Examining Neuroendocrine and Inflammatory Biomarker Profiles to Characterize PTSD Subtypes and Symptom Profiles

by

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Abstract

Post-traumatic stress disorder (PTSD) is a multifaceted mental health disorder characterized by diverse symptom profiles and biological underpinnings. Considering the heterogeneity of PTSD, understanding clinical symptomatologies and distinct peripheral biomarker profiles among subtypes of PTSD, with a focus on dissociative PTSD, may aid in informing personalized treatment strategies. Participants in the current study comprised individuals diagnosed with PTSD who had past or present military experience and healthy controls. All participants completed questionnaires assessing mental health symptoms in addition to providing saliva and blood samples for cortisol and inflammatory marker determination. The dissociative PTSD group displayed the highest levels of symptom severity, reflecting a high degree of comorbidity and complexity. Moreover, participants with a dissociative PTSD diagnosis demonstrated elevated traumatic life event encounters, including experiences of childhood abuse compared to healthy controls, an effect not found among the non-dissociative PTSD subtype. Upon assessing cortisol concentrations, individuals with dissociative PTSD had elevated nighttime cortisol levels relative to healthy controls whereas the non-dissociative PTSD group did not differ from controls. For the cortisol awakening response, levels were significantly elevated among both the PTSD groups. Inflammatory biomarker profiles did not differ according to diagnosis, but were associated with clinical symptoms of PTSD, depression, and childhood traumatic experiences. The present study suggests that PTSD subtypes may be differentiated on a clinical and neurobiological level, although further delineation of the biological underpinnings of these subtypes is needed in order to inform future personalized treatment plans for individuals with PTSD.
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Examining Neuroendocrine and Inflammatory Biomarker Profiles to Characterize PTSD Subtypes and Symptom Profiles

Post-traumatic stress disorder (PTSD) is a complex mental health disorder that is triggered by exposure to traumatic events and is characterized by a wide range of possible symptomatologies and presentations (Tsai et al., 2015). Symptoms of PTSD include intrusive flashbacks, hyperarousal, and negative alterations in the psychological state of an individual (American Psychiatric Association, 2013). PTSD is also highly comorbid with various other mental health disorders, such as depression (Nichter et al., 2019), and is heterogeneous in symptom presentation, as factors such as the type of trauma, early-life adversity, age, sex and genetics can all influence the development, heterogeneity and severity of PTSD (Campbell-Sills et al., 2021; Flory & Yehuda, 2015). Indeed, there are different forms or subtypes of this disorder, such as complex PTSD and dissociative PTSD (American Psychiatric Association, 2013). Within the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), dissociative PTSD has been characterized by symptoms of derealization and depersonalization, in addition to the symptomatology experienced in non-dissociative PTSD (American Psychiatric Association, 2013).

PTSD is highly prevalent among military personnel and veterans, due to their increased likelihood of combat trauma exposure (Litz et al., 2018). It is estimated that approximately 30% of combat exposed military personnel will develop a mental health disorder, and 10% are projected to suffer from PTSD (Paré, 2011). Elevated rates of PTSD among military personnel are owing to specific traumas that veterans are more likely to be exposed to, which include the threat to self, threat to others, aftermath of violence, traumatic loss, moral injury to self, and moral injury to others (Litz et al., 2018). Moreover, veterans are not only at a higher risk of suffering from PTSD
than those in the general population, but they also encounter obstacles to acquiring adequate and effective treatments.

The use of psychotherapy in combination with pharmacological treatments have been used for the management of PTSD symptomatology for several years (Haagen et al., 2015). However, treatment efficacy differs among each individual, and psychotherapy, which is the recommended intervention to overcome PTSD, has been shown to benefit veterans to a lesser extent than those in the general population (Haagen et al., 2015). Furthermore, treatment plans are significantly more complicated among individuals diagnosed with the dissociative subtype of PTSD, due to the addition of depersonalization and derealization symptoms (Hansen, Ross & Armour, 2017; Murphy & Busutill, 2015). Thus, to inform more effective treatments, a better understanding of the underlying neurobiology of PTSD symptoms and subtypes is required.

A specific focus related to the neurobiology of PTSD has included the hypothalamic-pituitary-adrenal (HPA) axis and the immune system, both of which are fundamentally involved in stress and trauma responses (de Oliveira et al., 2018; Wang et al., 2019). In this regard, PTSD is often marked by a blunted diurnal cortisol pattern, together with elevated evening cortisol levels, and elevated circulating pro-inflammatory cytokines (Cordero et al., 2017; Lindqvist et al., 2017; Michopoulos et al., 2015; Young & Breslau, 2004). Nonetheless, there remains a dearth of literature regarding the neurobiology of specific PTSD symptomatologies and subtypes, including the dissociative subtype, as well as how trauma and experiences including early life adversity might alter neurobiological profiles. Therefore, the aim of the current study is to identify and distinguish PTSD subtypes in terms of symptom profiles and neurobiology, through examining cortisol patterns and plasma inflammatory biomarker levels. Moreover, this study will explore how trauma experiences relate to specific PTSD symptomatologies and neurobiological profiles.
Together this research can lead to a better understanding of the heterogeneity of PTSD to inform more effective and personalized future treatments.

**Post-Traumatic Stress Disorder**

According to the first criterion (criterion A) in the DSM-5, a PTSD diagnosis is directly linked to the experience or witnessing of a traumatic event such as a serious accident, a natural disaster, war, rape, physical and emotional abuse, or other violent assault (American Psychiatric Association, 2013). Subsequently, PTSD consists of four symptom clusters. Intrusive re-experiencing of the traumatic event (criterion B) is revealed through symptoms of flashbacks, distressing dreams, or physiological reactions upon being reminded of the trauma. The other criterions include symptoms of avoidance behavior around stimuli, thoughts and emotions associated with the traumatic event (criterion C), negative alterations in thoughts or mood linked with the trauma (criterion D), and lastly, changes in arousal and reactivity (criterion E; American Psychological Association, 2013). For a diagnosis, symptoms from each category must be present consistently for longer than one month (criterion F) and must considerably disrupt various areas of an individual’s everyday life (criterion G). Additionally, the experienced symptoms must not occur as a result of a medical condition or substance use (criterion H; American Psychological Association, 2013).

PTSD is a prevalent and innately distressing trauma related disorder, in which, experiencing a trauma is a core feature of the diagnostic criteria. The prevalence of experiencing at least one traumatic event in Canada is as high as 76%, and of those individuals, 9.2% will go on to develop PTSD (van Ameringen et al., 2008). Taking into consideration that only a small proportion of individuals with traumatic experiences go on to develop PTSD (Atwoli et al., 2015), this begs the question as to what confers vulnerability to PTSD. It has been suggested that the
nature of the event, and the elapsed time from the occurrence of the trauma (Shalev et al., 2019), along with various other risk factors such as gender and family history of mental illness increase the risk of developing PTSD (Castro-Vale et al., 2020; Tang et al., 2017; Tortella-Feliu et al., 2019). In fact, several meta-analyses indicate that mood and anxiety disorders are highly associated with the later development of PTSD (Ogle et al., 2016; Sayed et al., 2015). Specifically, Kessler et al. (2018) reported that only previous anxiety disorders interacted with earlier trauma exposure, including witnessing brutal events, being a victim of physical violence, and rape, to predict PTSD.

