**Intolerance of Uncertainty Moderates the Association between Potentially Moral Injury Events, Suicide Ideation, and Behavior among Combat Veterans**

**Abstract**

**Background and Objectives:** Exposure to potentially morally injurious events (PMIEs) among combat veterans has been acknowledged as significant stressful combat events that may lead to mental health problems, such as self-injurious thoughts and behavior (SITB). However, only a few studies have examined risk and protective factors that explain the conditions in which PMIEs may contribute to the development and maintenance of SITB. In the current study, we aimed to examine the relationship between PMIEs and SITB among combat veterans, and to explore the moderating roles of intolerance of uncertainty in this relationship.

**Method**: A volunteer sample of 191 Israeli combat veterans with a mean age of 25.39 (*SD* = 2.37) were recruited during 2017. Participants completed validated self-report questionnaires in a cross-sectional design study.

**Results**: Two separate measures of PMIEs- the 'MIES' perceived perpetration by oneself and others and the 'MIQ'-'causes'- were positively associated with SITB. Moreover, above and beyond the contribution of reserve duty, posttraumatic stress symptoms and depressive symptoms, the 'MIQ'-'causes' significantly predicted SITB. Importantly, under low and average levels of inhibitory intolerance of uncertainty, significant positive effects were revealed for the MIQ-'causes' on SITB (*R²*=34.8%).

**Conclusions**: Veterans exposed to PMIEs are more prone to SITB even years after their release from military service. However, supporting veterans' intolerance of uncertainty might temper the link between experiences of PMIEs and SITB.

**Key words:** Moral injury; suicide, intolerance of uncertainty, veterans, war.

**Introduction**

With more than twenty million attempted suicides around the globe and close to one million people who die by suicide every year (WHO, 2014), suicidality is considered to be a notable public health concern (Nock, Borges, & Ono, 2012). Over the last decade, military service members, especially combat veterans, have become a major at-risk group for suicide, with rates increasing steadily and almost doubling since 2005 (Blais, Monteith, & Kugler, 2018; Kang et al., 2015). For example, O'Toole, Orreal-Scarborough, Johnston, Catts, and Outram (2015) found that among Australian Vietnam veterans the prevalence of lifetime suicidal ideation was 24%, with a relative risk of suicidal ideation being 7.9 times higher than the general population. In light of its significance and scope, it seems that better understanding the factors associated with military-related suicidality phenomena is of critical importance.

Several conditions have already been recognized as major risk factors for suicide ideation and suicide attempts among veterans in the post-recruitment period, including diagnoses of depression, posttraumatic stress disorder (PTSD), substance use disorders, personal traits (e.g., impulsivity), and environment variables, such as imitation (O’Connor & Nock, 2014; Snir, Levi-Belz & Solomon, 2017). Specifically, a considerable body of research suggests that previous traumas in general, and specifically war-related trauma, are associated with increased risk of suicidal behaviors among veterans (Kemp & Bossarte, 2013). However, while these elements may help detect some veterans engaged in self-injurious thoughts and behaviors (SITB), a much more thorough examination of the combat-related stressors and their relationship with SITB is needed. In the current study we address morally injurious experiences(or transgressive acts) as a unique form of potentially traumatic experiences, distinct from the fear-based traumas, which might be related to SITB.

Over the last decade there is a growing interest in the concept of *moral injury* and the deleterious effects of exposure to PMIEs on mental health (Farnsworth, Drescher, Evans, & Walser, 2017; Wisco et al., 2017). Moral injury (MI) experiences have been defined as "the lasting psychological, biological, spiritual, behavioral, and social impact of perpetrating, failing to prevent, or bearing witness to acts that transgress deeply held moral beliefs and expectations" (Litz et al., 2009, p. 697). It is agreed that two measures of PMIEs- the Moral Injury Events Scale (MIES; Nash et al., 2013), and the Moral Injury Questionnaire-Military version (MIQ-M; Currier, Holland, Drescher, & Foy, 2015), assess committed or witnessed transgressive acts by oneself or by trusted individuals and perceived betrayal by others. However, there is still debate regarding the proper way to define and assess PMIEs, and criticism has arisen regarding the assessment of both causes and effects on the MIQ–M (Frankfurt & Frazier, 2016). PMIEs may cause significant moral dissonance, which if left unresolved could lead to the development of intrapersonal (e.g., guilt, shame, demoralization, self-handicapping) and interpersonal problems, as well as psychopathologies (Jordan, Eisen, Bolton, Nash, & Litz, 2017).

To date, the literature shows that PMIEs tendto vary according to war theaters, branches of military service, and the specific transgressive acts assessed (Frankfurt & Frazier, 2016). For example, a recent study found that among a population-based sample of U.S. veterans, a total of 10.8% of combat veterans reported personal transgressions, 25.5% endorsed transgressions by others, and 25.5% endorsed betrayal (Wisco et al., 2017). Another recent report among active duty Marines deployed to Afghanistan revealed that 24.1% endorsed transgressions by self and 28.4% endorsed betrayal (Jordan et al., 2017). One study conducted among Israeli veterans, who had served in the West Bank and Gaza and were exposed to the civilian population, reported high exposure to civilian-related violent incidents (34.1% of male veterans and 16.9% of female veterans (Bleich, Gelkopf, Berger, & Solomon, 2008).

The moral injury conceptual model (Litz et al., 2009) proposed that PMIEs might severely shake a veteran's moral code and the basic expectations of what's right and wrong. Nevertheless, veterans must be aware of the discrepancy between their morals and the actual moral violation, causing dissonance and inner conflict. During the PMIE or in the subsequent time period, a small but significant portion of veterans might attribute their moral violation to a global, internal and stable personality deficit that might cause experiences of trauma-related guilt and shame and behavioral attempts to withdraw and avoid these experiences and reminders. The outcome of this process is represented by various possible psycho-social sequelae. Among these are posttraumatic stress symptoms (PTSS) as well as other collateral effects such as self-injury, demoralization, self-handicapping, and even life-threatening behaviors, such as SITB.

