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# The critical warzone experiences (CWE) scale: Initial psychometric properties and association with PTSD, anxiety, and depression

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## ABSTRACT

The objective of the present research was to develop and evaluate a critical warzone experiences (CWE) scale for use with Iraq/Afghanistan veterans. The psychometric properties of the CWE were evaluated across three independent samples of Iraq/Afghanistan veterans. Despite its brevity (7 items), the CWE exhibited good internal consistency (average  $\alpha = 0.83$ ), good temporal stability (1-year test–retest reliability = 0.73), good concurrent validity with lengthier measures of warzone experiences (average  $r = 0.74$ ), and a clear unidimensional factor structure (average factor loading = 0.69). Study 2 confirmed the CWE's factor structure through confirmatory factor analysis, and structural equation modeling demonstrated a strong association between CWE and post-deployment mental health,  $\beta = 0.49$ ,  $p < 0.001$ . Study 3 provided further support for the predictive validity of the CWE by demonstrating that it was associated with PTSD diagnosis, clinician-rated PTSD symptom severity, and global functional impairment in an independent sample of Iraq/Afghanistan veterans (average  $r = 0.59$ ). While replication of these findings in more diverse samples is needed, the preliminary evidence from these studies indicates that the CWE is a brief, reliable, and valid measure of critical warzone experiences among Iraq/Afghanistan war veterans.

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## 1. Introduction

In the aftermath of the Vietnam War, researchers began to intensively study the manner in which combat experiences might contribute to posttraumatic stress disorder (PTSD) and other types of mental health problems among returning veterans. As a result, several measures of combat exposure were created, including the widely-used 7-item Combat Exposure Scale (CES; Keane et al., 1989), which was validated with Vietnam veterans. In more recent years, considerably longer measures of combat exposure and other types of deployment experiences (e.g., post-battle experiences) have been developed for

use with returning Iraq/Afghanistan veterans, including the U.S. Army and Marine Corps Mental Health Advisory Team's Combat Experiences Scale (MHAT-CES).

The MHAT-CES has been used in numerous studies (e.g., Booth-Kewley et al., 2010; Castro et al., 2000; Meyer et al., 2013; Morissette et al., 2011; Wright et al., 2012), including Hoge and colleagues' (2004) seminal study on mental health problems among Iraq/Afghanistan veterans. Despite the widespread use of the MHAT-CES in published studies of Iraq/Afghanistan veterans, there has been significant variability in the manner in which this measure has been administered. Whereas some studies used versions of the MHAT-CES that contained as many as 41 items and assessed a broad range of warzone experiences (Wright et al., 2012), other studies used versions with as few as three items and limited content coverage (Hoge et al., 2006; Milliken et al., 2007).

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Guyker et al. (2013) recently conducted the first full-scale psychometric study of the MHAT-CES and developed a 28-item version of the scale through exploratory factor analysis. In addition, they identified three potential subscales through exploratory factor analysis, which they labeled as “Exposure to Combat Environment” (17 items), “Direct Engagement” (7 items), and “Nearness to Serious Injury/Death of Others” (4 items). Internal consistency for the three MHAT-CES subscales identified through factor analysis was good (0.94 for Exposure to Combat Environment, 0.81 for Direct Engagement, and 0.82 for Nearness to Serious Injury/Death of Others). However, the authors acknowledged that the three factors exhibited poor divergent validity and were not clearly distinguishable from each other. For example, the correlations between the three subscales and measures of PTSD, anxiety, and depression were quite similar, raising concerns about the utility of having three separate scales of warzone experiences. Moreover, given the success of the much briefer CES developed for use with Vietnam veterans (Keane et al., 1989), an additional question relates to whether it is necessary for the MHAT-CES to use four times as many items (i.e., 28 items) as the original CES to assess critical warzone experiences.

Similar concerns can be raised in relation to the two most relevant warzone measures from the *Deployment Risk and Resilience Inventory* (DRRI; King et al., 2006) and the more recently published *Deployment Risk and Resilience Inventory-2* (DRRI-2; Vogt et al., 2013). A clear advantage of the DRRI/DRRI-2 warzone measures is that they have been developed in a systematic fashion and have been validated with Iraq and Afghanistan veterans (King et al., 2006; Vogt et al., 2013); however, like the MHAT-CES, the two key DRRI/DRRI-2 scales assessing warzone experiences, the Combat Experiences (CE) and Aftermath of Battle (AB) subscales, include a total of 30 items, far more than the original CES. In addition, as with the MHAT-CES, the discriminant validity of the CE and AB subscales is also questionable. For example, the DRRI-2 manual reports that the CE and AB subscales have nearly identical correlations with self-reported PTSD symptom severity (0.45, 0.43, respectively), self-reported depression symptom severity (0.20, 0.22, respectively), and self-reported anxiety symptom severity (0.23, 0.22, respectively; Vogt et al., 2012). The latter finding again raises concerns about the usefulness of having multiple, lengthier scales of warzone experiences when prior research with Vietnam veterans has demonstrated the utility of much briefer measures (Keane et al., 1989).