It is recognised that PTSD tends to co-occur with other mental health disorders, with rates ranging from as low as 50% (Flory & Yehuda, 2015) to as high as 90% of individuals with PTSD have a comorbid diagnosis, such as anxiety and depression (Price et al., 2019). More specifically, approximately half of individuals with PTSD also suffer from major depressive disorder (MDD; Flory & Yehuda, 2015). Several individuals have identified issues with the DSM diagnostic criteria, suggesting that updated versions of the DSM might be contributing to the high rates of comorbidity (Flory & Yehuda, 2015). To be sure, when several related disorders arise from a common factor, such as trauma exposure, a more comprehensive assessment of the psychopathology of PTSD is required to delineate common mental health disorders from one another (Elhai et al., 2008; Elhai et al., 2011; Grubaugh et al., 2010), as to ensure a proper diagnosis, and therefore proper treatment methods. Despite the high rates of comorbidity, individuals diagnosed with PTSD do present unique symptomatologies compared to other mental health disorders (Flory & Yehuda, 2015). Moreover, recent advancements identified symptom profiles among PTSD using a network analysis investigation focused on the progression of the disorder following a traumatic event (Bryant et al., 2017). It was suggested that the network analysis approach illustrates a system of symptoms that are linked to one another to represent
PTSD development in the short- and longer-term phases (Borsboom & Cramer, 2013). For example, symptoms of insomnia associated with PTSD may contribute to fatigue, thus impairing concentration (McNally et al., 2015). A network analysis approach evaluates symptoms of PTSD which are associated or may stem from one another to characterize profiles of emerging PTSD symptomatologies (Bryant et al., 2017).

**Dissociative PTSD**

A subtype of PTSD, marked by dissociative symptoms (dissociative PTSD), has been included in the DSM-5, and comprises features of depersonalization and derealization (American Psychiatric Association, 2013). Depersonalization is characterized by experiences of a general detachment from oneself, where an individual feels as if they are a passive observer or a separate individual watching themselves go about daily life. Derealization consists of the belief that one’s surroundings, including other people, objects, and the world, are not part of reality (Stein et al., 2013). In order to receive a diagnosis of dissociative PTSD, an individual must satisfy all of the non-dissociative PTSD criteria and exhibit dissociative symptoms in response to the trauma-related stimuli (American Psychiatric Association, 2013).

The dissociative PTSD subtype brings unique considerations, including greater PTSD severity (Tsai et al., 2015; Wolf et al., 2017), more complex symptomatology (Galatzer-Levy & Bryant, 2013), and worse functional impairments affecting interpersonal relationships and occupational life (Boyd, Lanius & McKinnon, 2018; Herzog et al., 2020). More severe cases of PTSD have consistently been linked to symptoms of dissociation, and literature suggests that dissociative PTSD is more prominent among veterans (Blevins et al., 2015; Hansen et al., 2017). Studies have shown that among military personnel and veterans, 8-32% meet the criteria for the dissociative subtype (Armour et al., 2014; Tsai et al., 2015), and it has further been revealed that...
veterans tend to show higher levels of derealization symptoms, in addition to functional impairment (Boyd et al., 2018). Moreover, Boyd et al. (2018) further indicated that derealization and dissociative symptoms mediate the relationship between PTSD symptomatology and functional impairment, highlighting the increased severity of symptoms among individuals with dissociative PTSD (Tsai et al., 2015). Given the increased impairment, it is not surprising that differences in treatment responses have been reported between dissociative PTSD and individuals with PTSD in the absence of dissociative symptoms (Armour et al., 2014; Tsai et al., 2015), however, not all studies have found these differences (Burton et al., 2018; Haagen et al., 2018).

**Trauma Exposure Among Veterans**

Trauma exposure has consistently been linked to the development of mental and physical health disorders. Veterans, or individuals involved within the military, are more likely to have been exposed to trauma, and thus have a higher likelihood of developing psychiatric disorders (Litz et al., 2018). It is estimated that 30% of military personnel assigned to combat zones will develop a mental health disorder, and 10% are estimated to suffer from severe PTSD (Paré, 2011). Notably, 85% of Canadian Armed Forces (CAF) members are experiencing some form of trauma exposure in their lifetime, and of those, 16% develop depression, 12% develop generalized anxiety disorder, and 11% develop PTSD (Pearson, Zamorski & Janz, 2014).

Early studies reveal that elevated levels of combat trauma exposure predict PTSD severity (Hiley-Young et al., 1995), and promote prolonged PTSD symptom expression (Koenen et al., 2003). In addition to combat trauma exposure, several individual and social risk factors have been identified that increase the probability of developing PTSD. Specifically, a complex interplay between risk factors pre-trauma, during the time of the trauma, and post-trauma are thought to interact to increase risk of developing the disorder (Kessler et al., 2014). Pre-trauma vulnerability
to PTSD including gender, age of trauma, family history of mental disorders, personality traits, early traumatization, and adverse childhood experiences (Castro-Vale et al., 2020; Kessler et al., 2018). Specifically, a younger age at the time of trauma is thought to increase the risk of PTSD development, however findings have been contradictory (Salmon & Bryant, 2002). In this regard, while Booth-Kewley et al. (2010) and Koenen et al. (2003) indicate that a younger age is considered a strong predictor of PTSD, a meta-analysis concluded that age is largely unrelated to PTSD among veterans deployed to Iraq or Afghanistan, however age was a risk factor among veterans deployed to Vietnam or the Persian Gulf (Xue et al., 2015).

Several prospective studies have revealed that females were more likely than males to develop PTSD after combat trauma exposure (Sareen, 2014; Shalev et al., 2019; Tortella-Feliu et al., 2019; Xue et al., 2015), which is further supported by evidence showing a stronger relationship between combat exposure and PTSD symptoms among females compared to males (Luxton, Skopp & Maguen, 2010; Macera et al., 2014). Given that the number of females serving in the military has been increasing, it is thought that the prevalence of PTSD among females will increase as well (Manning, 2008). The fact that females are prone to PTSD at greater levels than males is suggested to be due, in part, to elevated rates of depression, and diminished social support within the military (Carter-Visscher et al., 2010; Xue et al., 2015). The elevated rates of depression among females can contribute to increased sensitivity to threatening events (Tolin & Foa, 2006), and an increased likelihood of interpreting the trauma more negatively compared to males (Stander, Thomsen & Highfill-McRoy, 2014; Street, Vogt & Dutra, 2009).

Due to the elevated levels of trauma experienced, veterans and military personnel are at risk of not only developing PTSD, but also co-occurring mental disorders. In line with this suggestion, of the veterans with a PTSD diagnosis, approximately 80% also had major depressive disorders.
episodes, 46% had a generalized anxiety disorder, 51% had a panic disorder, and 59% had a social anxiety disorder (Sareen et al., 2021). These findings suggest that over time, mental disorders may accumulate, even long after the exposure to trauma. Related to the elevated rates of comorbidity, it was identified that veterans with PTSD and at least one additional comorbid mental illness will experience greater PTSD symptom severity compared to those with PTSD and no present comorbidities (Knowles et al., 2019).

It has been established that a history of childhood trauma exposure may predispose an individual to developing PTSD (Engel et al., 1993; Tortella-Feliu et al., 2019), and the experience of childhood abuse may further exacerbate PTSD in adulthood (Breslau et al., 1997; Brewin et al., 2000; Tortella-Feliu et al., 2019). Childhood abuse is significantly higher among CAF members, with 48% of CAF who report childhood abuse compared to 33% in the civilian population (Afifi et al., 2016). It may be the case that childhood adversity itself increases the occurrence of mental illnesses among combat exposed veterans (Bandoli et al., 2017), and it is possible that the effects are cumulative or interact with one another (Afifi et al., 2021; Nichter et al., 2020). In line with this suggestion, approximately 65% of veterans with PTSD reported being physically abused in childhood compared to 45% of veterans without PTSD (Bečirović et al., 2017). Moreover, among CAF members and veterans, cumulative effects were found for those that experienced both child maltreatment and deployment-related trauma, increasing the odds of past 12-month PTSD symptoms (Afifi et al., 2021). Thus, the cumulative or interactive effects of childhood maltreatment together with subsequent traumas may further increase the risk of PTSD development and symptom severity.
Stress Sensitization and PTSD