Only recently has the link between PMIEs and SITB among veterans been systematically examined, mainly among US veterans. First reports documented that the killing of other combatants was found to increase suicidality among veterans (Maguen et al., 2012). Two studies among[ ] by Currier, Holland, Jones, & Sheu (2013) and Currier, Holland, and Malott (2015) found that PMIEs were both directly and indirectly (through PTSS and meaning-making processes, respectively) associated with suicide risk. Recently, one study among [ ] found an indirect effect of potentially transgressive acts through guilt to suicidality (Frankfurt, Frazier, & Engdahl, 2017). In the same vein, another study among help-seeking veterans found that involvement in wartime atrocities was directly and indirectly related (through combat-related guilt and PTSD severity) to increased suicidal ideation (Dennis et al., 2017). Another nationally representative survey found that MIES-transgressions by self were significantly associated with current suicidal ideation, and greater MIES-betrayal was associated with higher odds of post deployment suicide attempts (Wisco et al., 2017).

While acknowledging the contribution of these recent studies to the understanding of suicidality in morally-injured veterans, their results should be treated with caution. Some of these studies (e.g., Frankurt et al., 2017) relied on one item for the assessment of suicidal ideation, and some relied on non-specific measures for PMIEs (e.g., Dennis et al., 2017) or measures that combine PMIEs-'causes' and 'effects '(MIQ-M; e.g., Currier et al., 2017). To the best of our knowledge, studies have yet to examine the wide range of PMIEs and their relationship with SITB among non-U.S. veterans as well as in the context of non-war military experiences. Moreover, not all individuals who experience PMIEs report suicidal behavior, indicating the presence of potential risk or protective factors that might buffer this deleterious relationship. Still, the moderators of the relationship between PMIEs and SITB among veterans have not been explored. In the current study, we undertook the examination of the direct contribution of PMIEs on SITB among Israeli veterans who had been exposed to traditional combat experiences as well as to military missions in close proximity to civilians at varied levels of conflict. We sought to better understand the conditions in which SITB following transgressive acts is aggravated, by examining the theoretical and clinically-relevant concept of intolerance of uncertainty, above and beyond the contribution of other known risk factors of SITB (PTSS and depressive symptoms).

*Intolerance of uncertainty* (IU) represents a dispositional personality-cognitive structure of "incapacity to endure the aversive response triggered by the perceived absence of salient, key, or sufficient information, and sustained by the associated perception of uncertainty" (Carelton, 2016). Moreover, individuals high in IU find uncertainty significantly aversive, upsetting, and undesirable, therefore preferring a known negative outcome to an uncertain one (Dugas, Buhr, & Ladouceur, 2004). IU is usually represented by two dimensions: *Prospective IU* is a cognitive perception of threat relating to uncertainty about the future (e.g., when a person is excessively concerned regarding elements of order and organization in order to avoid future disasters). *Inhibitory IU* represents a range of behavioral symptoms indicating a possible result of uncertainty (e.g., when a person is unable to act effectively or to function properly due to uncertainty).

In recent years, the literature shows IU to be associated with a wide range of indices of poor mental health, mostly in relation to anxiety disorders. Indeed, a number of studies have linked IU to anxiety disorders such as generalized anxiety disorder (e.g., Paulus, Talkovsky, Heggeness, & Norton, 2015) and PTSD among trauma-exposed individuals (Oglesby et al., 2017). Several studies also found IU to be positively associated with unipolar depression (e.g., Carleton et al., 2012). The few studies regarding the direct link between IU and suicidality provide mixed results. While one study among adults with obsessive-compulsive disorder didn't find an association between these constructs (Storch, Kay, Wu, Nadeau, & Riemann, 2017), another study found IU to predict suicidal ideation among an undergraduate population (Ciarrochi, Said & Deane, 2005). To note, a recent study found that greater IU was associated with higher odds of being classified in a class of high internalizing disorders and high externalizing disorders, among adult patients who were hospitalized due to a recent suicide attempt (Ginley & Bagge, 2017).

The diathesis-stress model (e.g., Burns & Machin, 2013) is one way to view how personality risk factors such as IU may moderate the effect of exposure to PMIEs on the development and maintenance of SITB following military service. The integrative MI model proposed by Litz et al. (2009) suggests that if the PMIEs-related internal moral conflict gives rise to stable, internal, and global negative attributions about the causes and meaning of a transgressive act, then these attributions might lead to trauma-related guilt and shame and a fear of being judged. It is suggested that veterans with high IU would find the reasoning of their acts as problematic and end up ruminating about the uncertainty (Dugas et al., 1998). They are also more likely to interpret ambiguous situations as threatening (Dugas et al. 2005), which are known to be associated with negative problem orientation (Bottesi et al., 2016). Thus, it can be assumed that given the relative ambiguity and uncertainty inherent in the PMIEs (Currier et al., 2015), in the generally stressful atmosphere of combat service (Shelef, Levi-Belz, & Fruchter, 2014), veterans with high levels of IU may experience more continued distress and a tendency for depressive attributes and symptoms that are recognized facilitators of SITB (Zalsman et al., 2016). To our knowledge, some studies have found IU to moderate the link between stressful events and worry (e.g., Zlomke, K. R., & Jeter, K. M. (2014), but not the link between anxiety sensitivity and panic disorder (Carelton et al., 2014). There are also mixed findings regarding the ability of IU to moderate the link between stressful life events and suicidality among undergrads (Ciarrochi, Said & Deane, 2005).

To summarize, the current body of literature on moral injury is limited by a dearth of empirical data regarding the links between PMIEs and SITB among veterans. Importantly, only a few studies examined potential risk and resilience factors of the MI process, such as intolerance of uncertainty. A focus on these factors, that either directly reduce the risk following PMIEs or moderate these effects among veterans, is undoubtedly an important and increasingly urgent priority.

