiner, Department of Psychology, Florida State University.

This research was supported, in part, by a grant from the National Institute of Mental Health (T32 MH093311-04). This work was also supported, in part, by grants awarded to Florida State University (W81XWH-10-2–0181) and the Rocky Mountain Mental Illness Research, Education and Clinical Center (W81XWH- 10-2–0178) by the Department of Defense. The Department of Defense had no further role in the study design; in the collection, analysis, and interpretation of data; in the writing of the report; and in the decision to submit the paper for publication. The content of this paper is solely the responsibility of the authors and the views and opinions expressed do not necessarily represent those of the Military Suicide Research Consortium, Department of Defense, or the United States Government. We thank the Military Suicide Research Consortium (MSRC), an effort supported by the Office of the Assistant Secretary of Defense for Health Affairs, for being the funding source of the provided data and we express our gratitude to the following principal investigators (PIs) for providing data used in this submission: Jesse R. Cougle, PI of the study "Controlled Evaluation of a Computerized Anger-Reduction Treatment for Suicide Prevention"; Michael D. Anestis, PI of the study "Identifying Factors Associated with Future Suicidal Self-Directed Violence within a Sample of Mississippi National Guard Personnel"; Katherine A. Comtois, PI of the study "Continuity Contacts via Text Message: Testing a Brief Intervention to Prevent Suicidal Ideation and Behavior"; Lori Johnson, PI of the study, "Suicide Risk Assessments within Suicide-Specific Group Therapy Treatment for Veterans." These data are the property of the aforementioned PIs and cannot be used without prior written approval.

Correspondence concerning this article should be addressed to Carol Chu, Department of Psychology, Florida State University, Tallahassee, FL 32306. E-mail: chu@psy.fsu.edu

lifetime NSSI and recent suicidal ideation. Prospective studies are warranted to replicate these findings across other military samples.

What is the public health significance of this article?
This study demonstrated the importance of assessing and addressing social disconnection and social burden to mitigate suicide risk among military service members and veterans engaging in non-suicidal self-injury.

Keywords: interpersonal theory of suicide, military, non-suicidal self-injury, suicidal ideation, suicide attempt

The suicide rate has increased in recent years among United States (U.S.) military service members (Ramchand, Acosta, Burns, Jaycox, & Pernin, 2011) and veterans (Department of Veterans Affairs Office of Public & Intergovernmental Affairs, 2016), highlighting the need to identify factors that explain suicide risk within these populations. Studies have found that approximately 12.3% to 30.3% of military service members and veterans report a lifetime history of non-suicidal self-injury (NSSI; Bryan, Bryan, et al., 2015; Bryan, Rudd, et al., 2015; Bryan & Bryan, 2014; Klonsky, 2011; Villatte et al., 2015), which exceeds NSSI rates in the general population (4.0%-5.9%; Klonsky, May, & Glenn, 2013; Klonsky, 2011; Nock & Prinstein, 2004, 2005; Prinstein, 2008). Further, 60.9% of military members are between ages 21 and 30 years (Military OneSource, 2015), an age bracket typically associated with higher rates of NSSI in the general population (7.0%-40.0%; Lloyd, Kelley, & Hope, 1997; Ross & Heath, 2002; Whitlock et al., 2009; Wilcox et al., 2012). These data suggest that NSSI rates may be higher among military and veteran samples. Further, in a sample of 152 active duty U.S. soldiers, those with a history of attempts were not significantly more likely to make a suicide attempt at 2-year follow-up; however, soldiers with a history of NSSI were more than two times more likely to attempt suicide within a 2-year period, even after controlling for baseline symptom severity (Bryan, Rudd, et al., 2015). These findings highlight the importance of understanding NSSI to inform military suicide prevention initiatives; however, to date, a paucity of research has been conducted in this domain.

NSSI is defined by the Centers for Disease Control and Prevention (CDC) as self-directed, deliberate behaviors that result in actual or potential injury to oneself without concomitant suicidal intent (Crosby, Ortega, & Melanson, 2011). NSSI is often conceptualized as a point on the broader spectrum of self-injurious thoughts and behaviors, including ideation and attempts (Klonsky et al., 2013; Nock et al., 2007). However, NSSI does not always co-occur with ideation, plans, and attempts (Bryan, Bryan, et al., 2015), suggesting that suicidality is a distinct phenomenon. Indeed, by definition, NSSI is not enacted with a desire or intent to die (Crosby et al., 2011). Further, NSSI demonstrates distinct etiological features that are consistent with existing theoretical frameworks for NSSI (Klonsky, 2007; Nock, 2009). Thus, there is a need to understand factors that explain the link between NSSI and suicidal thinking.

Although several studies have examined the prevalence and associated features of NSSI within military and veteran samples, few studies have examined factors that might account for the association between (a) engaging in NSSI and (b) suicidal ideation and behavior. In this regard, it is useful to draw from theoretical frameworks that speak to this issue, such as the interpersonal theory of suicide (Joiner, 2005; Van Orden et al., 2010). The interpersonal theory conjectures that individuals will experience suicidal thoughts if they simultaneously experience feelings of *thwarted belongingness* (cf. loneliness; i.e., feelings that one does not belong to a social group) and *perceived burdensomeness* (i.e., the perception that one's death is worth more than one's life to others), and moreover, if they perceive these states as intractable. The theory explicitly differentiates between suicidal thoughts and lethal or near-lethal suicidal behaviors, hypothesizing that individuals who experience suicidal thoughts will only engage in life-threatening suicidal behaviors if they additionally have the *capability for suicide*. Dimensions of the capability for suicide include repeated exposure to painful and provocative events and a lowered fear of death (Smith et al., 2012; Van Orden et al., 2010). According to the interpersonal theory, thwarted belongingness, perceived burdensomeness, and capability for suicide are proximal and necessary predictors of near-lethal and/or lethal suicidal behavior (Van Orden et al., 2010). As such, the interpersonal theory hypothesizes that nontheory variables are distal correlates of suicide risk, and theory variables account in part for the relationship between distal risk factors and suicidal thoughts and behavior (Chu, Buchman-Schmitt, et al., in press; Van Orden et al., 2010). Studies across a variety of populations have found support for these hypotheses (e.g., Anestis et al., 2015; Batterham, Calear, & Spijker, 2015; Chu, Buchman-Schmitt, et al., 2016; Chu, Buchman-Schmitt, et al., in press); however, only a few studies have examined and found support for the *explanatory* roles of the interpersonal theory variables between distal risk factors and suicide risk (e.g., Chu, Rogers, et al., 2016; Chu, Rogers, Gai, & Joiner, in press; Chu, Walker, et al., 2017; Forrest et al., 2016).

In the context of the interpersonal theory, the influence of NSSI on capability for suicide is believed to largely account for the link between NSSI and suicidal behavior (Joiner et al., 2012). Specifically, the interpersonal theory proposes that repeated engagement in NSSI leads to diminished fear of death and elevated pain tolerance, which subsequently increases capability for suicide and risk for suicidal behavior. Indeed, converging evidence supports these hypotheses. Research has indicated that NSSI history is associated with an increased tolerance of and decreased sensitivity to pain (e.g., Hooley et al., 2010; Schmahl et al., 2004), elevated capability for suicide (e.g., Franklin et al., 2011; Van Orden et al., 2008; Willoughby et al., 2015), and risk for suicide attempts (e.g.,

Smith et al., 2010; Van Orden et al., 2008). However, no research to our knowledge has statistically tested whether the interaction of all three interpersonal theory variables represents an explanation for the relationship between NSSI and suicide attempts—an important test of the interpersonal theory.

Little research has examined the link between NSSI and suicidal ideation in military samples from the perspective of the interpersonal theory, although the trajectory from NSSI to suicidal ideation has been characterized in adolescent samples (e.g., Glenn et al., 2017; Victor, Styer, & Washburn, 2015). The association between NSSI and ideation is particularly important given that 77% of military personnel and veterans engaging in NSSI also report suicidal ideation (Bryan, Bryan, et al., 2015), a rate much higher than that observed in older adolescents and young adult self-injurers (34–45%; Muehlenkamp & Kerr, 2010; Whitlock et al., 2009). According to the propositions of the interpersonal theory, thwarted belongingness and perceived burdensomeness—as proximal risk factors for suicidal desire—account for the relationship between NSSI and suicidal ideation. This clinically informative test of the interpersonal theory has also received little empirical attention (see Chu, Buchman-Schmitt, et al., in press, for a meta-analysis).

Broader research suggests that NSSI negatively affects interpersonal functioning. For example, prior research has indicated that individuals engaging in NSSI tend to exhibit poorer interpersonal effectiveness (Nock & Prinstein, 2004) and report limited social support networks (Heath, Ross, Toste, Charlebois, & Nedecheva, 2009). These factors may contribute to isolation, loneliness, and feelings of thwarted belongingness. Indeed, one prior study found that adolescents with a history of NSSI presenting at a hospital following a suicide attempt report more loneliness than those without a history of NSSI (Guertin et al., 2001). Additionally, individuals engaging in NSSI report fears of emotionally burdening close others (Rosenrot, 2015) and feelings of shame regarding their NSSI behaviors (Brown et al., 2009)—both of which may lead to greater perceptions of burdensomeness on others. Altogether, findings suggest potential links between NSSI, thwarted belongingness and perceived burdensomeness.

Of the two studies that have directly examined NSSI in the context of the interpersonal theory constructs, one study found that greater frequency of engaging in NSSI was significantly related to higher levels of thwarted belongingness but not perceived burdensomeness (Assavedo & Anestis, 2016). However, this study did not examine thwarted belongingness and perceived burdensomeness as mediators in the link between NSSI and suicidal ideation, consistent with theory predictions. We are only aware of one study of NSSI and ideation that examined the indirect effects of thwarted belongingness and perceived burdensomeness. This longitudinal study (Chu, Rogers, et al., 2016) found that at baseline, thwarted belongingness and perceived burdensomeness operated as statistical mediators of the relationship between lifetime NSSI and current ideation; however, at 2-month follow-up, only perceived burdensomeness mediated this association. These findings are consistent with emerging evidence suggesting that compared to thwarted belongingness, perceived burdensomeness may be a more potent indicator of suicidal ideation (Bryan et al., 2010; Chu, Hom, Rogers, Ringer, et al., 2016; Chu, Buchman-Schmitt, et al., 2016; Ma et al., 2016). Chu, Rogers, et al.'s (2016) study is noted for its strengths, particularly its utilization of longitudinal design, which allows for improved delineation of the temporal relationship between variables. Nevertheless, the utility of their study's findings was hampered by its small sample size ($N = 49$) of undergraduate students with limited severity of suicidal symptoms. Replication across larger, high-risk samples, including military service members and veterans, is indicated.