Individuals who have been exposed to severe traumatic stressors may have an exaggerated response when they encounter later stressors (Anisman, 2014). This phenomenon is known as stress sensitization and has been proposed to significantly contribute to symptom development among those diagnosed with PTSD (Anisman, 2011; McFarlane, 2010). In this instance, traumatic events may sensitize essential neurobiological mechanisms underlying the stress response, thus hindering an individual’s capability to protect their wellbeing (Matheson, Asokumar & Anisman, 2020). The notion of stress sensitization among individuals with PTSD is further supported by the exaggerated neurobiological responses shown among military personnel when they encounter stressful life events the first year after returning from deployment that included high levels of combat exposure (Smid et al., 2015). In this regard, physiological implications are associated with the exposure to trauma, where a reminder of the adverse event may more readily trigger a response due to changes in neuronal structures (Anisman, 2014). In accordance with this view, the repetition of trauma or replaying of a traumatic event leads to the sensitization of neurons, resulting in an increased susceptibility to PTSD pathology (Anisman, 2014). More so, underlying mechanisms associated with the initial stressor, such as cortisol and inflammatory release, may further be exaggerated in response to a subsequent traumatic event. As a result, subsequent stressors that may not be associated with the initial trauma elevate biological reactivity (Anisman, 2014; Anisman, Hayley & Kusnecov, 2018).

Neurobiological Correlates of PTSD

Cortisol and Stressors

In response to a stressor or traumatic event, the HPA axis is activated, in which the hypothalamus releases corticotropin releasing hormone (CRH), resulting in the release of
adrenocorticotropic hormone (ACTH) from the pituitary gland, and subsequently the adrenal
glands release cortisol (Rivier & Vale, 1983; Vale et al., 1981). Cortisol, a biological marker of
the stress response, acts upon various tissues and organs using a negative feedback mechanism to
regulate its action under healthy conditions (Lucassen et al., 2014). However, the exposure to
chronic stress can lead to the dysregulation of the HPA axis, which in turn may contribute to
alterations of glucocorticoid receptors and glucocorticoid signaling (Daskalakis, Lehrner &
Yehuda, 2013). The impact of chronic stress and HPA axis dysregulation on cortisol levels results
in two contrasting observations: hypercortisolism and hypocortisolism (Miller, Chen & Zhou,
2007). Hypercortisolism, due to the prolonged activation of the HPA axis, results in higher-than-
normal levels of circulating cortisol, thus leading to tissue damage and overall negative health
consequences (Allen et al., 2018; Anisman, Kusnecov & Hayley, 2018). Conversely,
hypocortisolism, in response to chronic stressors, results in reduced or blunted cortisol levels,
which has also been linked to negative health outcomes (Metz et al., 2020; Young et al., 2021). In
this regard, initially chronic stress activates the HPA axis leading to hypercortisolism, although as
time progresses farther from the initial onset of the stressor, an adaptation in cortisol secretion
occurs due to the system being overly strained, which can ultimately result in reduced cortisol or
hypocortisolism (Young et al., 2021). Moreover, the nature of the stressor may also determine
whether cortisol levels will be chronically elevated or reduced, whereby threats to the physical
self, traumatic events and uncontrollable stressors may consequently result in reduced cortisol
secretion (Miller, Chen & Zhou, 2007).

The typical diurnal pattern of cortisol secretion starts with a sharp peak 30 minutes after an
individual wakes, often referred to as the cortisol awakening response (CAR), and as the day
progresses, gradually declines to its lower limits during sleep (Speer et al., 2019). The CAR and
the diurnal profile are often used as an indicator of HPA axis functionality, and fluctuations from the regular diurnal pattern may reflect HPA axis dysregulation. For example, in females aged 9 to 14, higher diurnal patterns were reported among those who had experienced childhood maltreatment (LeMoult et al., 2015). Childhood trauma was similarly linked to elevated diurnal cortisol concentrations; however, this was only found among depressed adults with glucocorticoid resistance in comparison to adults without glucocorticoid resistance (Nikkheslat et al., 2020). Other studies have suggested that individuals with early life neglect show an increase in CAR irrespective of an MDD diagnosis (Lu et al., 2016; Peng et al., 2014). Diurnal cortisol patterns following a traumatic experience might also depend on distress levels, as it was revealed that following the recent Pulse night club massacre in North Carolina, participants with higher daily distress displayed elevated waking cortisol across the testing period (Parra, Helm & Hastings, 2022). Childhood traumatic experiences have also been linked to lowered resting cortisol levels, particularly among individuals with a suicidal history (O’Connor et al., 2018). Moreover, survivors of the 9/11 World Trade Center attacks who were experiencing comorbid PTSD and depression symptomology were found to have a dampened cortisol response after their recollection of the traumatic event (Dekel et al., 2017). These data reveal that traumatic experiences may lead to altered baseline cortisol levels and secretion in response to various stressors among diverse populations.

**Cortisol and PTSD**

Many studies show that individuals with PTSD often display reduced diurnal cortisol patterns (Speer et al., 2019), which is in contrast to the elevated diurnal cortisol profiles typically displayed by individuals with depression (Murphy et al., 2022). Specifically, cortisol patterns among holocaust survivors who had been diagnosed with PTSD or developed PTSD over time
presented with a continued decline in urinary cortisol levels (Yehuda et al., 2007). Additionally, mothers who experienced interpersonal violence and had a diagnosis of PTSD, displayed a flatter diurnal cortisol pattern. More specifically, those with PTSD displayed a lower cortisol awakening response but elevated cortisol levels during the nighttime, in comparison to healthy controls (Cordero et al., 2017).

Findings relative to diurnal cortisol among combat exposed veterans diagnosed with PTSD tend to similarly suggest a blunted pattern in comparison to veterans without PTSD. Specifically, reduced levels of cortisol upon awakening, 30 minutes after waking, and at bedtime, signifying an overall blunted diurnal cortisol pattern were evident among veterans with PTSD (Adams et al., 2006; Starr et al., 2019; Wahbeh & Oken, 2013). De Kloet et al. (2007) also showed lower levels of cortisol in the first hour of waking among military veterans with PTSD compared to non-trauma exposed civilians. Conversely, when comparing PTSD diagnosed veterans to a non-PTSD diagnosed group with a history of combat exposure, no differences in diurnal cortisol concentrations were reported (de Kloet et al., 2007). In line with these data, salivary cortisol levels upon awakening and in the afternoon did not differ among Vietnam nurse veterans with chronic PTSD and those who had never had PTSD (Metzger et al., 2008). While biological data is very limited among dissociative PTSD, one study specified that women with dissociative PTSD show an even greater dysregulation by way of a flatter diurnal cortisol pattern in comparison to women with non-dissociative PTSD (Seng et al., 2018). Relative to evening cortisol levels, another study suggested that cortisol tends to be elevated among individuals with trauma exposed PTSD compared to those who have not developed PTSD in response to traumatic exposure (Young & Breslau, 2004). Likewise, individuals with a comorbid PTSD and MDD diagnosis tend to display significantly higher nighttime cortisol concentrations (Young & Breslau, 2004).
In addition to disrupted cortisol profiles, individuals with PTSD can also display altered circulating inflammatory levels. The HPA axis and immune systems are intricately linked whereby typically cortisol can regulate the immune system, however in chronic stress, such as traumatic experiences, cortisol receptors can become desensitized, and the immunosuppression of cortisol might not occur, possibly leading to a pro-inflammatory state (Cohen et al., 2012).