Based on the literature review, we hypothesize that: (1) Veterans with more severe SITB levels will report significantly higher levels of PMIEs, PTSS and depressive symptoms, than their less severe SITB cohorts; (2) PMIEs and intolerance of uncertainty will be positively associated with SITB, PTSS, and depressive symptoms; (3) Intolerance of uncertainty will moderate the relations between PMIEs and SITB, above and beyond socio-demographic, combat exposure, PTSS and depressive symptoms.

**Method**

**Participants**

Participants included 191 Israeli combat veterans in the IDF. For inclusion in this study, participants needed to be at least 20 years of age who had served in combat troops and were released from military service within the previous 10 years. Exclusion criteria from the study were age under 18, army service in non-combat units, and release from army service more than 10 years ago. Of all participants who gave their consent (*n* = 220), 22 (10%) participants did not fill out questionnaires and 7 (3.1%) participants were excluded because they did not meet the inclusion criteria. In sum, 191 veterans (86.8%) participated in the study (veterans' socio-demographic and army service characteristics are presented in Table 1).

 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Insert Table 1 here\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

**Procedure**

Potential participants were recruited between March and July 2017 in several ways: from among volunteers who were active participants in combat veterans' Websites and communities (online specialized forums in which veterans can discuss issues that are related to combat experiences and adaptation); students from two academic centers located in central Israel who participated in exchange for partial fulfillment of a research participation requirement; and volunteers who responded positively to an advertisement for enrollment in the study. The investigators' research assistants posted a message briefly explaining that they were conducting a research project focusing on 'military service experiences' and asked for possible volunteers. Those who agreed to participate received an explanation of the study’s aims and a link to the related online survey through an online data gathering website. Participants were required to affirm willingness to participate, and by their active participation provided informed consent. Following completion, participants were sent a letter of thanks and were compensated with a voucher for coffee and pastry (approximate value of US $5). Approval for this study was given by the 'Ariel University' and 'Ruppin Academic Center' internal review boards.

**Measurements**

**Combat Experiences Scale** (CES; Hoge et al., 2004). Combat experiences were examined with 18 items of a range of conventional modern combat-related experiences to which an individual may have been exposed (e.g., being attacked or ambushed, shooting or directing fire at the enemy, handling or uncovering dead bodies or body parts, etc.). Respondents were asked to indicate which events they had experienced at any time during a deployment, resulting in a total number of combat experiences ranging from 0 to 18. Cronbach's α on CES items was 0.84.

**The Moral Injury Questionnaire- Military Version** (MIQ-M; Currier et al., 2013). The MIQ-M includes 19 items that cover a broad range of possible combat-related activities/circumstances that might violate one’s moral beliefs/values. Participants were instructed to endorse the frequency that they had experienced each of the PMIEs in the context of their army service on a 4-point scale ranging from 1 (*never*) to 4 (*often*). Usually, the cumulative effects of PMIEs are represented by the sum of items. However, this sum index might represent a combination of items assessing 'causes' (14 items) and 'effects' (6 items). As it might confound exposure to transgressive acts with the effects of exposure (Frankfurt & Fraizer, 2016), we decided to use only the 14 items of PMIEs as 'causes'. Currier et al. (2015) recently provided preliminary evidence for the validity (factorial, convergent, and incremental) and utility of the instrument for additional research and clinical work with military populations. Internal consistency was good for the subscale of causes (α=.83) and moderate for effects (α=.64).

**Moral Injury Event Scale** (MIES; Nash et al., 2013) is a self-report scale comprised of nine statements tapping exposure to perceived transgressions committed by the respondent and/or others, and perceived betrayals by other military and nonmilitary individuals (e.g., "I acted in ways that violated my own moral code or values"). The scale ranged between 1 (*strongly disagree*) and 6 (*strongly agree*). The sum of scores for each subscale has been used. Nash et al. (2013) found that a two-factor solution best fits the data, with six items loading on a "perpetration" (both by oneself or/and by others) and the other three items comprising the "betrayal" factor. Bryan and colleagues (2016) found in two U.S. military samples that the three-factor solution (transgressions by oneself, witnessed by others, and betrayal) fits the data best. The MIES has demonstrated good preliminary factor structure and reliability, and demonstrates only small to moderate correlations with other indicators of psychopathology, indicating that it is a relatively distinct construct. Good internal consistency characterized the subscales of Self (α =.90), Others (α =.85), and Betrayal (α=.83).

**Posttraumatic Stress Disorder Checklist** (PCL-5; Weathers et al., 2013)**.** Participants’ PTSS were assessed with the PCL-5 that taps the 20 symptoms listed in the *DSM*–*5* (APA, 2013). Participants were asked to rate how often they suffered from each symptom in the previous month on a scale ranging from 0 (*not at all*) to 4 (*extremely*). Specifically, participants were asked about their reactions to any very stressful experiences in their military service (e.g., "I have recurrent dreams and nightmares about stressful experience from my service"). PTSS was operationalized both as a continuous variable and as a total symptoms severity score (range 0-80) by summing the scores for each of the 20 items, and as a dichotomized DSM self-report probable self-rated 'diagnosis'. Participants were identified as having PTSS if they reported in excess of the PCL-5 cut-off point of 38 (Weathers et al., 2013). Preliminary results show impressive psychometric properties for the PCL-5. For example, its convergent validity was proven when the PCL-5 was positively associated with other PTSD measures such as the PDS or DAPS (Blevins, Weathers, Davis, Witte, & Domino, 2015). The PCL-5 reliability in this study was Cronbach’s α= .95.