The Present Study

Given the relatively high rates of NSSI and suicidal thoughts and behaviors among military service members and veterans, as well as the robust link between NSSI and suicide risk, the present study aimed to examine the explanatory roles of thwarted belongingness, perceived burdensomeness, and capability for suicide in the link between lifetime NSSI, current suicidal ideation, and suicide attempt history in a large sample of military service members and veterans. To test the predictions of the interpersonal theory of suicide, we examined (a) thwarted belongingness as a moderator of the mediating role of perceived burdensomeness in the association between lifetime NSSI and current suicidal ideation, and conversely, (b) perceived burdensomeness as a moderator of the mediating role of thwarted belongingness in the association between lifetime NSSI and current suicidal ideation. Given that the interpersonal theory proposes that suicidal desire emerges among individuals who simultaneously experience high levels of thwarted belongingness and perceived burdensomeness (Joiner, 2005; Van Orden et al., 2010), we expected that (a) the mediating effect of perceived burdensomeness would be stronger at higher levels of thwarted belongingness than at lower levels of thwarted belongingness, and likewise, (b) the mediating effect of thwarted belongingness would be stronger at higher levels of perceived burdensomeness than at lower levels of burdensomeness.

Next, consistent with the interpersonal theory, we examined the interaction of thwarted belongingness, perceived burdensomeness, and capability for suicide as an explanation for the relationship between NSSI and suicide attempt history. Because the theory indicates that risk for suicidal behavior is only elevated among those with the desire and capability for suicide, we expected that the mediating effect of the interaction between perceived burdensomeness and thwarted belongingness would be stronger at higher levels of capability for suicide.

To rule out the alternate explanation that lifetime NSSI is related to suicidal thoughts and behaviors because both are associated with the presence of other putative risk factors, we controlled for the effects of three psychiatric symptoms—insomnia, hopelessness, and depression—that may also confer risk for suicide and/or NSSI (Hamza et al., 2012). Insomnia has been implicated as a robust suicide risk factor across samples (Chu, Hom, Rogers, Ringer, et al., 2016; Pigeon et al., 2012) and appears to be an especially important risk indicator in military samples (Caldwell, Knapik, & Lieberman, 2017; Hom, Chu, et al., 2017; Peterson, Goodie, Satterfield, & Brim, 2008; Ribeiro, Pease, et al., 2012). Similarly, across samples, hopelessness and depressive symptoms were significant correlates of both NSSI and suicidal thoughts and behaviors (Asarnow et al., 2011; Claes et al., 2010; McMillan et al., 2007; Nock & Kessler, 2006). To test the specificity of the interpersonal theory hypotheses, we also tested these covariates as rival mediators in the relationship between NSSI and suicidal ideation and attempts.

Finally, given that multiple studies, including those of military samples (e.g., Bryan et al., 2010), have suggested that perceived

burdensomeness may be a more robust correlate of suicide risk (see Chu, Buchman-Schmitt, et al., in press, and Ma et al., 2016, for reviews), we conducted exploratory analyses examining (a) perceived burdensomeness as an individual mediator of the association between lifetime NSSI and current suicidal ideation, (b) thwarted belongingness as an individual mediator in the relationship between lifetime NSSI and current suicidal ideation, (c) perceived burdensomeness moderating capability for suicide as a mediator of lifetime NSSI and attempt history, and (d) thwarted belongingness moderating capability for suicide as a mediator of lifetime NSSI and attempt history. In the Methods and Results, *thwarted belongingness*, *perceived burdensomeness*, and *capability for suicide* are abbreviated as TB, PB, and CS, respectively; *suicidal ideation* is abbreviated as SI; and *suicide attempt* is abbreviated as SA.

Method

Participants

This sample was composed of 973 military service members and veterans; see Table 1 for demographic details. The self-reported lifetime rate of NSSI was 18.7% (n = 191), which is in line with previously reported NSSI rates in military and

Table 1
Participant Demographics

Demographic variables	Total	No lifetime NSSI history	Lifetime NSSI history	$F(df)$
N	973	772 (79.3%)	201 (20.7%)	—
Age mean (*SD*)	29.94 (11.33)	30.25 (11.35)	28.75 (11.19)	2.80 (971)
Age range	18–71	18–71	18–59	—
Male	767 (78.8%)	622 (80.6%)	145 (72.1%)	—
Missing	3 (.3%)	3 (.4%)	—	—
Ethnicity				2.60 (959)
Hispanic/Latino	71 (7.3%)	51 (6.6%)	20 (10.0%)	—
Missing	12 (1.2%)	10 (1.3%)	2 (1.0%)	—
Race				1.59 (964)
Caucasian/White	621 (63.8%)	488 (63.2%)	133 (66.2%)	—
African American/Black	189 (19.4%)	171 (22.2%)	18 (9.0%)	—
Asian/Pacific Islander	23 (2.4%)	17 (2.1%)	6 (3.0%)	—
American Indian/Alaskan Native	10 (1.0%)	5 (.6%)	5 (2.5%)	—
Multiracial/Other	123 (12.6%)	85 (11.0%)	38 (18.9%)	—
Missing	7 (.7%)	6 (.8%)	1 (.5%)	—
Marital status				1.63 (959)
Married	301 (30.9%)	252 (32.6%)	49 (24.4%)	—
Single	467 (48.0%)	361 (46.8%)	106 (52.7%)	—
Widowed	5 (.5%)	4 (.5%)	1 (.5%)	—
Divorced/Separated	188 (19.3%)	146 (18.9%)	42 (20.9%)	—
Missing	12 (1.2%)	9 (1.2%)	3 (1.5%)	—
Military status				
Veteran	211 (21.7%)	149 (19.3%)	62 (30.9%)	—
Currently serving	762 (78.3%)	623 (80.7%)	139 (69.2%)	—
Deployment (*n*/% Yes)	53 (5.4%)	37 (4.8%)	16 (8.0%)	1.51 (249)
Missing	722 (74.2%)	615 (79.7%)	107 (53.2%)	—
Combat experience (*n*/% Yes)	173 (17.8%)	130 (16.8%)	43 (21.4%)	9.72 (396)*
Missing	575 (59.1%)	506 (65.5%)	69 (34.3%)	—
Military branch				
Army, active duty	243 (25.0%)	190 (24.6%)	53 (26.4%)	—
Army, National Guard	3 (.3%)	—	3 (1.5%)	—
Army, Reserves	471 (48.4%)	422 (54.7%)	49 (24.4%)	—
Air Force, active duty	12 (1.2%)	8 (1.0%)	4 (2.0%)	—
Air Force, National Guard	1 (.1%)	1 (.1%)	—	—
Air Force, Reserves	2 (.2%)	2 (.3%)	—	—
Navy, active duty	22 (2.3%)	15 (1.9%)	7 (3.5%)	—
Marine, active duty	110 (11.3%)	49 (6.3%)	61 (30.3%)	—
Other	22 (2.3%)	21 (2.7%)	1 (.5%)	—
Missing	87 (8.9%)	64 (8.3%)	23 (11.4%)	—
Suicidal symptom history				
Lifetime suicide attempt (*n*/%)	231 (23.7%)	128 (16.6%)	103 (51.2%)	3.63 (958)
1 previous attempt	127 (13.1%)	80 (10.4%)	47 (23.4%)	—
2+ previous attempts	104 (10.7%)	48 (6.2%)	56 (27.9%)	—
# of attempts, mean (*SD*)	1.14 (11.75)	.77 (12.40)	2.56 (8.68)	—
Missing	13 (1.3%)	10 (1.3%)	3 (1.5%)	—

Note. N = sample size; SD = standard deviation.
* $p < .05$.

veteran samples (12.3%, Bryan, Bryan, et al., 2015; 14.0%, Bryan & Bryan, 2014; 27%, Villatte et al., 2015; 30.3%, Bryan, Rudd, et al., 2015).

Procedures

Data for this study were drawn from four of the 24 studies funded by the Military Suicide Research Consortium (MSRC). The MSRC-funded studies were each conducted independently and as such, the studies varied regarding design, approach, and data collection methods and sites. Nonetheless, participants in all MSRC-funded studies completed the same brief battery of surveys at baseline (cf. common data elements; Gutierrez & Joiner, 2016; Ringer et al., in press); administration time of this battery was approximately 30 min (see Table 2 for details on the included CDE studies). This brief assessment battery was composed of subsets of items from several full-length measures due to time and setting constraints. Recently, Ringer et al. (in press) demonstrated that the abbreviated measures exhibited adequate internal consistency (αs = 0.77–0.91) and moderate to strong correlations with corresponding full measures (rs = 0.40–0.99). Further, exploratory factor analyses revealed that the CDEs comprised nine factors, consistent with the suicide risk constructs that were assessed; fit was also at least as good as that of the full measures (see Ringer et al., in press, for details). In this manuscript, only four studies were included as these studies used full-length measures of the present study's key variables. For all included studies, approval was obtained from each site's institutional review board and the U.S. Army Medical Research and Materiel Command Human Research Protection Office.

Measures

Full-length measures of key study variables (TB, PB, CS, SI, depressive symptoms) and abbreviated measures of insomnia symptoms and hopelessness were used.

Self-Injurious Thoughts and Behaviors Interview (SITBI; Nock et al., 2007). In line with the approaches of previous epidemiological studies (see Muehlenkamp et al., 2012 for review), one self-report item drawn from the SITBI was used to assess for the absence or presence of a lifetime history of NSSI. This item asked: "In your life, have you purposely hurt yourself *without wanting to die*?" Additionally, one self-report item drawn from the SITBI was used to assess participants' history of SAs (i.e., "How many times in your lifetime have you made an attempt to kill yourself during *which you had at least some intent to die*?").