**Inflammation and PTSD**

Various studies have suggested that PTSD and trauma exposure are associated with a heightened inflammatory state as a consequence of the dysregulation in the autonomic nervous system and HPA axis pathways (Lindqvist et al., 2017; Michopoulos et al., 2015; Neigh & Ali, 2016). Indeed, elevated C-reactive protein (CRP) levels, a general inflammatory marker released by the liver in response to proinflammatory cytokines, are increased among those with PTSD compared to healthy controls (Bersani et al., 2016; Kim, Lee & Yoon, 2020). Moreover, PTSD symptom severity also relates to CRP levels among civilians exposed to high levels of trauma (Michopoulos et al., 2015; Rosen et al., 2017), and among survivors of an extremist attack (Rosen et al., 2017). While studies have found elevations in CRP among trauma exposed individuals, other reports indicate that CRP was not significantly associated with exposure to physical and sexual abuse in childhood, or to PTSD symptom severity (Maples-Keller et al., 2022). In relation to these findings, CRP was not found to be a significant predictor in determining severity of PTSD symptoms (Maples-Keller et al., 2022).

Individuals with PTSD tended to display heightened interleukin (IL)-6 and IL-10 levels compared to healthy individuals (de Oliveira et al., 2018), in addition to elevated levels of IL-1β and tumor necrosis factor (TNF)-α following a traumatic natural disaster (Wang et al., 2019). While these studies reveal elevated cytokine levels among individuals diagnosed with PTSD, there
are also reports indicating that cytokine levels are unaffected (Gola et al., 2013; Heinzelmann et al., 2014; Teche et al., 2017). The discrepancy in the literature may be explained by differences in sample characteristics, including the type of trauma experienced, comorbid disorders, PTSD symptom severity, and potential exposure to subsequent stressors. However, the predominant finding in the literature supports the narrative that PTSD and trauma exposure are often linked to a pro-inflammatory state.

Similar trends are found when examining inflammation among military personnel and veterans (Groer et al., 2015; Lindqvist et al., 2017). Specifically, soldiers on active duty tend to show higher than expected levels of circulating CRP (Groer et al., 2015). In line with these data, combat exposed veterans with PTSD demonstrated a significantly greater total pro-inflammatory state in comparison to a combat exposed non-PTSD group (Lindqvist et al., 2017). Specifically, compared to healthy controls, veterans with PTSD displayed significantly elevated levels of interferon (IFN)-γ and TNF-α, but did not show elevated levels of CRP or IL-6 (Lindqvist et al., 2014). That said, in a cohort replication study, elevated levels of IL-6 and CRP were said to be a key pathophysiological feature of combat related PTSD (Lindqvist et al., 2017). Moreover, cytokine production predicted a steeper increase in the severity of PTSD symptoms following the return from high levels of exposure to combat, particularly in response to additional exposure to stressful life events post-deployment (Smid et al., 2015).

It is further suggested that the relationship between the level of CRP and PTSD symptom onset may not necessarily be mediated by the severity of the experienced trauma in the case of combat related PTSD, but rather by pre-deployment levels of proinflammatory cytokines (Eraly et al., 2014). Eraly et al. (2014) postulates that elevated CRP levels demonstrated prior to deployment may be due to preceding traumas experienced, thus increasing the vulnerability of PTSD
development. In this case, combat exposed veterans diagnosed with PTSD tend to demonstrate a significant discrepancy in their inflammatory profile compared to non-PTSD combat exposed veterans (Wang et al., 2016), where individuals with greater inflammation may be predisposed to PTSD development (Eraly et al., 2014). However, the possibility also exists that inflammation might be tied more closely to specific symptomatologies. For instance, while investigations examining inflammation among the dissociative PTSD subtype have not yet been conducted, a significant association was found between dissociation symptoms and greater CRP levels among trauma exposed individuals independent of PTSD diagnosis (Powers et al., 2019). These findings further highlighting the need to better understand the neurobiology of specific PTSD symptoms and subtypes in an effort to inform more personalized treatments.

**The Current Study**

The aim of the current study was to characterize symptom severity and distinct symptom profiles among subtypes of PTSD, with a specific focus on the dissociative PTSD subtype among individuals with past or present experience in the military. A further aim of this project was to examine whether neuroendocrine and inflammatory profiles could be used to differentiate PTSD subtypes and assess relationships between these biomarkers with various clinical symptom profiles. Additionally, the current project aimed to examine the relation between early childhood abuse experiences and other traumatic life experiences with clinical symptomatologies and peripheral biomarkers. Considering that dissociative PTSD has only recently been identified in the DSM-5, an improved clinical and biological understanding of this subtype will assist in filling various gaps in knowledge, in an effort to inform future tailored or personalized treatments. It was hypothesized that PTSD symptom severity would be elevated among the dissociative PTSD group in comparison to the non-dissociative PTSD and control groups. It was expected that elevated
depressive symptoms and childhood trauma experiences would be found among both the PTSD groups compared to controls, reflecting a high degree of comorbidity and complexity. Moreover, we hypothesized that the cortisol awakening response would be blunted among the non-dissociative PTSD group, but it was predicted that this blunted cortisol response might not be present among the dissociative PTSD group. It was further hypothesized that individuals with a clinical diagnosis of PTSD, regardless of subtype, would display elevated inflammatory biomarker profiles and that inflammatory markers would map onto clinical symptoms of PTSD, depression, and childhood trauma experiences.

Methods

Participants

Participants within the current study ($N = 69$) were recruited (Appendix A) through the Operational Stress Injury (OSI) Clinic at the Royal Ottawa Mental Health Centre (ROMHC), as well as through external recruitment via advertisements distributed in specialized clinics, support groups, and web-based platforms (i.e., ROHMC/Institute of Mental Health Research (IMHR) website, eMentalHealth Research Study Directory, Kijiji, and Facebook). In order to participate in the current study, individuals needed to meet a number of eligibility criteria including being: i) between the ages of 18 to 65 years old; and ii) a current or past member of the Canadian Armed Forces (CAF) who had been deployed to an active war zone since 2001 (except for the healthy control group). Additional inclusion criteria were classified to designate participants to one of three pre-determined groups: healthy controls, non-dissociative PTSD, and dissociative PTSD. The healthy control group required: i) no current self-reported diagnosis of a mental disorder; ii) Primary Care PTSD (PC-PTSD) score $< 3$; and iii) Beck Depression Inventory (BDI-II) score $< 14$. Participants in either of the PTSD groups required: i) self-reported diagnosis of a mental
disorder based on phone interviews (i.e., Mini International Neuropsychiatric Interview (M.I.N.I.) and/or questionnaires); and ii) meeting DSM-V criteria for PTSD based on the Clinician Administered PTSD Scale for DSM-V (CAPS-5). For individuals with a PTSD diagnosis where the M.I.N.I. or CAPS-5 was not available, PTSD was confirmed via self-reported diagnosis using the PC-PTSD or PTSD Checklist for DSM-5 (PCL-5). Cut-off scores to confirm PTSD diagnosis was ≥ 3 for PC-PTSD and ≥ 33 for PCL-5. To further differentiate non-dissociative PTSD participants from dissociative PTSD participants, the dissociation criterion of the CAPS-5, where a score of ≥ 1 out of 2 classified the diagnosis as a dissociative PTSD subtype. Specific secondary exclusion criteria were further outlined, consisting of: i) diagnosis of substance use disorder in the last 6 months or significant symptoms of substance use disorder on the M.I.N.I.; ii) recently traveled to a different time zone; iii) working night or rotating shifts; iv) major physical illnesses, failure of major organs, or head trauma with a loss of consciousness of a minimum 5 minutes; v) inability to abstain from caffeine, alcohol or nicotine for 24 hours, or refrain from illicit drugs (exception of cannabis) for three weeks; and/or vi) taking stimulant medications.