**Patient Health Questionnaire Depression Scale** (PHQ-8; Kroenke et al., 2009). The PHQ-8 is an 8-item depression screen used to assess depressive symptoms. Participants are asked, “Over the last 2 weeks, how often have you been bothered by any of the following problems?” They then rate each of these symptoms using a 4-point scale, ranging from: 0= “*not at all*,” 1=“*several days*,” 2=“*more than half the days*,” or 3=“*nearly every day*”. The sum of scores for the scale has been used. The PHQ is known to be associated with increased medical visitation, physical disability, risk of psychiatric comorbidity, and overall syndromic severity. The PHQ-8 reliability in this study was Cronbach’s α 0.88.

**Intolerance of Uncertainty (IUS-12)** (Carleton, Norton & Asmundson, 2007). The IUS-12 is a 12-item short-form of the original 27-item Intolerance of Uncertainty Scale (Freeston, Rheaume, Letarte, Dugas & Ladouceur, 1994). This scale measures reactions to uncertainty, ambiguous situations, and the unknown future. The IUS-12 has two factors: prospective anxiety (e.g., "Unforeseen events upset me greatly") and inhibitory anxiety (e.g., "Uncertainty keeps me from living a full life"). Items are scored on a 5-point Likert scale ranging from 1 ("*not at all characteristic of me*") to 5 ("*entirely characteristic of me*"). IUS-12 scores are based on a sum of items, as the total score evaluates general intolerance of uncertainty. The IUS-12 has proven test-retest reliability within five weeks, convergent validity (Buhr & Dugas, 2002), and almost complete correlation with the IUS full questionnaire (Fergus & Bardeen, 2013). Cronbach’s alpha for the IUS-12 was .86 in this study.

**Sociodemographic measurements**. were assessed using demographic characteristics of country of origin, location of residence in Israel, family status, religious orientation, age, gender, income level, birth order, and educational level. We collected descriptive information regarding veterans’ army service characteristics such as service branch, their role or profession in IDF, whether they were still performing reserve duty, and the time period since the end of their military service.

**Analytic strategy**

Data analysis was divided into four stages. First, descriptive statistics and rates of PTSS, depressive symptoms and SITB were calculated. Second, a multivariate analysis of covariance (MANCOVA) was performed to determine group differences for the study variables, with participation in reserve duty as covariant. The independent variables were extracted from the SBQ-R, with three levels of SITB: history of suicide attempt (SB); history of suicide ideation without SB (SI); and controls with no history of SITB. In order to overcome unmet assumptions in light of skewed data distributions, a bootstrapping procedure was used, with *n* = 1000 resamples (Preacher & Hayes, 2008). Third, the relationships between the study variables were examined with a series of Pearson correlation analyses. Fourth, the data were screened for missing values. The percentage of missing values in the studied variables ranged from 0% to 17.3%. The data was not MCAR (Missing Completely At Random; Little's χ2 (26) = 40.95, *p* = .03), and according to supplementary t-tests, there were indications that the absent data was related to the observed data. Hence, we cautiously assumed that the data were missing at random (MAR). Missing data were handled with the maximum likelihood (ML) module in AMOS 23 software. Fourth, in order to address the unique contribution of the independent variables to SITB, a four-step hierarchical regression analysis was conducted. All independent variables were centered before entrance to regression models. In the first step of the regression, we entered the socio-demographic variable participation in reserve duty for statistical control. In the second step, we entered the traditional combat exposure and the PMIE's variable of MIQ- 'causes' (due to the lack of correlation between MIES-betrayal and SITB and the strong correlation between MIQ- 'causes' and MIES-perpetration by self and others, we decided to focuses solely on MIQ- 'causes'). In the third step, we entered two psychopathological correlates of SITB: namely, PTSS and depressive symptoms and the risk factor of intolerance of uncertainty. In the fourth step, we entered the hypothesized two-way interaction between MIQ causes and intolerance of uncertainty. Last, in order to examine our moderation hypotheses, ordinary least squares regression analysis was conducted using the PROCESS macro in SPSS (Hayes, 2013). We have tested significance of interaction effects with a 'pick-a-point' approach for probing moderation effects. This approach involves selecting representative moderator values (e.g., low=one SD below the mean, moderate=sample mean, and high=one SD above the mean) of the moderator variable, and then estimating the effect of the focal predictor at those values (Hayes & Matthes, 2009). All analyses were conducted with IBM SPSS software (Version 23; 2015)

**Results**

**Prevalence of transgression acts, PTSS, depressive symptoms and STIB**

In this section we calculated descriptive statistics and rates of transgression acts, PTSS, depressive symptoms and STIB. The percentage of participants who reported "*slightly agree*" or higher for the MIES' items, and "*Seldom*" or higher in the MIQ 'causes' items has been calculated. The most commonly endorsed items from the MIES were "I saw things that were morally wrong." (29.6%), and “I feel betrayed by leaders who I once trusted” (25.2%). The most commonly endorsed items from the MIQ were"I had an encounter(s) with the enemy that made him/ her seem more ‘human’ and made my job more difficult,"(45.2%), and "I had to make decisions in the war at times when I didn’t know the right thing to do" (31.4%). As hypothesized, 21.9% endorsed at least one of the MIES-perpetration by oneself items,33.7% of the veterans endorsed at least one of the MIES-perpetration by others items, and 31% endorsed at least one of the MIES- betrayal items, at the "*slightly agree"* or higher level, as in recent reports from other western armies (Jordan et al., 2017).

According to the PCL-C-5, 15 participants (9.6%) exceeded the 38 cutoff score following stressful experiences in military service according to the DSM-5 (APA, 2013) criteria. Forty one (25.8%) reported 1 or more intrusion symptoms, 29 (18.2%) reported 1 or more avoidance symptoms, 43 (27.1%) reported 2 or more negative alterations in cognition and mood symptoms, and 65 (40.9%) reported 2 or more hyperarousal symptoms. Scores on the PCL-C-5 ranged from 0 to 76, with a mean of 14.13 (*SD*=15.45).