Interpersonal Needs Questionnaire (INQ-15; Van Orden et al., 2012). The INQ-15 is a 15-item self-report measure of feelings of PB and TB. In the INQ-15, 6 items assess PB (INQ-PB) and 9 items assess TB (INQ-TB). Items are rated on a 7-point Likert scale ranging from 1 (*not at all true for me*) to 7 (*very true for me*), with higher total scores indicating greater feelings of PB and TB. Previous research has indicated that the INQ-TB and the INQ-PB exhibit good internal consistency and adequate validity (Van Orden et al., 2008, 2012). In this study, the internal consistencies of the INQ-TB (α = .88) and INQ-PB (α = .89) were good.

Acquired Capability for Suicide Scale (ACSS-20; Bender, Gordon, Bresin, & Joiner, 2011; Van Orden, Witte, Gordon, Bender, & Joiner, 2008). The ACSS-20 is a 20-item self-report measure of two components of CS: fearlessness about death and perceived tolerance of pain. Items are rated on a 5-point Likert scale that ranges from 0 (*not at all like me*) to 4 (*very much like me*) with higher total scores on the ACSS indicating greater CS. Consistent with prior research (Bender et al., 2011), this measure exhibited good internal consistency in this study (α = .80). The ACSS-20 was only administered in three of the four samples (n = 892).

Depressive Symptom Index-Suicidality Subscale (DSI-SS; Joiner, Pfaff, & Acres, 2002; Metalsky & Joiner, 1997). The DSI-SS is a 4-item measure used to evaluate the severity and frequency of SI in the past two weeks. Items are rated on a 4-point Likert-type scale ranging from 0 to 3. Previous research supports the validity (Joiner, Pfaff, & Acres, 2002) and internal consistency of this measure (Joiner, Pfaff, & Acres, 2002; Ribeiro, Braithwaite, Pfaff, & Joiner, 2012). This measure exhibited good internal consistency in the current study (α = .89). In this study, the DSI-SS total score was entered into analyses as the dependent variable.

Insomnia Severity Index (ISI; Bastien, Vallières, Morin, 2001; Ringer et al., in press). An abbreviated 5-item version of the original 7-item ISI was used to assess insomnia symptom severity in the past two weeks. Items are rated on a 5-point Likert scale ranging from 0 to 4, with higher total scores indicating more severe insomnia symptoms. Total scores ranged from 0 to 20 on the abbreviated ISI. In previous research, the ISI has demonstrated adequate reliability and validity (Bastien et al., 2001), particularly in military samples (Hom, Chu, et al., 2017). Internal consistency of the shortened measure was excellent (α = .90).

Beck Hopelessness Scale (BHS; Beck, Weissman, Lester, & Trexler, 1974; Ringer et al., in press). An abbreviated, 3-item version of the original 20-item BHS was used to measure feelings of general hopelessness. Items are rated on a true-false scale and total scores on the shortened BHS range from 0 to 3. Higher total scores reflect greater feelings of hopelessness. The original scale's reliability and validity have been supported (McMillan et al., 2007). Internal consistency of the abbreviated measure was adequate (α = .69).

Table 2
Summary of the Military Suicide Research Consortium–Funded Studies Using the Common Data Elements Measures in This Study

Study topic	Sites	Population	Administration	Current study N
CAMS SSF	Veterans Affairs Medical Center, Southern U.S.	Veterans	In person	134
Caring text messages	Marine Corps bases, Southern and Western U.S.	Army and Marine active duty	In person	235
Anger	University, Southern U.S.	Veterans, Reserves, and civilians[a]	Online, phone	81
Self-directed violence	National Guard Camp, Southern U.S.	Army and Air National Guards	In person	523

Note. CAMS SSF = Collaborative Assessment and Management of Suicidality Suicide Status Form; U.S. = United States.
[a] Civilians in this sample were excluded from the present study.

Beck Depression Inventory-Second Edition (BDI-II; Beck et al., 1996). The BDI-II is a 21-item self-report measure of depressive symptoms in the previous two weeks. Items are rated on a 4-point Likert scale ranging from 0 to 3, with higher total scores indicating more severe depressive symptoms. The BDI-II has been widely used in prior research and has demonstrated consistently strong psychometric properties (Beck et al., 1996). In this study, item 9 of the BDI-II, which assesses suicidal thinking and desire, was removed to diminish redundancy with our dependent variable. Internal consistency of this measure was excellent in this study ($\alpha = .94$). The BDI-II was only administered in one of the four samples ($n = 81$).

Data Analytic Strategy

Preliminary analyses. First, we examined variable descriptive statistics and calculated bivariate Pearson's correlations (two continuous variables), point-biserial correlations (dichotomous and continuous variables), or phi coefficients (two dichotomous variables) to examine the relationship between all study variables. One-way ANOVAs were used to compare those with and without a history of NSSI on demographic variables. Additionally, given that these data were collected as part of four independent investigations, one-way ANOVAs were used to examine whether study variables differed across CDE investigations.

Main analyses. First, to test the interpersonal theory of suicide and evaluate whether the interaction of TB and PB (INQ-TB, INQ-PB) accounts for the association between lifetime NSSI history and SI (DSI-SS), we conducted bias-corrected bootstrap mediation analyses. Specifically, moderated mediation analyses were conducted to examine whether PB mediated the association between lifetime NSSI history and SI at low (1 standard deviation [*SD*] below mean), moderate (at the mean), and high levels (1 *SD* above mean) of TB, controlling for age, sex, insomnia symptoms, and hopelessness. Conversely, moderated mediation analyses were used to examine whether TB mediated the association between lifetime NSSI history and SI at low, moderate, and high levels of PB, controlling for the aforementioned covariates. In these two models, we subsequently included depressive symptoms as a covariate. This covariate was modeled separately as the measure of depressive symptoms (BDI-II) was only administered in one CDE study and analyses including this covariate were underpowered (see Power section).

Next, we evaluated whether the interaction of TB, PB, and CS (ACSS-20) mediated the association between lifetime NSSI history and number of SAs, controlling for all covariates. Again, moderated mediation analyses were conducted to examine whether the interaction of TB and PB mediated the association of NSSI and the number of prior SAs at low, moderate, and high levels of CS, controlling for covariates. Depressive symptoms were not evaluated as a covariate in this model as this variable was not assessed in the data sets that measured CS.

Finally, to evaluate the specificity of these aforementioned models, we tested whether symptoms of insomnia, hopelessness, and depression emerged as significant rival mediators, controlling for TB, PB, CS, age, and sex—each variable was entered as an individual mediator of the association between NSSI history and SI and all potential rival mediators, except depressive symptoms, were entered as mediators of NSSI and SA history.

Exploratory analyses. To examine whether PB may be a more robust suicide risk correlate than TB, we tested PB and TB as individual mediators of the relationship between NSSI history and SI, beyond covariates. Further, to determine whether the interaction between TB and CS and/or the interaction of PB and CS may also explain the effect of NSSI on SA history, we tested TB and PB as individual moderators of the mediating role of CS in the association between NSSI and SA history. Specifically, moderated mediation analyses were used to examine whether CS was a significant mediator at low, moderate, and high levels of PB and whether CS was a significant mediator at low, moderate, and high levels of TB.

All mediation analyses were conducted with the SPSS PROCESS macro, following procedures described by Hayes (2013): 10,000 bootstrapped samples were drawn from the data and bias-corrected 95% confidence intervals (BCCI) were computed to estimate the indirect effect for each of the resampled data sets. Mediation analyses were conducted using PROCESS Model 4 and moderated mediation analyses were conducted using Model 14. For moderated mediation analyses, BCCI were computed to estimate the index of moderated mediation. Missing data, which were minimal for key study variables (<1.0%), were addressed using listwise deletion, consistent with recommendations by Widaman (2006).

Power. A sample size of 115 is required to be adequately powered ($1\text{-}\beta \geq 0.80$) to detect small-to-moderate effect sizes for the α path and moderate effect sizes for the β path using a bias-corrected bootstrap mediation approach (Fritz & MacKinnon, 2007). Thus, with our sample size of 973, we were more than adequately powered for the proposed analyses. Further, as noted above, CS was only assessed in three of the four samples; nonetheless, with a sample size of 892, we remained adequately powered for analyses. With a sample size of 81, we were underpowered for analyses controlling for depressive symptoms—these analyses should be interpreted with caution.

Results

Preliminary Analyses

Descriptive statistics are reported in Table 1, details regarding the included MSRC-funded studies are provided in Table 2, and correlations between study variables are reported in Table 3. In comparison with individuals without a history of NSSI, individuals reporting a history of NSSI were more likely to report a history of combat experience, $F[396] = 9.72$, $\phi = 0.16$, $p = .002$[1]—a finding that is consistent with previous research (Bryan & Bryan, 2014). No other demographic differences emerged between those with and without lifetime NSSI (see Table 1). Between the included CDE studies, significant differences in NSSI history, $F(3, 970) = 31.56$, $p < .001$, TB, $F(3, 970) = 243.35$, $p < .001$, PB, $F(3, 970) = 71.14$, $p < .001$, CS, $F(3, 890) = 9.38$, $p < .001$, and

[1] Given significant group difference in combat experience, the main analyses were also conducted with combat experience as an added covariate. Of note, the pattern of findings remained unchanged, such that the indirect effect of NSSI history on SI through TB and PB, controlling for all covariates and combat history, was significant (95% CI [0.0991,0.1756]; $b = 0.26$, $SE = 0.10$).