**Procedure**

All procedures were approved by The Royal’s Institute of Mental Health Research’s Research Ethics Board (REB Protocol #2019037; Appendix B). Prior to the start of the experiment, various screening procedures were performed to confirm eligibility of potential participants (Appendix C). First, participants were contacted to determine if they meet the Participant Screening Form criteria. For possibly eligible participants, a research assistant obtained verbal consent from the potential participant to send screening questionnaires by email or post. The screening questionnaires included the PC-PTSD and BDI-II for all groups. These questionnaires took approximately 5 to 20 minutes to complete. If the potential participants chose to fill out the
questionnaires online, the research assistant emailed a link where they could access the questionnaires online via a secured website (Qualtrics). Potential participants were instructed to use an anonymous research screening code when filling out the questionnaires. If preferred, potential participants were sent a paper copy of the questionnaire by post with a pre-paid return envelope. Together with the questionnaires, participants were sent a copy of the Informed Consent Form (ICF). If the questionnaires indicated that the second set of eligibility criteria were met, potential participants were invited for the third and last screening step: a face-to-face interview with the M.I.N.I. (and the CAPS-5 for the PTSD groups). For the healthy control group, if the participant answered yes on the M.I.N.I. screen question about drugs or alcohol, the Module I or J of the M.I.N.I. was administered to determine eligibility. Module I and J assess alcohol use disorder and substance use disorder. Based on all clinical interviews and the completed questionnaires, participants were separated into the three groups according to classification criteria.

After the screening procedure, informed consent for the study was obtained from all eligible participants (Appendix D). A research assistant verbally summarized the study and answered any inquiries participants had. When participants felt comfortable with their understanding of the study procedures, they signed the ICF and were given a copy. Due to the multiple visits required for this study, ongoing verbal consent was obtained and documented prior to the start of each visit’s protocols (Appendix E).

The current project is part of a larger study referred to as Multi-dimensional Assessment of PTSD Subtypes (MAPS), which comprises various metrics ranging from genome-wide DNA methylation, autonomic functions, sleep metrics, circadian rhythm tracking, neuroimaging, and EEG, which are outside the scope of the current study. The data relevant to the current study
include the clinical/questionnaires data which assessed demographics, general health, childhood and general traumatic life events, mood disorders, and trauma-related disorders, as well as peripheral biomarkers including the general inflammatory marker, CRP, and pro-inflammatory cytokines, IL-6 and TNF-α, in addition to salivary cortisol.

The overarching MAPS longitudinal protocol consists of three in-person visits to the Royal Ottawa per time point: Visit #1 (V1; baseline), Visit #2 (V2; within a week), and Visit #3 (V3; within 2-3 days of V2), and follow-ups six and twelve months later. The current study however focuses primarily on data collected within the first and third visits (V1 and V3). Participants were asked not to drink alcohol 24 hours prior to V1; not eat, consume caffeine, or smoke 1 hour prior; and on the day of, not engage in vigorous exercise. During V1, after filling out the required questionnaires, anthropometrics, including height and weight, were measured as these features can strongly influence on inflammatory, cardiovascular and sleep functions. A non-fasting blood draw was also performed via venipuncture (≤ 16 mL, about ≤ 1.1 tablespoons) at noon to obtain the inflammatory blood markers. All blood collection procedures were administered in the ROMHC blood laboratory. Any treatments, alongside changes in medication and/or diagnoses of existing mental health disorders, were documented via an online treatment log that participants were provided and reminded of to keep updated every 3 months. Pharmacy records, electronic medical records, and information for external mental health care providers were obtained with participants consent to maintain an up-to-date record of treatments and diagnoses. More stringent protocols were required for V2 (which comprised EEG, an overnight sleep assessment in the lab) and V3 (which comprised fMRI neuroimaging and another overnight sleep assessment in the lab). Relevant to the current study was that V3 comprised an overnight sleep assessment in the laboratory, and saliva samples were taken before bedtime (PM) and immediately upon awakening
For nighttime cortisol determination, samples were collected two and a half hours prior to bedtime (considered time point PM1), two hours (PM2), one and a half hours (PM3), one hour (PM4), and 30 minutes (PM5) before bedtime. For cortisol awakening response, samples were collected immediately upon awakening in the laboratory (considered time point AM1), 15 minutes after waking (AM2), and 35 minutes after waking (AM3). Bed and wake times were tailored to each individual’s sleep patterns, as participants were asked to complete a sleep log where they documented their sleep and wake times for the duration of one week prior to coming into the laboratory for V3. Based on the sleep log, average sleep and wake times were determined for each participant and saliva sample collection time was adjusted accordingly. Compensation was determined based on the number of attended study visits, in which participants received $25 for V1, $75 for V2, and $150 for V3.

**Measures** (Appendix F)

**Demographics.** Participant’s age, gender, ethnicity, and various other demographics were documented. General health information was also requested, specifically current medical records and history of mental and medical disorders, alongside any medication and/or treatments.

**Depression.** The Beck Depression Inventory Second Edition (BDI-II; Beck, Steer, & Brown, 1961) is a 21-item self-report scale used to assess the severity of an individual’s depression symptoms. Each item ranges from 0 (low depressive symptoms) to 3 (high depressive symptoms) with a maximum total score of 63. The higher the total score, the more severe the depression symptoms experienced by the individual. Items in this scale were assessed by summing scores for a total depression score ($\alpha = 0.95$).

**Anxiety.** the Beck Anxiety Inventory is a 21-item self-report scale (BAI; Beck & Steer, 1993), used to measure the severity of anxiety for an individual. Each question ranges from 0 (none
to low anxiety) to 3 (severe anxiety) with a maximum total score of 63. Higher total scores represent greater anxiety severity levels. Items in this scale were assessed by summing scores for a total anxiety score ($\alpha = 0.93$).

**Mood.** The Positive and Negative Affect Schedule short form (PANAS-SF; Watson, Clark & Tellegen, 1988) is a 20-item scale to measure mood or emotion. The scale is comprised of 10 items to measure positive affect and 10 items to measure negative affect. Each item is rated on a five-point scale, ranging from 1 (very slightly or not at all) to 5 (extremely). Positive affect totals are computed by summing scores, with higher scores representing higher levels of positive affect ($\alpha = 0.88$), while negative affect scores are summed to compute a total score, in which lower scores represent lower levels of negative affect ($\alpha = 0.84$).

**PTSD.** The 20-question PTSD Checklist for DSM-5 (PCL-5; Blevins et al., 2014) is a self-screening tool to assist in the diagnosis of PTSD by a clinician where all items correspond to the current DSM-5 diagnostic criteria for PTSD. Each item can be scored using a five-point scale from 0 (not at all) to 4 (extremely) with a maximum total score of 80. While a higher total score is indicative of higher likelihood of PTSD symptom severity, a score of 31 to 33 can be used as a cut-off of probable PTSD. Items in this scale were assessed by summing scores for a total PTSD score ($\alpha = 0.96$).

The Clinician-Administered PTSD Scale for DSM-5 (CAPS-5; Weathers et al., 2018) is a 30-item structured interview that is used to make a current and lifetime diagnosis of PTSD, in addition to assessing PTSD symptoms over the past week. In addition to assessing the symptoms of PTSD listed in the DSM-5, questions of the CAPS-5 focus on symptom onset and duration, subjective experiences impacting social and occupational functioning, and symptoms linked to dissociative PTSD (depersonalization and derealization) to formulate overall PTSD severity.
Severity rating includes 0 (absent), 1 (mild/subthreshold), 2 (moderate/threshold), 3 (severe/markedly elevated), and 4 (extreme/incapacitating). CAPS-5 total scores were summed to assess PTSD severity ($\alpha = 0.74$). To assess symptoms of dissociative PTSD, subscales of the CAPS-5 were formulated, including dissociative, depersonalization, and derealization symptom severity. The dissociative subscale was calculated by summing two symptoms in the CAPS-5 to yield a total score of 4, while depersonalization and derealization scores were based on individual questions on a dichotomous scale (i.e., yes or no), to yield a total score of 2 for each symptom. Higher scores on the total scale and each subscale indicate elevated symptom severity.