The self-report diagnosis of depression as defined by the PHQ-8 cut-off point has been set to equal or higher than a sum score of 10 (Kroenke et al., 2009). Accordingly, the prevalence of current depression was 11.4% (n=18). The self-report diagnosis of general distress as defined by the K6 cut-off point has been set to equal or higher than a sum score of 13 (Kessler et al., 2010). Accordingly, the prevalence of current general distress was 7.9% (n=12).

Based on responses to the SBQ-R questionnaire (Osman et al., 2001), thirty-nine (24.5%) veterans from our sample reported having a SITB history, thirty-one (19.5%) veterans reported having thought about suicide at some point in their lives, and eight (5.0%) reported SB. According to their self-reported SITB history, veterans were classified into three groups: suicide behavior, suicidal ideation, and veterans having had no SITB (controls).

**Differences between study variables according to SITB levels**

In the first stage of the results, we sought to examine the differences in PMIEs as well as in depressive symptoms, PTSS, and intolerance of uncertainty, according to the participants' SITB history. A MANCOVA analysis was carried out in order to examine differences between veterans having had SB, SI, and having no SITB. The analysis revealed a significant group effect of measures, Wilks’ *F* (16, 296) = 5.61, *p* < .001, Eta² = .23. As can be seen in Table 2, the univariate ANCOVAs yielded significant group effects on most of the examined study variables, excepting MIES-Betrayal. Dunnett post-hoc comparisons confirmed our hypotheses and revealed that veterans with SI or SB experienced higher levels of MIES-Perpetration by self and others, as well as higher levels of depressive symptoms, PTSS, and inhibitory intolerance of uncertainty, compared with veterans with no SITB.

\*\*\* Insert Table 2 here \*\*\*

**Relationships between the study variables**

In preliminary analyses before examining the hypotheses, SITB among veterans was not found to be correlated with any of our demographic variables, including gender, age, family status, income level, religiosity, and education level. With regard to army service characteristics, we found that veterans who still perform reserve duty reported lower levels of SITB (*M* = 3.37, *SD* =1.73), compared with participants exempt from reserve duty (*M* = 4.44, *SD* = 2.37; *F* (1,189) = 4.15,  *p* < .05). Thus, serving on reserve duty was used as a covariate in subsequent analyses. No other significant differences in SITB were found regarding veterans’ service branch as well as their role or profession in IDF and the time period since their demobilization.

As can be seen in Table 3, the results partially confirmed our hypothesis. PMIEs of perpetration by self and others were positively associated with SITB and depressive symptoms, while MIQ-'causes' was only associated with SITB, and MIES-Betrayal was positively associated with PTSS. None of the PMIEs were associated with intolerance of uncertainty. Notably, inhibitory intolerance of uncertainty, but not prospective intolerance of uncertainty, was positively associated with PTSS and SITB. As combat exposure and no participation in reserve duty were associated with SITB, they were both treated as covariates in further analyses.

\*\*\* Insert Table 3 here \*\*\*

**Prediction of SITB by PMIE's, PTSS, depressive symptoms and intolerance of uncertainty**

Our next aims were to examine the relative contributions of PMIE's, PTSS, depressive symptoms and intolerance of uncertainty to SITB. Furthermore, we examined the moderating role of intolerance of uncertainty on the associations between participants' PMIE's and SITB, above and beyond the contribution of PTSS and depressive symptoms.

The total set of variables in the final model explained 34.8% of the variance of participants' SITB. As seen in Table 4, in the last model we found that participation in reserve duty contributed negatively to SITB. Furthermore, MIQ-'causes' was a significant positive predictor of SITB. The more a veteran experienced PMIE's, the more SITB he or she reported. Among the psychopathological outcomes, we found that a depressive symptom was a significant positive predictor of SITB. Last, as hypothesized, above and beyond the explaining variables, we found a two-way significant interaction between MIQ-'causes' and intolerance of uncertainty.

Following the hierarchical regression results, we employed moderation analysis using the PROCES macro (Hayes, 2013). MIQ-'causes' was the independent variable and inhibitory intolerance of uncertainty was entered as a moderator variable. All other variables were entered as covariates. A significant interaction was found between MIQ-'causes' and inhibitory intolerance of uncertainty (*b* = -.22, *SE* = .05, *t* = -4.19, *p* =.00, 95% CI.-32,-.11). Probing of the interaction revealed that under low and average levels of intolerance of uncertainty-inhibitory, significant positive effects were revealed for MIQ-'causes' on their SITB *(Low: b* = .41, *SE* = .07, *t=*5.68*, p* = .00, 95% CI .26, .55; *Average*: *b* = .19, *SE* = .07, *t=*2.80*, p* = .001, 95% CI .06, .32). However, when veterans' levels of inhibitory intolerance of uncertainty were high, MIQ-'causes' did not predict their SITB(*b* = -.02, *SE* = .10, *t=*-.25*, p* = .79, 95% CI -.21, .16; see Figure 6).

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**Discussion**

Moral injuries experiences are already known as traumatic events with long lasting negative impact (Litz et al., 2009). However, while the relationship between MI and some psychopathological ramifications (e.g., PTSD; Jordan et al., 2017) has already been established, understanding the MI-SITB link and psychological conditions that increase suicidality probability remains chiefly unaddressed, particularly among non US veterans' samples. In this study, we examined the role of intolerance of uncertainty as a possible moderator in the MI-SITB link, above and beyond the known risk factors of PTSS and depressive symptoms.

The first aim of this study was to examine if PMIEs contribute to SITB levels among Israeli veterans. Our results indicated that veterans who reported SI or SB also reported significantly higher levels of PMIEs of self and others as well as higher levels of depression and PTSS. Moreover, PMIEs were found to positively contribute to SITB, beyond the contribution of combat experience and reserve duty. These results are in line with several recent studies that examined the MI-SITB relationship (e.g. Frankfurt et al., 2017), stressing the higher risk for SI and SB among those who had been exposed to transgressive acts.