Table 3
All Study Variable Means, Standard Deviations and Correlations

Sample	1	2	3	4	5	6	7	8	9	10	*N*	Mean	*SD*	Range	Skew	α
Total, $N = 973$																
1. NSSI history (0 = no, 1 = yes)	—										973	.21	.41	0–1	1.45	—
2. INQ-15 thwarted belongingness	.28**	—									973	25.00	11.64	4–63	1.03	.88
3. INQ-15 perceived burdensomeness	.19**	.33**	—								973	17.16	7.04	5–42	.66	.89
4. ACSS-20 capability for suicide	.10*	.13**	.15**	—							892	51.37	12.44	12–80	−.18	.80
5. DSI-SS suicidal ideation	.25**	.39**	.37**	.16**	—						973	1.73	2.72	0–12	1.40	.89
6. Number of prior suicide attempts	.41**	.16**	.16**	.12**	.24**	—					957	1.14	11.75	0–74	—	—
7. ISI insomnia severity	.04	.06	.12**	.07*	−.12	.06	—				973	3.38	3.40	0–20	1.69	.90
8. BHS hopelessness	−.21**	−.26**	.05	−.04	−.09*	−.17**	−.06	—			973	1.93	1.03	0–3	−.42	.69
9. BDI-II depressive symptoms	.48**	.66**	.59**	—	.51**	−.34*	.72**	−.54**	—		81	19.19	12.93	0–52	.62	.94
10. Age	−.05	−.15**	.18**	−.04	.30**	−.06	−.02	.05	.07	—	973	29.94	11.33	18–71	1.33	—
11. Sex (1 = male, 2 = female)	.09*	.03	.01	−.19**	−.07*	.18**	.09*	−.06	.24*	.01	970	1.21	.41	1–2	1.43	—
Controls, $n = 772$																
1. NSSI history (0 = no, 1 = yes)	—										772	.00	.00	.00	—	—
2. INQ-15 thwarted belongingness	—	—									772	23.36	10.65	4–63	1.20	.87
3. INQ-15 perceived burdensomeness	—	.33**	—								772	16.47	6.58	5–42	.73	.87
4. ACSS-20 capability for suicide	—	.08*	.13*	—							725	50.72	12.42	12–80	−.19	.81
5. DSI-SS suicidal ideation	—	.42**	.34**	.10*	—						772	1.39	2.48	0–11	1.65	.89
6. Number of prior suicide attempts	—	.19**	.13*	.17**	.19**	—					762	.77	.62	0–2	—	—
7. ISI insomnia severity	—	.08*	.14**	.09*	−.09*	.11*	—				772	3.31	3.51	0–20	1.59	.90
8. BHS hopelessness	—	−.26**	.12**	−.001	−.13**	−.05	−.06	—			772	2.04	1.01	0–3	−.59	.66
9. BDI-II depressive symptoms	—	.56**	.28*	—	.27*	−.04	.70**	−.44**	—		58	15.34	10.33	0–46	.66	.91
10. Age	—	−.12**	.16**	−.03	.32**	−.06	.002	.01	.07	—	772	30.25	11.35	18–71	1.29	—
11. Sex (1 = male, 2 = female)	—	−.03	−.03	−.21**	−.09*	.06	.12**	−.03	.13	.02	769	1.19	.39	1–2	1.57	—
Lifetime NSSI History, $n = 201$																
1. NSSI history (0 = no, 1 = yes)	—										201	1.00	.00	1.00	—	—
2. INQ-15 thwarted belongingness	—	—									201	31.31	13.08	51–63	.43	.87
3. INQ-15 perceived burdensomeness	—	.22*	—								201	19.78	8.11	5–39	.25	.87
4. ACSS-20 capability for suicide	—	.18*	.16*	—							167	53.77	12.26	13–80	−.16	.79
5. DSI-SS suicidal ideation	—	.16*	.34**	.09	—						201	3.07	3.14	0–12	.71	.88
6. Number of prior suicide attempts	—	.09	.16*	.05	−.02	—					198	2.56	8.68	1–74	—	—
7. ISI insomnia severity	—	−.07	<.001	−.01	−.28**	−.24*	—				201	3.62	2.95	0–18	2.42	.83
8. BHS hopelessness	—	−.09	.04	−.12	.25**	−.11	−.02	—			201	1.50	1.01	0–3	.17	.62
9. BDI-II depressive symptoms	—	.69**	.69**	—	.50*	.15	.60*	−.50*	—		23	28.87	13.95	4–52	−.13	.95
10. Age	—	−.21*	.30**	−.05	.34**	.02	.10	.16*	.39	—	201	28.75	11.19	18–59	1.51	—
11. Sex (1 = male, 2 = female)	—	−.12	.04	−.15	−.10	.36*	−.02	−.09	.53*	−.02	201	1.28	.45	1–2	1.00	—

Note. NSSI history = lifetime history of non-suicidal self-injury (0 = no, 1 = yes); INQ-15 = Interpersonal Needs Questionnaire-15; ACSS-20 = Acquired Capability for Suicide Scale; DSI-SS = Depressive Symptom Index-Suicidality Subscale; ISI = Insomnia Severity Index (abbreviated, 5 items); BHS = Beck Hopelessness Scale (abbreviated, 3 items); BDI = Beck Depression Inventory-II (item 9, suicidal ideation, was removed from the total score). Sex (1 = male, 2 = female). Pearson's correlations are reported between continuous variables, point-biserial correlations are reported between dichotomous and continuous variables, and phi coefficients are reported between dichotomous variables.
* $p < .05$. ** $p \leq .001$.

SI severity, $F(3, 970) = 455.68$, $p < .001$ were observed.[2] However, there were no significant differences in SA history across CDE studies, $F(3, 957) = 3.62$, $p = .06$.

Main Analyses: TB and PB as Mediators Between NSSI History and SI

TB moderating PB as a mediator between NSSI history and SI. First, we examined whether TB moderated the mediating role of PB in the relationship between NSSI history and SI, controlling for age, sex, insomnia symptoms, and hopelessness. Although TB was not a significant moderator (index = −0.0012, *SE* = 0.006; 95% CI [−0.0139, 0.0112]), there was a significant indirect effect of PB at low ($b = 0.52$, $SE = 0.11$, 95% CI [0.3297, 0.7528]), moderate ($b = 0.51$, $SE = 0.09$, 95% CI [0.3451, 0.7096]), and high levels of TB ($b = 0.50$, $SE = 0.10$, 95% CI [0.3328, 0.7138]). Unexpectedly, the indirect effect of PB was slightly stronger at lower levels of TB than at higher TB, a point that we discuss below.

PB moderating TB as a mediator between NSSI history and SI. Next, we examined whether PB moderated the mediating role of TB in the relationship between NSSI history and SI, controlling for age, sex, insomnia symptoms, and hopelessness, PB was not a significant moderator (index = −0.0007, *SE* = 0.004; 95% CI [−0.008, 0.006]). Again, results indicated a significant indirect effect of TB at low ($b = 0.29$, $SE = 0.09$, 95% CI [0.1382, 0.5044]), moderate ($b = 0.28$, $SE = 0.07$, 95% CI [0.1583, 0.4558]), and high PB levels ($b = 0.27$, $SE = 0.08$,

[2] For each of the four studies, a new variable was created (coded yes/no) and entered as a covariate in all main analyses. Across all hypotheses, the pattern of findings remained the same even after accounting for potential differences across CDE studies.

95% CI [0.1404, 0.4519]). Again, the indirect effect of TB was slightly stronger at lower PB levels.[3]

When depressive symptoms were also covaried in these two models, the pattern remained unchanged—TB (index = 0.002, *SE* = 0.01; 95% CI [−0.0095, 0.0290]) and PB (index = −0.0182, *SE* = 0.03; 95% CI [−0.0946, 0.0149]) did not emerge as significant moderators and in both models, the indirect effects remained significant at all levels of the moderator.[4]

Specificity of TB and PB as mediators between NSSI history and SI. We examined whether insomnia symptoms, hopelessness, and depressive symptoms emerged as potential mediators, beyond TB, PB, age, and sex. Insomnia symptoms did not emerge as a significant mediator—the direct effect of NSSI history on SI remained significant after accounting for insomnia symptoms (b = 0.99, SE = 0.19, $p < .001$) and the indirect effect of NSSI history on SI through insomnia symptoms was not significant (b = 0.004, SE = 0.03, 95% CI [−0.06, 0.07]). Hopelessness also did not emerge as a significant mediator—the direct effect remained significant after accounting for hopelessness (b = 0.99 SE = 0.19, $p < .001$) and the indirect effect through hopelessness was also not significant (b = 0.01, SE = 0.03, 95% CI [−0.05, 0.08]). Similarly, depressive symptoms did not emerge as a significant mediator—the direct effect after accounting for depressive symptoms (b = 0.31, SE = 0.33, p = .35) and the indirect effect through depressive symptoms (b = 0.11, SE = 0.10, 95% CI [−0.01, 0.46]) were not significant. These findings support the specificity of TB and PB as mediators.

Main Analyses: CS Moderating PB and TB as Mediators Between NSSI and SA History

We examined whether CS moderated the mediating role of the interaction of PB and TB in the relationship between NSSI and the number of prior SAs, controlling for age, sex, insomnia symptoms, and hopelessness. CS emerged as a significant moderator (index = 0.0014, SE = 0.001; 95% CI [0.0002, 0.0048]). Results indicated that the indirect effect was not significant at low (b = −0.02, SE = 0.02, 95% CI [−0.0930, 0.0070]) and moderate (b = −0.001, SE = 0.01, 95% CI [−0.0329, 0.0252]) levels of CS. Consistent with the predictions of the interpersonal theory of suicide, the indirect effect of the interaction of TB and PB was only significant at high levels of CS (b = 0.02, SE = 0.01, 95% CI [0.002, 0.0551]).

Specificity of TB, PB, and CS as mediators between NSSI and SA history. We examined whether insomnia symptoms, hopelessness, and depressive symptoms emerged as mediators, beyond TB, PB, CS, age, and sex. Insomnia symptoms did not emerge as a significant mediator—the direct effect of NSSI history on SA history remained significant after accounting for insomnia symptoms (b = 0.45, SE = 0.06, $p < .001$) and the indirect effect of NSSI history on SA history through insomnia symptoms was not significant (b = −0.009, SE = 0.009, 95% CI [−0.04, 0.003]). Hopelessness was also not a significant mediator—the direct effect remained significant after accounting for hopelessness (b = 0.45, SE = 0.06, $p < .001$) and the indirect effect through hopelessness was not significant (b = −0.006, SE = 0.008, 95% CI [−0.03, 0.005]).