The Dissociative Subtype of PTSD Scale (DSPS; Wolf et al., 2017) is a 15-item scale that assesses lifetime and current (past-month) dissociative symptoms, which are listed in the DSM-5 to define the dissociative PTSD subtype. The DSPS is structured on a dichotomous scale such that individuals are asked if they have ever (in their lifetime) experienced a given symptom, and then asked if the symptom has been present in the last month. The scale is comprised of three subscales: i) derealization/depersonalization; ii) loss of awareness; and iii) psychogenic amnesia. For the purpose of this thesis, the subscale assessing derealization/depersonalization symptoms at the lifetime level was used, as the subscale has been shown to differentiate the DSM-5 dissociative subtype of PTSD (Wolf et al., 2017). Scores were derived by summing each item, where higher scores reflect greater dissociative symptom severity ($\alpha = 0.84$).

**Traumatic Life Events.** The Life Events Checklist for DSM-5 (LEC-5; Weathers et al., 2013) consists of 17 events which are linked to the development of PTSD or distress. The LEC-5 is a self-report measure that screens for potential traumatic life events in an individual’s lifetime. Responses for each item indicates varying levels of exposure to various forms of traumatic events which are included on a six-point nominal scale. Responses include “happened to me”, “witnessed
it”, “learned about it”, “part of my job”, “not sure”, and “doesn’t apply”. Based on responses to “happened to me” and “witnessed it”, a total score was computed by summing the frequencies of each of the 17 events (α = 0.85).

**Childhood Trauma.** The short form of the Childhood Trauma Questionnaire (CTQ-SF; Bernstein et al., 2003) consists of a 28-item self-report measure that determines level of maltreatment across five categories, including: emotional, physical, and sexual abuse, and emotional and physical neglect. Scoring for each item ranged from 1 (never true) to 5 (very often true). Higher total scores represented a greater frequency of experiencing trauma during childhood. Items in this scale were assessed by summing scores for a total childhood trauma score (α = 0.90). There are also subscales that assess subtypes of childhood trauma including emotional abuse (α = 0.81), physical abuse (α = 0.83), sexual abuse (α = 0.96), emotional neglect (α = 0.92) and physical neglect (α = 0.65).

**Clinician Interviews.** The Primary Care PTSD Screen for DSM-5 (PC-PTSD; Prins et al., 2016) consists of five questions administered to individuals with probable PTSD, often used in a primary care setting. The first question assesses if the individual has been exposed to any traumatic events. If the individual responds no, a screen total of 0 is assigned. If yes, five items consisting of yes or no questions are administered asking how the past trauma has affected their life for the past month. Individuals can score up to 5, in the case when they respond yes to each question. Often if the individual responds yes to 3 out of 5 questions, PTSD is probable and further assessment, such as a clinical interview, is recommended as the PC-PTSD cannot determine a PTSD diagnosis definitively.

Mini International Neuropsychiatric Interview (M.I.N.I.; Lecrubier et al., 1997) and the CAPS-5 were used in conjunction to confirm diagnoses of non-dissociative and dissociative PTSD.
The M.I.N.I. assesses 17 disorders apart of the Diagnostic and Statistical Manual (DSM-III-R). One to two screening questions for each disorder is used to eliminate a diagnosis, whereas the CAPS-5 is used to determine a PTSD diagnosis and severity of symptoms.

**Biological Markers**

*Saliva Collection.* Saliva samples were collected at night before bedtime, and in the morning upon awakening. Time points for the nighttime saliva samples include two and a half hours before bedtime (PM1), two hours (PM2), one and a half hours (PM3), one hour (PM4), and 30 minutes (PM5) before bedtime. In the morning, samples were collected immediately upon awakening in the laboratory (AM1), 15 minutes after waking (AM2), and 35 minutes after waking (AM3). Upon the specified times and prior to drinking or eating, for each sample, participants were instructed to place the swab directly into the mouth and chew gently on the swab for 2 minutes to stimulate salivation. After 2 minutes, participants removed the swab from the mouth and returned it into the salivette collection container. Upon collection, saliva samples were immediately placed on ice and centrifuged. Saliva was then aliquoted into tubes and frozen until required for cortisol assays.

*Blood Collection.* Participant blood samples were collected into EDTA coated chilled tubes by a registered nurse/phlebotomist at approximately 12pm for all participants to limit the influence of diurnal hormone and immune fluctuations. Upon collection, blood samples were immediately placed on ice and centrifuged for 20 minutes at 4°C and 1000g. Plasma was then aliquoted into Eppendorf tubes and frozen at -80°C until required for inflammatory assays.

*Cortisol Assay.* Plasma cortisol was determined in duplicate by radioimmunoassay (RIA) using a Cortisol Coated Tube RIA kit (125I) obtained from MP Biomedicals LLC. The assay was
performed according to the manufacturer’s instructions. The inter- and intra-assay variability was < 15%.

**Inflammatory Assays.** Circulating levels of CRP, IL-6, and TNF-α were determined in duplicate by high sensitivity human enzyme-linked immunosorbent assay (ELISA) kits. For CRP, high performance CRP kits were obtained from Life Technologies (Fisher Scientific). For IL-6 and TNF-α, high sensitivity human ELISA kits were obtained from R&D Systems (Bio-Techne Canada). The assays were performed according to the manufacturer’s instructions. The inter- and intra-assay variability was < 15%.

**Statistical Analysis**

All statistical analyses were conducted via the IBM SPSS Statistics version 27 for Windows (SPSS Inc., Armonk, NY, USA). To clean the data, all items were checked for out-of-range scores due to human error in data entry, in addition to any outliers (± 3.29), which were brought into range. Pearson correlations were conducted to examine possible relationships between scores on variables of interest within each diagnostic group. Because only the non-dissociative and dissociative PTSD groups completed the PTSD-related questionnaires, analyses assessing differences according to the two PTSD groups on variables of interest (i.e., PTSD severity and dissociative symptoms) were measured using independent samples t-test. One-way analysis of variance (ANOVA) with Bonferroni post-hoc tests were used to compare means on clinical symptoms (i.e., anxiety and depressive symptoms, positive and negative affect, and trauma experiences) according to the three groups: healthy controls, non-dissociative PTSD, and dissociative PTSD. Multivariate analysis of variance (MANOVA) was used in order to assess group differences on childhood trauma subscales. Analysis of covariance (ANCOVA) were used to determine differences in inflammatory biomarkers with respect to the diagnosis groups, with
BMI included as a covariate. To be sure, ANCOVAs were also run when assessing inflammatory biomarkers and controlling for anti-depressant/anti-anxiety medications, however, results remained the same and were not reported. Additionally, a mixed measures ANOVA, with time serving as the within-subjects variable, was used to determine differences between the diagnosis groups on concentrations of the cortisol awakening response. For nighttime cortisol, as too few participants had completed all five samples, resulting in very small samples sizes ($n = 2$), we were not able to conduct a repeated measures ANOVA. Thus, separate ANVOAs were performed and a correction was applied to correct for multiple testing, wherein individual ANOVAs were considered significant at $p \leq 0.01$ ($p = 0.05$ corrected for running five separate ANOVAs). For all other analyses, statistically significant results were determined at $p < 0.05$ (two-tailed analysis).

Results

Participant Demographic Information

Participants comprised 69 individuals with an average age of 48.81 years ($SE = 1.01$, range $= 33 – 63$ years). Of participants, 73.9% identified as male ($n = 51$), and 26.1% ($n = 18$) identified as female. The vast majority (80.3%; $n = 49$) of participants identified their ethnicity as White (e.g., European descent), followed by French-Canadian (16.4%; $n = 10$); while Black individuals (e.g., African American, African, Caribbean, or Haitian descent) constituted the smallest group (1.4%; $n = 1$).