Our study is the first to emphasize the risk for SITB following MI among non U.S. military veterans. Based on several studies that focus on PTSS and depression as possible psychological consequences of MI (Frankfurt & Frazier, 2016), it is suggested that transgressive acts contribute to SITB through the facilitation of depression and PTSS, which are known as risk factors of suicide (e.g., O'Connor & Nock, 2014). Moreover, by definition, MI represents experiences from which veterans desire to escape, but lack any actual ability to do so, due to their obligation for military missions. This situation of inability to escape/change an aversive situation has already been coined by Gilbert and Allan (1998) and Williams (1997) as the experience of *entrapment* – an important risk factor of SITB among military personnel (e.g. Shelef, Levi-Belz, Fruchter, Santo & Dahan, 2016). Thus, it is suggested that PMIEs might be related to SITB among veterans, due in part to facilitation of the entrapment process.

The second aim of this study was to shed light on the psychological mechanisms of the MI-SITB relationship, and particularly the role of IU in this relationship. We found that veterans who reported SI or SB also reported significantly higher levels of both prospective and inhibitory dimensions of IU. Both dimensions were positively correlated to depressive symptoms, while the inhibitory dimension was also correlated to both PTSS and SITB. Moreover, the IU-inhibitory dimension moderated the association between PMIEs and SITB. Specifically, PMIEs positively contribute to SITB levels when the veterans are characterized by low or average inhibitory IU. However, when veterans are characterized by high levels of inhibitory IU, no such association was found.

Different studies have already highlighted several psychological risk factors (e.g. guilt; Frankfurt et al., 2017) that may facilitate SITB following PMIEs. However, this study is the first to highlight how IU can serve as a moderator in the MI-SITB relationship, beyond the known risk factors, such as PTSS and depression. While the scientific literature reported mixed results concerning the specific role of IU in psychopathologies (e.g., PTSD, anxiety and depressive disorders; Paulus et al., 2015; Carleton, 2012), surprisingly, no studies have been conducted in relation to the role of IU in suicide ideation or suicide attempts. Bearing that in mind, future research which will focus longitudinally on the IU processes and its effect on SITB following PMIEs would probably help to validate our preliminary pattern of results.

De Jong-Meyer, Beck & Riede (2009) found that IU facilitates the levels of worries and ruminations, which have been previously linked to SI and suicidal behavior in different populations (e.g. Miranda & Nolen-Hoeksema 2007; Miranda et al., 2013). Thus, one can suggest that high IU will positively contribute to the SITB levels among veterans. However, as noted earlier, our results emphasized a different picture in which only the combination of high levels of MI experiences with low/average IU inhibitory may facilitate SITB. These interesting and somewhat surprising results raised the question, What could explain the specific moderating role of intolerance of uncertainty in the MI-SITB relationship?

Three plausible explanations can be presented for this moderation effect. The first is related to the core characteristic of IU, which represent the "fear of the unknown" (Carleton, 2012). This fear is noted as a facilitator of the desire for cognitive closure (Berenbaum & Bredemeier, 2008), meaning that veterans with high IU strive to rapidly resolve the difficult experience they encounter in order to avoid uncertainty (Andersen & Schwartz, 1992). It can be suggested that high IU among veterans represents the need for psychological closure of their inner conflicts and ruminations about their transgressive acts, which in turn may help the veterans to reduce guilt and shame feelings about their reactions. Thus, while high IU appears to serve as a vulnerability factor both for depression and hopelessness (Carleton, 2012), its role in diminishing rumination about MI may have some beneficial effect in relation to SITB (Smith & Alloy, 2006).

Another way to interpret the moderating role of IU is to focus on understanding of the nature of the inhibitory aspect of IU. This aspect taps the behavioral symptoms indicating apprehension due to uncertainty (e.g., being unable to act effectively or function properly in the face of uncertainty). These behavioral symptoms are considered in several studies as defensive freezing (e.g. Blanchard et al., 2001), as some items indicate behavioral freezing in response to uncertain situations (e.g., ‘When it’s time to act, uncertainty paralyses me’). Given that, it may not be surprising that IU inhibitory was found to facilitate the perceived control levels of individuals in stressful situations, whereas high IU inhibitory related to perception of non-control – due to the inhibition of behaviors (Carleton, 2012).

How might the perception of low control help veterans to deal more positively with MI experiences? Moral injury is mostly related to the veterans' perception that they committed an immoral act or failed to do something that ought to have been done in order to prevent commission of the immoral act (Litz et al., 2009). Thus, we can speculate that veterans with high IU may perceive that they had no control over the transgressive act and may thus feel no responsibility for it – which is why their IU is not related to SITB. Gould & Edelstein (2010) showed that individuals with low perceived control implemented some kind of emotional regulation in an attempt to regain control over anxiety-related events, and these helped them to adjustment better. On the other hand, veterans with low IU had a higher perception of controllability over the immoral events, and may thus feel responsible for it, resulting in self-agony and shame which in turn can lead to SITB (Ansell et al., 2015). In other words, it may be that under the condition of having experiencing a transgressive act in their past, IU mayfunction differently, in that it supplies a plausible explanation to the veterans for why they act as they do in the situation, and as a result, they felt less guilt and shame, which in turn diminished their levels of SITB.

Yet another alternative possibility for our results is related to the differences in the emotional distress effect among high and low IU levels under the condition of an uncertain threat. Nelson & Shankman (2011) elegantly examined the psychophysiological responses to IU in the laboratory and focus on the startle reflex, which is a psychophysiological tool that can be used for measuring emotional states during uncertain situations. The authors found that when encountered with uncertain threatening events, individuals who were highly intolerant of uncertainty are likely to demonstrate inhibited aversive responding (i.e., smaller startle response). Other studies found similar results in other physiological responding techniques among patients with generalized anxiety disorder (Lang, McTeague, and Cuthbert, 2007). Thus, while high IU is generally related to high anxiety and depression levels, it may be that high IU inhibitory may help to inhibit aversive responses of panic, fear or startle when confronting an MI experience. Thus, after we controlled for the depression level, the level of SITB did not increase. When no such of inhibition occurred, veterans with low IU inhibitory who encountered PMIEs were prone to an aversive response which increased SITB, even after statistical control of the depression levels.