Exploratory Analyses: Comparing the Robustness of TB and PB as Suicide Risk Factors

PB and TB as individual mediators. Lastly, given prior research indicating that PB is a more potent correlate of suicidal thoughts and behaviors than TB (e.g., Bryan et al., 2010; Chu, Buchman-Schmitt, et al., 2016; Chu, Rogers, et al., 2016), we examined TB and PB as individual mediators of the relationship between NSSI history and SI, beyond age, sex, insomnia symptoms, and hopelessness. When PB was entered as an individual mediator, the direct effect of NSSI history on SI remained significant after accounting for PB (b = 1.33, SE = 0.19, $p < .001$). Additionally, the indirect effect of NSSI history on SI through PB, controlling for covariates, was significant and between 0.2912 and 1.7109 (95% CI; b = 0.45, SE = 0.19; κ^2 = 0.07; R^2 = 0.03); this indicates mediation. When depressive symptoms were covaried, the pattern remained the same; the direct effect was not significant (b = 0.34, SE = 0.33, p = .31) and the indirect effect of NSSI history on SI through PB was significant (b = 0.32, SE = 0.17; 95% CI [0.0789, 0.8459]).

When TB was entered as an individual mediator, the direct effect remained significant after accounting for TB (b = 1.16, SE = 0.19, $p < .001$) and the indirect effect of NSSI history on SI through TB, controlling for covariates, was also significant (95% CI [0.4274, 0.8369]; b = 0.62, SE = 0.10; κ^2 = 0.10; R^2 = 0.04). However, when depressive symptoms were included in this model, the indirect effect was no longer significant as the 95% CI crossed zero (b = 0.004, SE = 0.05; 95% CI [−0.0636, 0.1561]). Consistent with past research (Chu, Rogers, et al., 2016), this may suggest PB is a more robust correlate of SI than TB; however, given the limited sample size for these analyses, results should be interpreted with caution.

TB and PB moderating CS as mediator of NSSI and suicide attempt history. Lastly, we explored whether the interaction of CS and TB and the interaction of CS and PB would significantly mediate the relationship between NSSI and the number of prior SAs. Our results indicated that neither PB (index = 0.002, SE = 0.002; 95% CI [−0.0013, 0.0087]) nor TB (index = 0.004, SE = 0.001; 95% CI [−0.0005, 0.003]) individually moderated the mediating effect of CS on NSSI and SA history. In both cases, the mediating effect of CS was stronger at higher levels of PB (low PB: −0.005, moderate PB: 0.001, high PB: 0.06) and TB (low TB: −0.001, moderate TB: 0.001, high TB: 0.04).

[3] Of note, hopelessness about feelings of TB and PB is a key component of the interpersonal theory (Van Orden et al., 2010). Previous studies have used general hopelessness (BHS) as a proxy for this component of the theory (Hagan et al., 2015). Thus, we also examined these two main models without the inclusion of hopelessness as a covariate and the pattern of findings remained unchanged. Given that general hopelessness is a robust predictor of ideation, we presented our main analyses with hopelessness as a covariate.

[4] Given that depression is a robust suicide risk factor, we also conducted exploratory analyses to examine whether depression moderated the mediating effects of TB and PB on the relationship between NSSI history and SI. Depression did not emerge as a significant moderator of the mediating effects of TB (index = −0.0009, SE = 0.005; 95% CI [−0.0185, 0.0059]) or PB (index = 0.0088, SE = 0.01; 95% CI [−0.0157, 0.0440]).

Discussion

Consistent with the interpersonal theory's hypotheses (Joiner, 2005; Van Orden et al., 2010; see Chu et al., in press for review), our findings indicated that the interaction of thwarted belongingness and perceived burdensomeness only explained the relationship between NSSI and suicide attempt history among military service members and veterans with high levels of capability for suicide. Results also indicated that a history of NSSI was significantly associated with current thwarted belongingness, perceived burdensomeness, and suicidal ideation. Additionally, thwarted belongingness and perceived burdensomeness significantly accounted for the association between lifetime NSSI history and current suicidal ideation—a finding that suggests that these results may be applied to both young adult civilian (e.g., Assavedo & Anestis, 2016; Chu, Rogers, et al., 2016; Muehlenkamp & Gutierrez, 2007) and adult military and veteran populations. The present findings also highlight the specificity of the interpersonal theory variables as mediators since other notable suicide risk factors did not serve as significant explanatory mechanisms. Unexpectedly, and in contrast to the interpersonal theory's hypotheses, the mediating effect of perceived burdensomeness was not moderated by thwarted belongingness, and the mediating effect of thwarted belongingness was not moderated by perceived burdensomeness. Overall, our findings largely contribute to a mounting body of evidence indicating that the interpersonal theory may help explain the relationship between NSSI and suicide risk. Therefore, our results may have implications for research and clinical work among military service member and veteran populations.

First, the current findings indicate that NSSI serves to increase not only capability for suicide—likely by increasing familiarity with self-injury, pain, and death—but also thwarted belongingness and perceived burdensomeness. Moreover, our results indicated that the intersection of thwarted belongingness and perceived burdensomeness did not explain the relationship between NSSI and suicide attempt history among those with low levels of capability for suicide. This finding is in line with the interpersonal theory's conjectures that individuals who attempt near-lethal self-injurious behavior not only desire suicide but also possess the capability for suicide. This finding also suggests that among military service members and veterans, NSSI may be a distal risk factor for suicidal behavior. Specifically, NSSI may be explained by the simultaneous presence of the three interpersonal theory variables. As this is the first study to our knowledge to statistically examine the interpersonal theory variables as explanatory mechanisms between distal risk factors and suicidal behavior, it will be important for future studies to employ this approach across other populations to examine the roles of the interpersonal theory variables as proximal suicide risk correlates.

The connection between NSSI and capability for suicide has been examined regularly in the literature (e.g., Franklin et al., 2011). However, the associations between lifetime NSSI history and elevated thwarted belongingness and perceived burdensomeness are not well understood. Although the present study did not examine the mechanisms linking NSSI and interpersonal difficulties, several factors may explain these observed associations. For example, as mentioned previously, one function of NSSI is to obtain social reinforcement, and individuals engaging in NSSI may lack interpersonal effectiveness (Nock & Mendes, 2008; Nock & Prinstein, 2004). Given that individuals with a history of NSSI report limited social support networks (Heath et al., 2009), NSSI may be related to diminished social functioning and subsequent increases in feelings of isolation and thwarted belongingness. Additionally, research has indicated that individuals engaging in NSSI are fearful of burdening close others (Rosenrot, 2015) and experience shame regarding their behavior (Brown et al., 2009). Feelings of shame are also associated with an increased likelihood of concealing mental illness from others (MacDonald & Morley, 2001) and may ultimately contribute to feelings of perceived burdensomeness. *How* NSSI increases thwarted belongingness and perceived burdensomeness will be an important topic for future research.

Contrary to expectations, neither perceived burdensomeness nor thwarted belongingness emerged as a significant moderator. The mediating role of perceived burdensomeness was significant at high and low levels of thwarted belongingness. Similarly, the mediating role of thwarted belongingness was also significant at high and low levels of perceived burdensomeness. In contrast to the propositions of the interpersonal theory, this finding suggests that the interaction of thwarted belongingness and perceived burdensomeness does not play a significant explanatory role. Rather, that both interpersonal theory of suicide variables emerged as mediators suggests that they do not significantly influence one another and that both feelings comparably explain the relationship between lifetime NSSI and suicidal ideation (cf. parallel mediation; Hayes, 2012).

Interestingly, this finding is consistent with other studies that have similarly investigated the mediating roles of thwarted belongingness and perceived burdensomeness in conferring suicide risk. For example, in a recent study of the relationship between sleep problems and suicidal ideation in three military service member and veteran samples, Hom, Chu, et al. (2017) found that thwarted belongingness and perceived burdensomeness emerged as significant parallel mediators. However, moderated mediation analyses indicated that perceived burdensomeness did not moderate the mediating role of thwarted belongingness (the study did not examine whether thwarted belongingness moderated the mediating role of perceived burdensomeness; Hom, Hames, et al., 2017). Apart from their study and ours, no other studies of which we are aware have employed moderated mediation analyses to examine the association between the interpersonal theory of suicide variables and other distal risk factors.

Importantly, our pattern of findings remained significant even after accounting for demographic variables and robust suicide risk factors. As noted above, insomnia symptoms and hopelessness are both robustly associated with increased feelings of thwarted belongingness and suicidal risk across populations (Acosta et al., 2012; Chu et al., 2015; Chu, Hom, Rogers, Ringer, et al., 2016; Nadorff et al., 2011), including samples of service members (Caldwell, Knapik, & Lieberman, 2017; Ribeiro, Pease, et al., 2012). That our results remained significant even after controlling for insomnia and hopelessness highlights the robustness of the interpersonal theory variables as mediators. Furthermore, our results also remained significant after controlling for depressive symptoms and symptoms of depression were not a significant mediator. These results are notable given the robust relationship between depressive symptoms and both NSSI and suicide risk (e.g., Asarnow et al., 2011; Hamza et al., 2012). However, as discussed earlier, the inclu-

sion of depressive symptoms significantly diminished power to detect effects and we were unable to covary for depressive symptoms in our model evaluating the relationship between NSSI and suicide attempt history—these factors limit results that include depression as a covariate. Thus, further work using larger samples is needed to examine the role of depressive symptoms in NSSI and suicidal symptoms.

Finally, in exploring whether perceived burdensomeness may be more robustly related to suicide risk than thwarted belongingness, our findings indicated that neither variable interacted with capability for suicide to significantly explain the relationship between NSSI and suicide attempt history. This finding does not support the hypothesis that perceived burdensomeness is a more robust risk correlate than thwarted belongingness. Nevertheless, we did find that thwarted belongingness was no longer a significant individual mediator beyond depressive symptoms, whereas the mediating effect of perceived burdensomeness remained a significant mediator. This latter result may indicate support for perceived burdensomeness as a more prominent explanatory link between NSSI and suicide risk among military and veteran populations. These mixed findings are further complicated by recent studies finding that thwarted belongingness may be an important explanatory factor in the relationship between insomnia severity and suicidal ideation in undergraduate (Chu, Hom, Rogers, Stanley, et al., 2017; Chu, Hom, Rogers, Ringer, et al., 2016) and military (Hom, Chu, et al., 2017) samples. Other studies testing the interpersonal theory have found support for thwarted belongingness and perceived burdensomeness as interactive indicators of suicidal desire (e.g., Anestis et al., 2015). Thus, it will be important to examine the source of these inconsistent findings through continued research testing the interpersonal theory across varying samples.