### 1.1. Research objective

The objective of the present research was to develop a brief, reliable, valid, and unidimensional measure of critical warzone experiences for use with Iraq/Afghanistan veterans. We were particularly interested in developing a measure that would be strongly associated with the development of PTSD, anxiety, and depression among returning veterans, while also exhibiting good reliability and factor structure. To achieve this objective, we conducted three studies aimed at evaluating a 7-item version of the MHAT-CES that we refer to hereafter as the critical warzone experiences (CWE) scale.

The primary objective of Study 1 was to develop the CWE and to evaluate its internal consistency, test–retest reliability, factor structure, and concurrent validity with other measures of warzone experiences. The objectives of Study 2 were to: (1) use confirmatory factor analysis (CFA) to further examine the factor structure of the CWE; and (2) use structural equation modeling (SEM) to assess the predictive validity of the CWE in relation to post-deployment mental health symptoms. The objective of Study 3 was to further assess the predictive validity of the CWE in relation to key clinical outcomes, including PTSD diagnosis, clinician-rated PTSD

symptom severity, depression symptoms, anxiety symptoms, and global functional impairment.

## 2. Study 1

### 2.1. Study 1 participants

Study 1 was comprised of 130 Iraq/Afghanistan veterans enrolled for healthcare within the Department of Veterans Affairs (VA). Veterans with mental health conditions were oversampled to ensure adequate representation. Exclusion criteria included: (1) diagnoses of schizophrenia, another psychotic disorder, or bipolar disorder; (2) current suicidality or homicidality warranting immediate crisis intervention; or (3) recently beginning psychiatric medications or psychotherapy (in order to limit symptom fluctuations related to stopping or starting psychiatric medication or therapy). Veterans with other psychiatric diagnoses were eligible. The majority of participants were male (85%), had served in the Army (82%), and were either Caucasian (63%) or African American (18%). With respect to ethnicity, 26% of participants identified as Latino. Participants' average age was 38.0 years (S.D. = 10.8).

### 2.2. Study 1 procedures

All procedures were approved by the local Institutional Review Board (IRB) prior to data collection. Veterans completed the measures as part of a pilot longitudinal study on functional impairment in veterans. A subset of participants ( $n=67$ ) completed an annual assessment that enabled us to examine the temporal stability of the CWE. The *Clinician Administered PTSD Scale* (CAPS; Blake et al., 1995) was administered by either a doctoral-level psychologist or a master's level assessment technician who completed intensive assessment training and was supervised by a clinical psychologist with expertise in PTSD assessment.

### 2.3. Study 1 measures

A 33-item version of the MHAT-CES similar to the one used by Guyker et al. (2013) to develop their 28-item version of the measure was administered to participants and used to develop the CWE, as described in more detail below. As the DRRI-2 was not yet published, the original DRRI (King et al., 2006) CE and AB subscales were used to measure combat experiences and post-battle experiences, respectively, in order to assess the concurrent validity of the CWE. The *Clinician Administered PTSD Scale* (CAPS; Blake et al., 1995) and *PTSD Checklist-Military Version* (PCL-M; Weathers et al., 1993) assessed PTSD symptom severity according to the Diagnostic and Statistical Manual of Mental Disorders, 4th Edition (DSM-IV; APA, 2000). The *Beck Depression Inventory-II* (BDI-II; Beck et al., 1996) assessed depression symptom severity, and the *Depression-Anxiety-Stress Scales* (DASS; Lovibond and Lovibond, 1995) assessed severity of depression, anxiety, and stress.

### 2.4. Study 1 measure development

Given our objectives, we made an *a priori* decision that we would ideally like the measure to contain seven or fewer items in keeping with other brief measures of combat exposure (cf. Keane et al. 1989). Because our primary focus was on developing a measure of critical warzone experiences with high predictive validity, we initially examined the relationship between the 33 MHAT-CES items and the measures of PTSD, depression, and anxiety. We then selected the seven items that had the highest average correlation to represent the seven most critical warzone experiences with respect to the development of PTSD, depression, and anxiety.

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