Approximately three quarters of participants (75.4%. $n = 52$) had a confirmed PTSD diagnosis according to clinical interviews, while 18.8% ($n = 13$) had no clinical diagnosis and were categorized as healthy controls. Additionally, 5.8% ($n = 4$) of individuals were excluded from analyses due to the lack of a valid diagnosis. Those with a PTSD diagnosis were further categorized into two subtypes: i) non-dissociative PTSD, (63.5%; $n = 33$); and ii) dissociative (36.5%; $n = 19$)
PTSD. Of participants in the healthy control group \((n = 13)\), one participant was a veteran \((7.7\%)\), 30.8\% \((n = 4)\) were active CAF personnel, and 61.5\% \((n = 8)\) were non-military. For those with a non-dissociative PTSD diagnosis, the majority \((93.9\%; n = 31)\) were veterans, one participant \((3.0\%)\) was an active CAF personnel, and one other participant \((3.0\%)\) was on medical/psychiatric leave of absence from the military, while all participants \((n = 19)\) with a dissociative PTSD diagnosis were veterans.

As expected, many individuals diagnosed with PTSD also had a MDD diagnosis. Specifically, of participants, 20.6\% \((n = 14)\) had a comorbid PTSD and MDD disorder. Moreover, of the dissociative PTSD group, approximately half \((47.4\%, n = 9)\) were taking a form of mood medication (i.e., antidepressants, anxiolytics, etc.), and 36.4\% \((n = 12)\) of the non-dissociative PTSD group, reported taking these medications.

**Frequency of Trauma Experiences**

Given that trauma exposure is a core component of PTSD, it was of interest to identify various traumatic life events that participants have encountered or witnessed, based on diagnosis group. Due to the distressing nature of the LEC-5, several participants did not complete the questionnaire \((n = 10)\), and as such, the sample size is diminished in each group. The specific events are outlined in Table 1.
### Table 1

Experienced or witnessed traumatic life events among diagnosis groups.

<table>
<thead>
<tr>
<th>Life event</th>
<th>Dissociative PTSD $n = 18$</th>
<th>Non-dissociative PTSD $n = 27$</th>
<th>Healthy control $n = 10$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural disaster</td>
<td>11 (61.1%)</td>
<td>11 (40.7%)</td>
<td>3 (30.0%)</td>
</tr>
<tr>
<td>Fire or explosion</td>
<td>15 (83.3%)</td>
<td>21 (75.0%)</td>
<td>2 (20.0%)</td>
</tr>
<tr>
<td>Transportation accident</td>
<td>11 (61.1%)</td>
<td>21 (75.0%)</td>
<td>9 (90.0%)</td>
</tr>
<tr>
<td>Serious accident</td>
<td>12 (66.7%)</td>
<td>13 (48.2%)</td>
<td>2 (20.0%)</td>
</tr>
<tr>
<td>Exposure to toxic substance</td>
<td>8 (44.4%)</td>
<td>15 (55.6%)</td>
<td>2 (20.0%)</td>
</tr>
<tr>
<td>Physical assault</td>
<td>15 (83.3%)</td>
<td>22 (81.5%)</td>
<td>1 (10.0%)</td>
</tr>
<tr>
<td>Assault with weapon</td>
<td>14 (77.8%)</td>
<td>19 (70.4%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>Sexual assault</td>
<td>10 (55.6%)</td>
<td>7 (25.9%)</td>
<td>1 (10.0%)</td>
</tr>
<tr>
<td>Other unwanted or uncomfortable sexual experience</td>
<td>10 (55.6%)</td>
<td>10 (37.0%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>Combat or exposure to a warzone</td>
<td>17 (94.4%)</td>
<td>23 (85.2%)</td>
<td>1 (10.0%)</td>
</tr>
<tr>
<td>Captivity</td>
<td>3 (11.1%)</td>
<td>2 (7.4%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>Life-threatening illness or injury</td>
<td>6 (33.3%)</td>
<td>13 (48.2%)</td>
<td>5 (50.0%)</td>
</tr>
<tr>
<td>Severe human suffering</td>
<td>14 (77.8%)</td>
<td>19 (70.4%)</td>
<td>3 (30.0%)</td>
</tr>
<tr>
<td>Sudden violent death</td>
<td>9 (50.0%)</td>
<td>14 (51.9%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>Sudden accidental death</td>
<td>2 (11.1%)</td>
<td>16 (59.3%)</td>
<td>2 (20.0%)</td>
</tr>
<tr>
<td>Serious injury, harm, or death you caused to someone else</td>
<td>6 (33.3%)</td>
<td>10 (37.0%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>Any other stressful event or experience</td>
<td>6 (33.3%)</td>
<td>15 (55.6%)</td>
<td>2 (20.0%)</td>
</tr>
</tbody>
</table>
PTSD Subtypes and Symptom Severity

It was of interest to compare PTSD symptom severity and the specific dissociative features among the PTSD subtypes. Total PTSD severity, as measured through a constructed clinical interview (i.e., the CAPS-5), differed according to PTSD diagnosis, $t(48) = -4.77, p < 0.001$, in which the dissociative PTSD group exhibited higher symptomatology ($M = 48.11 \pm 2.34$) than the non-dissociative PTSD group ($M = 33.03 \pm 1.97$). Similarly, self-reported measures of PTSD symptom severity (i.e., the PCL-5) were also higher among the dissociative PTSD group, ($M = 49.63 \pm 2.69$), in relation to the non-dissociative PTSD group, ($M = 38.00 \pm 2.79$), $t(45) = -3.00, p = 0.002$. Moreover, and as shown in Figure 1, when examining the CAPS-5 dissociative subscales, as expected, the dissociative PTSD group displayed elevated dissociative symptoms, $t(49) = -10.58, p < 0.001$, depersonalization symptoms, $t(49) = -6.29, p < 0.001$, and derealization symptoms, $t(49) = -6.94, p < 0.001$, compared to the non-dissociative PTSD group.
Figure 1

Mean dissociative, depersonalization, and derealization scores (± SE) between non-dissociative and dissociative PTSD. ***$p < 0.001$
Mood States and Comorbidity

Univariate ANOVAs were conducted to assess mood states according to the three diagnosis groups. Assessment of depression scores revealed differences across the groups, \( F(2, 59) = 38.10, p < 0.001, \eta^2 = 0.56 \). As shown in Figure 2, the dissociative PTSD group displayed elevated levels of depression symptomatology compared to both the non-dissociative PTSD group, \( p = 0.01 \), and the healthy control group, \( p < 0.001 \). Consistent with these findings, differences in anxiety symptoms were also found, \( F(2, 56) = 22.37, p < 0.001, \eta^2 = 0.44 \). Specifically, while anxiety symptoms did not differ between the two PTSD groups, \( p = 0.12 \), both PTSD groups had elevated anxiety scores in relation to the healthy control group, \( p's < 0.001 \) (Figure 2).
Figure 2

Mean depression and anxiety scores (± SE) between healthy controls and PTSD subtypes. ***$p < 0.001$, **$p \leq 0.01$
Upon assessing affective states, it was revealed that the three groups differ relative to both positive, $F(2, 50) = 15.43, p < 0.001, \eta^2 = 0.38$, and negative affect, $F(2, 50) = 27.93, p < 0.001, \eta^2 = 0.53$. Specifically, the dissociative PTSD and non-dissociative PTSD groups both had lower levels of positive affect compared to controls, $p$’s < 0.001, respectively, but did not significantly differ from each other, $p = 0.78$. However, and as shown in Figure 3, when examining negative affect, the dissociative PTSD subtype demonstrated greater negative affect compared to both the non-dissociative PTSD group, $p = 0.008$, and controls, $p < 0.001$. 
Figure 3

Mean positive and negative affect scores (± SE) between healthy controls and PTSD subtypes.

***p < 0.001, **p < 0.01
**Trauma Exposures**

**Traumatic Life Events**

ANOVA analyses were conducted to determine differences in the amount of encountered or witnessed traumatic life events outside of childhood abuse experiences. Results indicate differences between the groups, $F(2, 52) = 10.81, p < 0.001, \eta^2 = 0.45$. Specifically, while the dissociative ($M = 10.50 \pm 0.92$) and non-dissociative group ($M = 11.19 \pm 1.05$) did not differ, $p = 1.00$, both PTSD groups demonstrate significantly elevated traumatic life event encounters compared to the healthy controls ($M = 3.60 \pm 0.60$), $p$’s < 0.001.