Clinical Implications

Our findings also have implications for clinical practice. The significant association found between lifetime NSSI and current severity of suicidal ideation emphasizes the potential importance of identifying and treating military service members and veterans with a history of NSSI, as they appear to be at increased risk of suicidal behavior. As revealed by our study and consistent with prior work (Chu et al., 2015), thwarted belongingness and perceived burdensomeness, specifically, may be useful to assess and monitor as signals of risk. They may also be key treatment targets for service members with an NSSI history (see Joiner et al., 2009, for a guide). Fortunately, evidence-based interventions exist that may help to address feelings of thwarted belongingness, including behavioral activation (Martell et al., 2001), interpersonal psychotherapy (Klerman & Weissman, 1994), and the cognitive–behavioral analysis system of psychotherapy (McCullough, 2003). Several empirically supported interventions may also be useful in targeting misperceptions that one's death is worth more than one's life (cf. perceived burdensomeness), including cognitive therapy (Brown et al., 2005) and dialectical behavior therapy (Linehan, 1993). By therapeutically impacting these significant mediators, risk for suicidal thoughts may then be mitigated in this population—the less that individuals are thinking about suicide, the less likely they are to engage in potentially lethal self-harm behaviors.

Limitations and Future Directions

This study is not without its limitations. First, data were collected exclusively via self-report measures. Given that military service members may be reluctant to disclose thoughts of suicide (Anestis & Green, 2015), the use of implicit measures of suicidality (e.g., Nock et al., 2010) should be considered for similar future studies.[5] Second, as noted above, study data were aggregated across four independent investigations with distinct study designs, assessment methods, and sample populations, yielding a demographically and clinically heterogeneous study sample. Nonetheless, most samples were collected from the Southern U.S.; thus, our findings may not be broadly generalizable and require replication in representative military and veteran samples. Third, as noted previously, though we aimed to probe the temporal relationship between NSSI and subsequent suicidal ideation by examining lifetime NSSI as a predictor of past two weeks suicidal ideation, we were unable to account for suicidal ideation history (prior to the preceding two weeks) in our analyses. Therefore, detailed assessment of which construct temporally preceded the other will be important in enhancing our understanding of risk trajectories—and thus, intervention points—in this population (Bryan, Bryan, et al., 2015). Relatedly, our assessment of NSSI and suicide attempt history were limited to the single questions included in the MSRC's brief CDE assessment battery (Hom, Joiner Jr, & Bernert, 2016). Future studies may benefit from assessment of military members' onset, frequency, duration, and severity of NSSI because these factors may influence the degree of suicide risk (Nock et al., 2006). Finally, to fully test for mediation effects, additional assessment time points are required. This is particularly important given that the interpersonal theory specifically predicts that the intersection of the three interpersonal theory variables explains future suicidal behavior (Van Orden et al., 2010).

Despite a robust literature supporting the interpersonal theory of suicide and the association between NSSI and suicidal ideation and attempts, this investigation was the first to examine thwarted belongingness, perceived burdensomeness, and capability for suicide as explanatory links in this association. Although further investigation of these constructs using longitudinal study designs is needed, our results highlight important links between NSSI and suicide risk in service member and veteran populations and areas for further investigation.

[5] A recent study found that there is no significant association between participants' history of suicidal ideation and implicit association tests of suicide and death in a large military sample (Chiurliza et al., 2016). However, given that Chiurliza et al.'s (2016) study was limited by the low severity of suicidal symptoms and the specificity of the sample (i.e., Army recruiters), more research is needed to determine the utility of implicit measures of suicide risk for a broader military service member and veteran population.

References

Acosta, F. J., Vega, D., Torralba, L., Navarro, S., Ramallo-Fariña, Y., Fiuza, D., . . . Siris, S. G. (2012). Hopelessness and suicidal risk in bipolar disorder. A study in clinically nonsyndromal patients. *Comprehensive Psychiatry, 53,* 1103–1109. http://dx.doi.org/10.1016/j.comppsych.2012.03.013

Anestis, M. D., & Green, B. A. (2015). The impact of varying levels of confidentiality on disclosure of suicidal thoughts in a sample of United States National Guard personnel. *Journal of Clinical Psychology, 71,* 1023–1030. http://dx.doi.org/10.1002/jclp.22198

Asarnow, J. R., Porta, G., Spirito, A., Emslie, G., Clarke, G., Wagner, K. D., . . . Brent, D. A. (2011). Suicide attempts and nonsuicidal self-injury in the treatment of resistant depression in adolescents: Findings from the TORDIA study. *Journal of the American Academy of Child & Adolescent Psychiatry, 50,* 772–781. http://dx.doi.org/10.1016/j.jaac.2011.04.003

Assavedo, B. L., & Anestis, M. D. (2016). The relationship between non-suicidal self-injury and both perceived burdensomeness and thwarted belongingness. *Journal of Psychopathology and Behavioral Assessment, 38,* 251–257. http://dx.doi.org/10.1007/s10862-015-9508-8

Bastien, C. H., Vallières, A., & Morin, C. M. (2001). Validation of the Insomnia Severity Index as an outcome measure for insomnia research. *Sleep Medicine, 2,* 297–307.

Batterham, P. J., Calear, A. L., & Spijker, B. A. (2015). The specificity of the interpersonal-psychological theory of suicidal behavior for identifying suicidal ideation in an online sample. *Suicide and Life-threatening Behavior, 45,* 448–460.

Beck, A. T., Steer, R. A., & Brown, G. K. (1996). *Manual for Beck Depression Inventory-II*. San Antonio, TX: Psychological Corporation.

Beck, A. T., Weissman, A., Lester, D., & Trexler, L. (1974). The measurement of pessimism: The hopelessness scale. *Journal of Consulting and Clinical Psychology, 42,* 861–865.

Bender, T. W., Gordon, K. H., Bresin, K., & Joiner, T. E. (2011). Impulsivity and suicidality: The mediating role of painful and provocative experiences. *Journal of Affective Disorders, 129,* 301–307.

Brown, G. K., Ten Have, T., Henriques, G. R., Xie, S. X., Hollander, J. E., & Beck, A. T. (2005). Cognitive therapy for the prevention of suicide attempts: A randomized controlled trial. *Journal of the American Medical Association, 294,* 563–570. http://dx.doi.org/10.1001/jama.294.5.563

Brown, M. Z., Linehan, M. M., Comtois, K. A., Murray, A., & Chapman, A. L. (2009). Shame as a prospective predictor of self-inflicted injury in borderline personality disorder: A multi-modal analysis. *Behaviour Research and Therapy, 47,* 815–822. http://dx.doi.org/10.1016/j.brat.2009.06.008

Bryan, C., & Bryan, A. (2014). Nonsuicidal self-injury among a sample of United States military personnel and veterans enrolled in college classes. *Journal of Clinical Psychology, 70,* 874–885. http://dx.doi.org/10.1002/jclp.22075

Bryan, C. J., Bryan, A. O., May, A. M., & Klonsky, E. D. (2015). Trajectories of suicide ideation, nonsuicidal self-injury, and suicide attempts in a nonclinical sample of military personnel and veterans. *Suicide and Life-Threatening Behavior, 45,* 315–325. http://dx.doi.org/10.1111/sltb.12127

Bryan, C. J., Morrow, C. E., Anestis, M. D., & Joiner, T. E. (2010). A preliminary test of the interpersonal-psychological theory of suicidal behavior in a military sample. *Personality and Individual Differences, 48,* 347–350. http://dx.doi.org/10.1016/j.paid.2009.10.023

Bryan, C. J., Rudd, M. D., Wertenberger, E., Young-McCaughon, S., & Peterson, A. (2015). Nonsuicidal self-injury as a prospective predictor of suicide attempts in a clinical sample of military personnel. *Comprehensive Psychiatry, 59,* 1–7. http://dx.doi.org/10.1016/j.comppsych.2014.07.009

Caldwell, J. A., Knapik, J. J., & Lieberman, H. R. (2017). Trends and factors associated with insomnia and sleep apnea in all United States military service members from 2005 to 2014. *Journal of Sleep Research, 26,* 665–670. http://dx.doi.org/10.1111/jsr.12543

Chiurliza, B., Hagan, C. R., Rogers, M. L., Podlogar, M. C., Hom, M. A., Stanley, I. H., & Joiner, T. E.. (2016). Implicit measures of suicide risk in a military sample. *Assessment*. Advance online publication. http://dx.doi.org/10.1177/1073191116676363

Chu, C., Buchman-Schmitt, J. M., Hom, M. A., Stanley, I. H., & Joiner, T. E., Jr. (2016). A test of the interpersonal theory of suicide in a large sample of current firefighters. *Psychiatry Research, 240,* 26–33. http://dx.doi.org/10.1016/j.psychres.2016.03.041

Chu, C., Buchman-Schmitt, J. M., Stanley, I. H., Hom, M. A., Tucker, R., Hagan, C. R., . . . Joiner, T. E. (in press). The Interpersonal Theory of Suicide: A systematic review and meta-analysis of a decade of cross-national research. *Psychological Bulletin*.

Chu, C., Hom, M. A., Rogers, M. L., Ringer, F. B., Hames, J. L., Suh, S., & Joiner, T. E. (2016). Is insomnia lonely? Exploring thwarted belongingness as an explanatory link between insomnia and suicidal ideation in a sample of South Korean university students. *Journal of Clinical Sleep Medicine, 12,* 647–652. http://dx.doi.org/10.5664/jcsm.5784

Chu, C., Hom, M. A., Rogers, M. R., Stanley, I. H., Ringer, F. B., Podlogar, M. P., . . . Joiner, T. E. (2016). Insomnia and suicide-related behaviors: A multi-study investigation of thwarted belongingness as a distinct explanatory factor. *Journal of Affective Disorders, 208,* 153–162.