Several limitations of this study warrant mentioning. First, the data regarding MI experiences were obtained using retrospective self-report measures, possibly introducing a well-known range of biases caused by factors such as mood-dependent recall, forgetting, cathartic effect, and social desirability. Specifically, the prevalence of suicidal thoughts and behaviors assessed by a self-report scale in the absence of objective and/or professional assessment, may present an estimation bias. Secondly, we capitalized on a non-representative, volunteer sample that may not reflect accurate rates of PMIEs among veterans. Thirdly, although we have used the recognized and validated MIES and MIQ questionnaires, researchers should develop specific measures for each of these experiences, as well as a measure that focuses on the witnessing of transgressive acts and on the feeling of betrayal as they relate to MI, separately from committing these acts. Importantly, more research is needed to confirm the specific moderating role of IU found in this study. Importantly, in this study IU was not related specifically to the MI experience, and thus we can only speculate that those with high IU were also intolerant to the PMIEs as an example of an uncertain type of situation. Future research would benefit from using a modified version of the IUS-12 that distinguishes between trait (IUS-12) and state IU (IUS-SS) (Mahoney & McEvoy, 2010). In the IUS-SS participants are asked to select a primary concern, describe a related distressing situation, and then complete items from the IUS-12, but with specific reference to the described situation.

Notwithstanding these limitations, the findings of this study have several clinical implications as well as some important future research directions. Firstly, our results indicated that veterans who experience PMIEs need to be targeted for screening the presence of suicidal thoughts and behaviors (e.g., Bryan et al., 2017). Therefore, raising awareness of suicidality following MI-related experiences should be expanded to other non-U.S. veterans and to military personnel deployed to complex war zones around the globe. Moreover, following screening, interventions could be developed around the close link between MIES-Self experiences, and to address more specifically the mental burden resulting from the MI experience and its consequences in relation to suicide ideation and sometimes suicidal behavior.

The psychological moderator in facilitating SITB following transgressive acts can also help clinicians identify issues to be addressed in therapy. In this study, veterans seem to strive for mental strategies in order to adjust or recover from their MI experiences. High levels of IU- inhibition were found to be one of these strategies, and veterans characterized by high IU had some strategies available (e.g., cognitive closure, freezing) to avoid SITB. However, while our results indicated that inhibition aspects are in some cases an effective strategy to avoid SITB after MI, IU has some major disadvantages such as a higher risk for several anxiety and depression (Paulus et al., 2015; Carleton, 2012). Thus, it may be important to help veterans to expand their mental tools to address this issue, for example to add some positive psychological strategies to deal with an aversive situation in general and with MI experiences in particular. Specific interventions like adaptive disclosure are designed to help veterans come to terms with the personal meaning and implications of their transgressive acts, and may help veterans to create a capacity to cope and psychologically process the emotional difficulties of shame and guilt that go along with MI experiences (Litz, Lebowitz, Gray, & Nash, 2017). Hopefully, veterans will be able to deal more directly with their past in the military services, without need for cognitive closure, freezing or inhibitions.

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Table 1.*Veterans' socio-demographic and army service characteristic*s

|  |  |  |  |
| --- | --- | --- | --- |
| M (SD) | N (%) |  | variable |
|  |  |  | *Veterans' characteristics*  |
| 25.39 (2.37) |  |  | Age at study\* |
| 12.46 (1.15) |  |  | Years of education |
|  | 134(85.4%) | Male | Gender |
|  | 12(14.6%) | Female |  |
|  | 152 (88.9%) | Israel | Place of birth |
|  | 2 (5.3%) | Former Soviet Republics |  |
|  | 1(0.6%) | Asia/Africa |  |
|  | 9(5.4%) | Europe and America |  |
|  | 110 (70.1%) | Single  | Marital status |
|  | 37(23.6%) | Married  |  |
|  | 2(1.3%) | Divorced |  |
|  | 8(5.1%) | Other  |  |
|  | 47 (27.5%) | Full-time job | Working status |
|  | 89(56.7%) | Part-time job |  |
|  | 23(14.6%) | Not working |  |
|  | 16 (10.2%) | Above average | Income\*\* |
|  | 13 (8.3%) | Average |  |
|  | 128 (81.5%) | Below average |  |
|  | 33 (21%) | Traditional | Religiosity |
|  | 63(40.1%) | Secular |  |
|  | 58(36.9%) | Religious |  |
|  | 3(1.9%) | Other  |  |
|  |  |  |  |
|  |  |  | *Army service characteristic*s |
| 4.36 (2.27) |  |  | Time since deployment\* |
|  | 156 (81.7%) | Yes  | Reserve service |
|  | 35(18.3%) | No  |  |
|  | 182(95.3%) | Full | Length of army service\*\*\* |
|  | 8(4.2%) | Partial  |  |
|  | 1(.5%) | Other  |  |
|  | 176(92.1%) | Combatant  | Army duty |
|  | 15(13.9%) | Combat support |  |
|  | 157(82.1%) | Enlisted | Army rank |
|  | 34(17.8%) | Officer |  |
|  | 139(72.7%) | Infantry units | Branch of military |
|  | 11(5.7%) | Armored Corps |  |
|  | 11(5.7%) | Engineering Corps |  |
|  | 8(4.7%) | Artillery Corps |  |
|  | 21(10.9%) | Other combat units |  |

*Note.* \* In years; \*\* average monthly income was defined as 9200 NIS;\*\*\* Compulsory army service in Israel is 3 years for males and 2 years for females