Chu, C., Klein, K. M., Buchman-Schmitt, J. M., Hom, M. A., Hagan, C. R., & Joiner, T. E. (2015). Routinized assessment of suicide risk in clinical practice: An empirically informed update. *Journal of Clinical Psychology, 71,* 1186–1200. http://dx.doi.org/10.1002/jclp.22210

Chu, C., Rogers, M. L., Gai, A., & Joiner, T. E. (in press). Role of thwarted belongingness and perceived burdensomeness in the relationship between violent daydreaming and suicidal ideation in two adult samples. *Journal of Aggression, Conflict and Peace Research*.

Chu, C., Rogers, M. L., & Joiner, T. E. (2016). Cross-sectional and temporal association between non-suicidal self-injury and suicidal ideation in young adults: The explanatory roles of thwarted belongingness and perceived burdensomeness. *Psychiatry Research, 246,* 573–580. http://dx.doi.org/10.1016/j.psychres.2016.07.061

Chu, C., Walker, K. L., Stanley, I. H., Hirsch, J. K., Greenberg, J. H., Rudd, M. D., & Joiner, T. E. (2017). Deficits in problem-solving ability and suicide-related behaviors: Evidence for the explanatory roles of thwarted belongingness and perceived burdensomeness in five samples. *Journal of Personality and Social Psychology*. Advance online publication. http://dx.doi.org/10.1037/pspp0000152

Claes, L., Muehlenkamp, J., Vandereycken, W., Hamelinck, L., Martens, H., & Claes, S. (2010). Comparison of non-suicidal self-injurious behavior and suicide attempts in patients admitted to a psychiatric crisis unit. *Personality and Individual Differences, 48,* 83–87. http://dx.doi.org/10.1016/j.paid.2009.09.001

Crosby, A. E., Ortega, L., & Melanson, C. (2011). *Self-directed violence surveillance: Uniform definitions and recommended data elements, version 1.0 (RPRT)*. Atlanta, GA: Centers for Disease Control and Prevention, National Center for Injury Prevention and Control.

Department of Veterans Affairs Office of Public and Intergovernmental Affairs. (2016). *VA conducts nation's largest analysis of veteran suicide*. Washington, DC: Author.

Forrest, L. N., Bodell, L. P., Witte, T. K., Goodwin, N., Bartlett, M. L., Siegfried, N., . . . Smith, A. R. (2016). Associations between eating disorder symptoms and suicidal ideation through thwarted belongingness and perceived burdensomeness among eating disorder patients. *Journal of Affective Disorders, 195,* 127–135. http://dx.doi.org/10.1016/j.jad.2016.02.017

Franklin, J. C., Hessel, E. T., & Prinstein, M. J. (2011). Clarifying the role of pain tolerance in suicidal capability. *Psychiatry Research, 189,* 362–367. http://dx.doi.org/10.1016/j.psychres.2011.08.001

Fritz, M. S., & Mackinnon, D. P. (2007). Required sample size to detect the mediated effect. *Psychological Science, 18,* 233–239. http://dx.doi.org/10.1111/j.1467-9280.2007.01882.x

Glenn, C. R., Lanzillo, E. C., Esposito, E. C., Santee, A. C., Nock, M. K., & Auerbach, R. P. (2017). Examining the course of suicidal and nonsuicidal self-injurious thoughts and behaviors in outpatient and inpatient adolescents. *Journal of Abnormal Child Psychology, 45,* 971–983. http://dx.doi.org/10.1007/s10802-016-0214-0

Guertin, T., Lloyd-Richardson, E., Spirito, A., Donaldson, D., & Boergers, J. (2001). Self-mutilative behavior in adolescents who attempt suicide by overdose. *Journal of the American Academy of Child & Adolescent Psychiatry, 40,* 1062–1069. http://dx.doi.org/10.1097/00004583-200109000-00015

Gutierrez, P. M., & Joiner, T. E. (2016). *The military suicide research consortium common data elements: Psychometric support, clinical, and research utility*. Presented at the Military Health System Research Symposium, Kissimmee, FL.

Hagan, C. R., Podlogar, M. C., Chu, C., & Joiner, T. E. (2015). Testing the interpersonal theory of suicide: The moderating role of hopelessness. *International Journal of Cognitive Therapy, 8,* 99–113. http://dx.doi.org/10.1521/ijct.2015.8.2.99

Hamza, C. A., Stewart, S. L., & Willoughby, T. (2012). Examining the link between nonsuicidal self-injury and suicidal behavior: A review of the literature and an integrated model. *Clinical Psychology Review, 32,* 482–495. http://dx.doi.org/10.1016/j.cpr.2012.05.003

Hayes, A. F. (2012). *PROCESS: A versatile computational tool for observed variable mediation, moderation, and conditional process modeling*. Retrieved from http://www.afhayes.com/public/process2012.pdf

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York, NY: Guilford Press.

Heath, N. L., Ross, S., Toste, J. R., Charlebois, A., & Nedecheva, T. (2009). Retrospective analysis of social factors and nonsuicidal self-injury among young adults. *Canadian Journal of Behavioural Science/Revue Canadienne des Sciences du Comportement, 41,* 180–186.

Hom, M. A., Chu, C., Schneider, M. E., Lim, I. C., Hirsch, J. K., Gutierrez, P. M., & Joiner, T. E. (2017). Thwarted belongingness as an explanatory link between insomnia symptoms and suicidal ideation: Findings from three samples of military service members and veterans. *Journal of Affective Disorders, 209,* 114–123. http://dx.doi.org/10.1016/j.jad.2016.11.032

Hom, M. A., Hames, J. L., Bodell, L. P., Buchman-Schmitt, J. M., Chu, C., Rogers, M. L., . . . Joiner, T. E. (2017). Investigating insomnia as a cross-sectional and longitudinal predictor of loneliness: Findings from six samples. *Psychiatry Research, 253,* 116–128. http://dx.doi.org/10.1016/j.psychres.2017.03.046

Hom, M. A., Joiner Jr, T. E., & Bernert, R. A. (2016). Limitations of a single-item assessment of suicide attempt history: Implications for standardized suicide risk assessment. *Psychological Assessment, 28,* 1026–1030.

Hooley, J. M., Ho, D. T., Slater, J., & Lockshin, A. (2010). Pain perception and nonsuicidal self-injury: A laboratory investigation. *Personality Disorders, 1,* 170–179. http://dx.doi.org/10.1037/a0020106

Joiner, T. E. (2005). *Why people die by suicide*. Cambridge, MA: Harvard University Press.

Joiner, T. E., Jr., Pfaff, J. J., & Acres, J. G. (2002). A brief screening tool for suicidal symptoms in adolescents and young adults in general health settings: Reliability and validity data from the Australian National General Practice Youth Suicide Prevention Project. *Behaviour Research and Therapy, 40,* 471–481. http://dx.doi.org/10.1016/S0005-7967(01)00017-1

Joiner, T. E., Jr., Van Orden, K. A., Witte, T. K., & Rudd, M. D. (2009). *The interpersonal theory of suicide: Guidance for working with suicidal clients*. Washington, DC: American Psychological Association. http://dx.doi.org/10.1037/11869-000

Joiner, T. E., Ribeiro, J. D., & Silva, C. (2012). Nonsuicidal self-injury, suicidal behavior, and their co-occurrence as viewed through the lens of the interpersonal theory of suicide. *Current Directions in Psychological Science, 21,* 342–347. http://dx.doi.org/10.1177/0963721412454873

Klerman, G. L., & Weissman, M. M. (1994). *Interpersonal psychotherapy of depression: A brief, focused, specific strategy*. Lanham, MD: Jason Aronson, Inc.

Klonsky, E. D. (2007). The functions of deliberate self-injury: A review of the evidence. *Clinical Psychology Review, 27,* 226–239. http://dx.doi.org/10.1016/j.cpr.2006.08.002

Klonsky, E. D. (2011). Non-suicidal self-injury in United States adults: Prevalence, sociodemographics, topography and functions. *Psychological Medicine, 41,* 1981–1986. http://dx.doi.org/10.1017/S0033291710002497

Klonsky, E. D., May, A. M., & Glenn, C. R. (2013). The relationship between nonsuicidal self-injury and attempted suicide: Converging evidence from four samples. *Journal of Abnormal Psychology, 122,* 231–237. http://dx.doi.org/10.1037/a0030278

Linehan, M. M. (1993). *Cognitive-behavioral treatment of borderline personality disorder*. New York, NY: Guilford Press.

Lloyd, E., Kelley, M. L., & Hope, T. (1997). *Self-mutilation in a community sample of adolescents: Descriptive characteristics and provisional prevalence rates*. Presented at the Annual meeting of the Society for Behavioral Medicine, New Orleans, LA.

Ma, J., Batterham, P. J., Calear, A. L., & Han, J. (2016). A systematic review of the predictions of the Interpersonal-Psychological Theory of Suicidal Behavior. *Clinical Psychology Review, 46,* 34–45. http://dx.doi.org/10.1016/j.cpr.2016.04.008

MacDonald, J., & Morley, I. (2001). Shame and non-disclosure: A study of the emotional isolation of people referred for psychotherapy. *British Journal of Medical Psychology, 74,* 1–21. http://dx.doi.org/10.1348/000711201160731

Martell, C. R., Addis, M. E., & Jacobsen, N. S. (2001). *Depression in context: Strategies for guided action.* New York, NY: W. W. Norton & Co.

McCullough, J. P., Jr. (2003). Treatment for chronic depression using Cognitive Behavioral Analysis System of Psychotherapy (CBASP). *Journal of Clinical Psychology, 59,* 833–846. http://dx.doi.org/10.1002/jclp.10176

McMillan, D., Gilbody, S., Beresford, E., & Neilly, L. (2007). Can we predict suicide and non-fatal self-harm with the Beck Hopelessness Scale? A meta-analysis. *Psychological Medicine, 37,* 769–778. http://dx.doi.org/10.1017/S0033291706009664

Metalsky, G. I., & Joiner, T. E., Jr. (1997). The hopelessness depression symptom questionnaire. *Cognitive Therapy and Research, 21,* 359–384. http://dx.doi.org/10.1023/A:1021882717784

Military OneSource. (2015). *2015 Demographics: Profile of the military community*. Retrieved from http://download.militaryonesource.mil/12038/MOS/Reports/2015-Demographics-Report.pdf

Muehlenkamp, J. J., Claes, L., Havertape, L., & Plener, P. L. (2012). International prevalence of adolescent non-suicidal self-injury and deliberate self-harm. *Child and Adolescent Psychiatry and Mental Health, 6,* 10. http://dx.doi.org/10.1186/1753-2000-6-10

Muehlenkamp, J. J., & Gutierrez, P. M. (2007). Risk for suicide attempts among adolescents who engage in non-suicidal self-injury. *Archives of Suicide Research, 11,* 69–82. http://dx.doi.org/10.1080/13811110600992902

Muehlenkamp, J. J., & Kerr, P. L. (2010). Untangling a complex web: How non-suicidal self-injury and suicide attempts differ. *Prevention Researcher, 17,* 8–11.

Nadorff, M. R., Nazem, S., & Fiske, A. (2011). Insomnia symptoms, nightmares, and suicidal ideation in a college student sample. *Sleep, 34,* 93–98. http://dx.doi.org/10.1093/sleep/34.1.93

Nock, M. K. (2009). Why do people hurt themselves? New insights into the nature and functions of self-injury. *Current Directions in Psychological Science, 18,* 78–83. http://dx.doi.org/10.1111/j.1467-8721.2009.01613.x

Nock, M. K., Holmberg, E. B., Photos, V. I., & Michel, B. D. (2007). Self-Injurious Thoughts and Behaviors Interview: Development, reliability, and validity in an adolescent sample. *Psychological Assessment, 19,* 309–317. http://dx.doi.org/10.1037/1040-3590.19.3.309

Nock, M. K., Joiner, T. E., Jr., Gordon, K. H., Lloyd-Richardson, E., & Prinstein, M. J. (2006). Non-suicidal self-injury among adolescents:

Diagnostic correlates and relation to suicide attempts. *Psychiatry Research, 144,* 65–72. http://dx.doi.org/10.1016/j.psychres.2006.05.010

Nock, M. K., & Kessler, R. C. (2006). Prevalence of and risk factors for suicide attempts versus suicide gestures: Analysis of the National Comorbidity Survey. *Journal of Abnormal Psychology, 115,* 616–623. http://dx.doi.org/10.1037/0021-843X.115.3.616

Nock, M. K., & Mendes, W. B. (2008). Physiological arousal, distress tolerance, and social problem-solving deficits among adolescent self-injurers. *Journal of Consulting and Clinical Psychology, 76,* 28–38. http://dx.doi.org/10.1037/0022-006X.76.1.28

Nock, M. K., Park, J. M., Finn, C. T., Deliberto, T. L., Dour, H. J., & Banaji, M. R. (2010). Measuring the suicidal mind: Implicit cognition predicts suicidal behavior. *Psychological Science, 21,* 511–517. http://dx.doi.org/10.1177/0956797610364762

Nock, M. K., & Prinstein, M. J. (2004). A functional approach to the assessment of self-mutilative behavior. *Journal of Consulting and Clinical Psychology, 72,* 885–890.

Nock, M. K., & Prinstein, M. J. (2005). Contextual features and behavioral functions of self-mutilation among adolescents. *Journal of Abnormal Psychology, 114,* 140–146.

Peterson, A. L., Goodie, J. L., Satterfield, W. A., & Brim, W. L. (2008). Sleep disturbance during military deployment. *Military Medicine, 173,* 230–235. http://dx.doi.org/10.7205/MILMED.173.3.230

Pigeon, W. R., Pinquart, M., & Conner, K. (2012). Meta-analysis of sleep disturbance and suicidal thoughts and behaviors. *The Journal of Clinical Psychiatry, 73,* e1160–e1167. http://dx.doi.org/10.4088/JCP.11r07586

Prinstein, M. J. (2008). Introduction to the special section on suicide and nonsuicidal self-injury: A review of unique challenges and important directions for self-injury science. *Journal of Consulting and Clinical Psychology, 76,* 1–8.

Ramchand, R., Acosta, J., Burns, R. M., Jaycox, L. H., & Pernin, C. G. (2011). *The war within: Preventing suicide in the U.S. military*. Santa Monica, CA: RAND Corporation.

Ross, S., & Heath, N. (2002). A study of the frequency of self-mutilation in a community sample of adolescents. *Journal of Youth and Adolescence, 31,* 67–77.

Ribeiro, J. D., Braithwaite, S. R., Pfaff, J. J., & Joiner, T. E. (2012). Examining a brief suicide screening tool in older adults engaging in risky alcohol use. *Suicide and Life-Threatening Behavior, 42,* 405–415. http://dx.doi.org/10.1111/j.1943-278X.2012.00099.x

Ribeiro, J. D., Pease, J. L., Gutierrez, P. M., Silva, C., Bernert, R. A., Rudd, M. D., & Joiner, T. E., Jr. (2012). Sleep problems outperform depression and hopelessness as cross-sectional and longitudinal predictors of suicidal ideation and behavior in young adults in the military. *Journal of Affective Disorders, 136,* 743–750. http://dx.doi.org/10.1016/j.jad.2011.09.049

Ringer, F. B., Soberay, K., Rogers, M. L., Hagan, C. R., Chu, C., Schneider, M., . . . Joiner, T. E. (in press). Initial validation of brief measures of suicide risk factors: Common Data Elements used by the Military Suicide Research Consortium. *Psychological Assessment*.

Rosenrot, S. (2015). *Talking about non-suicidal self-injury: The identification of barriers, correlates, and responses to NSSI disclosure* (Doctoral dissertation). The University of Guelph, Guelph, Ontario, Canada.

Schmahl, C., Greffrath, W., Baumgärtner, U., Schlereth, T., Magerl, W., Philipsen, A., . . . Treede, R. D. (2004). Differential nociceptive deficits in patients with borderline personality disorder and self-injurious behavior: Laser-evoked potentials, spatial discrimination of noxious stimuli, and pain ratings. *Pain, 110,* 470–479. http://dx.doi.org/10.1016/j.pain.2004.04.035

Smith, A. R., Ribeiro, J. D., Mikolajewski, A., Taylor, J., Joiner, T. E., & Iacono, W. G. (2012). An examination of environmental and genetic contributions to the determinants of suicidal behavior among male twins. *Psychiatry Research, 197,* 60–65. http://dx.doi.org/10.1016/j.psychres.2012.01.010

Smith, P. N., Cukrowicz, K. C., Poindexter, E. K., Hobson, V., & Cohen, L. M. (2010). The acquired capability for suicide: A comparison of suicide attempters, suicide ideators, and non-suicidal controls. *Depression and Anxiety, 27,* 871–877. http://dx.doi.org/10.1002/da.20701

Van Orden, K. A., Cukrowicz, K. C., Witte, T. K., & Joiner, T. E., Jr. (2012). Thwarted belongingness and perceived burdensomeness: Construct validity and psychometric properties of the Interpersonal Needs Questionnaire. *Psychological Assessment, 24,* 197–215. http://dx.doi.org/10.1037/a0025358

Van Orden, K. A., Witte, T. K., Cukrowicz, K. C., Braithwaite, S. R., Selby, E. A., & Joiner, T. E., Jr. (2010). The interpersonal theory of suicide. *Psychological Review, 117,* 575–600. http://dx.doi.org/10.1037/a0018697

Van Orden, K. A., Witte, T. K., Gordon, K. H., Bender, T. W., & Joiner Jr, T. E. (2008). Suicidal desire and the capability for suicide: Tests of the interpersonal-psychological theory of suicidal behavior among adults. *Journal of Consulting and Clinical Psychology, 76,* 72–83.

Van Orden, K. A., Witte, T. K., James, L. M., Castro, Y., Gordon, K. H., Braithwaite, S. R., . . . Joiner, T. E., Jr. (2008). Suicidal ideation in college students varies across semesters: The mediating role of belongingness. *Suicide and Life-Threatening Behavior, 38,* 427–435. http://dx.doi.org/10.1521/suli.2008.38.4.427

Victor, S. E., Styer, D., & Washburn, J. J. (2015). Characteristics of nonsuicidal self-injury associated with suicidal ideation: Evidence from a clinical sample of youth. *Child and Adolescent Psychiatry and Mental Health, 9,* 20. http://dx.doi.org/10.1186/s13034-015-0053-8

Villatte, J. L., O'Connor, S. S., Leitner, R., Kerbrat, A. H., Johnson, L. L., & Gutierrez, P. M. (2015). Suicide attempt characteristics among veterans and active-duty service members receiving mental health services: A pooled data analysis. *Military Behavioral Health, 3,* 316–327. http://dx.doi.org/10.1080/21635781.2015.1093981

Whitlock, J., Eells, G., Cummings, N., & Purington, A. (2009). Nonsuicidal self-injury in college populations: Mental health provider assessment of prevalence and need. *Journal of College Student Psychotherapy, 23,* 172–183. http://dx.doi.org/10.1080/87568220902794366

Widaman, K. F. (2006). III. Missing data: What to do with or without them. *Monographs of the Society for Research in Child Development, 71,* 42–64.

Wilcox, H. C., Arria, A. M., Caldeira, K. M., Vincent, K. B., Pinchevsky, G. M., & O'Grady, K. E. (2012). Longitudinal predictors of past-year non-suicidal self-injury and motives among college students. *Psychological Medicine, 42,* 717–726.

Willoughby, T., Heffer, T., & Hamza, C. A. (2015). The link between nonsuicidal self-injury and acquired capability for suicide: A longitudinal study. *Journal of Abnormal Psychology, 124,* 1110–1115. http://dx.doi.org/10.1037/abn0000104

Received February 2, 2017
Revision received September 12, 2017
Accepted September 14, 2017 ■