Table 2*.*

*Means, Bootstrapped Standard Deviations, and MANCOVA Results of Dependent Measures According to Levels of SITB.*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Post-hoc** **Test** | **Eta2** | ***F*(2,145)** | **SB**(3) | **SI**(2) | **No SITB**(1) |  | **Measure** |
|  |  |  | *n*=8 | *n*=31 | *n*=120 |  |  |
| 1<2,3 | .09 | 7.38\*\* | 16.758.54 | 14.676.70 | 10.785.93 | *M**SD* | MIES- Perpetration  |
|  | .02 | 1.32 | 7.751.98 | 7.544.20 | 6.473.66 | *M**SD* | MIES-Betrayal |
| 1<3 | .10 | 8.23\*\*\* | 25.3711.52 | 19.514.74 | 18.404.04 | *M**SD* | MIQ- Causes |
| 1<2 1<3 | .32 | 35.67\*\*\* | 9.254.80 | 7.835.20 | 2.732.77 | *M**SD* | Depressive symptoms |
| 1<2 1<3 | .09 | 7.50\*\* | 26.6221.31 | 20.5120.71 | 11.5212.42 | *M**SD* | PTSS |
| 1<2  | .05 | 3.79\* | 26.628.79 | 25.935.92 | 22.856.30 | *M**SD* | IU-Prospective |
| 1<2  | .11 | 9.38\*\*\* | 13.124.51 | 13.643.86 | 10.473.79 | *M**SD* | IU-Inhibitory |

Note. \**p* < .05 \*\**p* < .01 \*\*\**p* < .001; SITB= self-injurious thoughts and behaviors, SI=Suicide ideation, SB=Suicidal behavior, MIES=Moral Injury Exposure Scale, MIQ=TheMoral Injury Questionnaire- Military Version**;** PTSS=Posttraumatic stress symptoms, IU= Intolerance of uncertainty.

.

Table 3.

*Descriptive statistics and bivariate correlations between study variables*.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
|  |  |  |  |  |  |  |  |  | 1 | 1. Performing reserve duty |
|  |  |  |  |  |  |  |  | 1 | -.15\* | 2. Combat exposure  |
|  |  |  |  |  |  |  | 1 | .07 | .06 | 3. MIES- 'Perpetration' |
|  |  |  |  |  |  | 1 | .48\*\*\* | .10 | .14 | 4. MIES-'Betrayal' |
|  |  |  |  |  | 1 | .32\*\*\* | .63\*\*\* | .48\*\*\* | -.12 | 5. MIQ- 'Causes' |
|  |  |  |  | 1 | .02 | -.01 | .10 | -.08 | -.01 | 6. IU-prospective |
|  |  |  | 1 | .60\*\*\* | -.08 | .02 | .11 | -.18\* | .01 | 7. IU-inhibitory |
|  |  | 1 | .50\*\*\* | .42\*\*\* | .11 | .15 | .22\*\* | .10 | .14 | 8. Depressive symptoms |
|  | 1 | .54\*\*\* | .26\*\*\* | .14 | .11 | .31\*\*\* | .12 | .24\*\* | .11 | 9. PTSS |
| 1 | .24\*\* | .53\*\*\* | .16\* | .04 | .38\*\*\* | .14 | .28\*\*\* | .20\* | -.17\* | 10. SITB |
| 3.91 | 14.13 | 4.06 | 11.17 | 23.66 | 18.72 | 6.42 | 11.58 | 5.10 | 1.18 | *M* |
| 2.04 | 15.45 | 4.18 | 4.04 | 6.44 | 4.82 | 3.65 | 6.37 | 3.86 | .38 | *SD* |

*Note*. \**p* <.05. \*\**p* < .01. \*\*\**p* < .001; MIES=Moral Injury Exposure Scale, MIQ=TheMoral Injury Questionnaire- Military Version , PTSS=Posttraumatic stress symptoms, SITB= Self-injurious thoughts and behaviors, IU= Intolerance of uncertainty.

Table 4.

*Summary of hierarchical regression coefficients of SITB reserve duty, combat exposure, MIQ-M 'causes',*

*depressive symptoms, PTSS and inhibitory intolerance of uncertainty*

|  |  |
| --- | --- |
| Variables | SITB |
|  | Model 1 | Model 2 | Model 3 | Model 4 |  |
|  | B | SEB | β | B | SEB | β | B | SEB | β | B | SEB | β |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Reserve duty | -.14 | .07 | -.14\* | -.19 | .07 | -.19\*\* | -.12 | .06 | -.12 | -.13 | .06 | -.14\* |  |  |  |
| Combat exposure |  |  |  | .08 | .07 | .08 | .03 | .07 | .03 | .01 | .07 | .01 |  |  |  |
| MIQ- Causes  |  |  |  | .30 | .07 | .30\*\*\* | .26 | .07 | .27\*\*\* | .18 | .07 | .18\* |  |  |  |
| Depressive symptoms |  |  |  |  |  |  | .37 | .09 | .39\*\*\* | .38 | .07 | .40\*\*\* |  |  |  |
| PTSS |  |  |  |  |  |  | .03 | .07 | .04 | .04 | .06 | .04 |  |  |  |
| IU- Inhibitory |  |  |  |  |  |  | -.05 | .08 | -.05 | -.04 | .07 | -.04 |  |  |  |
| MIQ- Causes \* IU-Inhibitory |  |  |  |  |  |  |  |  |  | -.21 | .05 | -.28\*\*\* |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *R2* change | 2% | 12.2% | 14.1 % | 6.6% |  |
| *F* change | *F*(1,189)=3.88\* | *F*(2,187)=13.29\*\*\* | *F*(3,184)=12.03\*\*\* | *F*(1,183)=18.42 |  |

*Note.* \* *p* < .05,\*\* *p* < .01,\*\*\* *p* < .001



Figure 1.

*The relationship between MIQ-'causes' and SITB is moderated by levels of inhibitory intolerance of uncertainty*