**Childhood Trauma Experiences**

It was of particular interest to examine levels of childhood trauma exposure according to clinical diagnosis. Indeed, childhood trauma scores did differ across diagnostic groups, $F(2, 56) = 3.45, p = 0.04, \eta^2 = 0.11$. Specifically, childhood trauma was higher among the dissociative PTSD group ($M = 45.95 \pm 3.83$) compared to individuals in the healthy control group ($M = 33.42 \pm 1.71$), $p = 0.04$, however this effect was not found when comparing individuals with non-dissociative PTSD ($M = 42.00 \pm 2.32$) to controls, $p = 0.18$. More so, the PTSD groups did not differ from one another, $p = 0.94$.

A MANOVA was run to distinguish between subtypes of childhood trauma, as displayed in Figure 4. The results revealed that the subscales of childhood trauma also differed by diagnosis group, Pillai’s Trace, $F(10, 106) = 2.18, p = 0.02, \eta^2 = 0.17$. Univariate ANOVAs demonstrated that specific traumas, including sexual abuse, $F(2, 56) = 4.11, p = 0.02, \eta^2 = 0.13$, and emotional neglect, $F(2, 56) = 3.90, p = 0.02, \eta^2 = 0.12$, differed between diagnosis group, whereas emotional abuse approached significance, $F(2, 56) = 3.08, p = 0.05, \eta^2 = 0.10$. In contrast, physical abuse, $F(2, 56) = 2.28, p = 0.11, \eta^2 = 0.08$, and physical neglect, $F(2, 56) = 0.31, p = 0.74, \eta^2 = 0.01$, did
not significantly differ according to group. Bonferroni follow-up comparisons for the significant trauma subscales revealed that the dissociative PTSD subtype displayed higher scores on sexual abuse exposure compared to the healthy controls, $p < 0.05$, and the non-dissociative PTSD group, $p = 0.05$. For emotional neglect, while the dissociative and non-dissociative PTSD group both differed significantly from the healthy controls, $p$’s $< 0.05$, they did not differ from one another, $p = 1.00$. 
Figure 4

Subtypes of childhood trauma among healthy controls and PTSD subtypes (± SE). *p ≤ 0.05
Cortisol Levels

Nighttime Cortisol Levels

Separate univariate ANOVAs were run to examine nighttime cortisol among the three groups. As shown in Figure 5, the diagnostic groups significantly differed at time points PM1, $F(2, 36) = 6.49, p = 0.004, \eta^2 = 0.27$; PM3, $F(2, 38) = 5.25, p = 0.01, \eta^2 = 0.22$; and PM4, $F(2, 32) = 4.94, p = 0.01, \eta^2 = 0.24$; whereas PM2, $F(2, 39) = 4.28, p = 0.02, \eta^2 = 0.18$; and PM5, $F(2, 35) = 3.67, p = 0.04, \eta^2 = 0.18$, were not considered significant at the adjusted cut-off of $p \leq 0.01$. Upon examining these group differences, the same trend emerged for PM1, PM3 and PM4, in which the dissociative PTSD group had significantly elevated nighttime cortisol levels compared to the healthy control group, $p$’s $< 0.01$, an effect not found for the non-dissociative group $p$’s $> 0.10$. While the dissociative group differed from controls, there were no differences when comparing the dissociative PTSD group to the non-dissociative group, $p$’s $> 0.10$. 
Figure 5

Mean cortisol levels (± SE) at night, specifically two and a half hours before bedtime (PM1), two hours (PM2), one and a half hours (PM3), one hour (PM4), and 30 minutes (PM5) before bedtime among individuals with dissociative PTSD, non-dissociative PTSD, and healthy controls. **p < 0.01
Cortisol Awakening Response

In addition to nighttime cortisol levels, morning cortisol awakening responses were also assessed. As displayed in Figure 6, a mixed measures ANOVA comparing individuals with dissociative PTSD, non-dissociative PTSD, and healthy controls with respect to three morning time points (i.e., AM1, AM2, and AM3) was conducted. An overall effect of Time was found, Pillai’s Trace, $F(2, 25) = 4.79, p = 0.02, \eta^2 = 0.28$. It was apparent that cortisol levels were increasing across the time points, such that levels were highest at AM3, which differed from those at AM1, $p = 0.04$, and likewise, levels at AM2 were significantly elevated from those at AM1, $p = 0.02$. Although there was no Time by Diagnosis interaction, Pillai’s Trace, $F(4, 52) = 1.24, p = 0.31, \eta^2 = 0.09$, there was a significant between-groups effect, such that morning cortisol concentrations differed between diagnosis groups, $F(2, 26) = 8.85, p = 0.001, \eta^2 = 0.41$. Specifically, cortisol levels were elevated among the dissociative and non-dissociative groups compared to controls, $p = 0.001$, and $p = 0.018$, respectively. Based on an a priori hypothesis that the cortisol awakening response would differ according to PTSD groups, the simple effects comprising this interaction were assessed. Cortisol concentration was significantly higher at time point AM1 among the dissociative PTSD group compared to the healthy controls, $p = 0.045$, an effect not found when assessing the non-dissociative PTSD group in comparison to the healthy controls, $p = 0.11$. At time point AM2, the dissociative and the non-dissociative PTSD groups both displayed elevated cortisol concentrations compared to the healthy controls, $p = 0.001$, and $p = 0.048$, respectively. Likewise, at time point AM3, compared to the healthy control group, dissociative PTSD group, $p = 0.004$, and the non-dissociative PTSD group, $p = 0.03$, demonstrated elevated cortisol concentration levels. At no time point did the dissociative and non-dissociative groups differ, $p$’s $> 0.05$. 
Figure 6

Mean cortisol levels (± SE) in saliva collected at three time points including directly upon awakening (AM1), 15 minutes after waking (AM2), and 35 minutes after waking (AM3) among individuals with dissociative PTSD, non-dissociative PTSD, and healthy controls.
**Mood States and Trauma Exposure Relations to Cortisol Levels**

It was of further interest to examine relationships between clinical and psychosocial factors with levels of nighttime and awakening cortisol separately according to groups. As shown in Table 2, among the dissociative PTSD group, cortisol levels at night (PM4) strongly and negatively correlated with PTSD symptom severity, $p = 0.04$, while among the non-dissociative PTSD group, a similar relationship was evident upon awakening (AM1), $p = 0.03$. Moreover, upon assessing dissociative symptom severity, the dissociative PTSD group showed strong positive associations between dissociative symptom severity and both nighttime (PM5), $p = 0.04$, and morning awakening (AM1) cortisol levels, $p = 0.03$. A similar, however weaker relationship was found among the non-dissociative group, these findings were only applicable to nighttime cortisol levels (PM1 and PM3), $p = 0.02$, and $p = 0.04$. While unexpected, depression symptom severity was negatively correlated with cortisol levels during the nighttime among the dissociative (PM4), $p = 0.04$, and in the morning among the non-dissociative PTSD groups (AM1), $p = 0.01$, while this relationship was not present among the healthy control group at any time point. Moreover, while childhood trauma was not associated with cortisol levels, a strong negative correlation between the traumatic life events checklist score and nighttime cortisol (PM1) was found among the dissociative group only (Table 2).
Table 2

Zero-order Pearson correlations between PTSD symptom severity, depressive symptoms, anxiety symptoms, positive affect, negative affect, childhood trauma, traumatic life events, and cortisol levels (i.e., nighttime and upon awakening) among individuals with dissociative PTSD (2a), non-dissociative PTSD (2b), and healthy controls (2c). ***p < 0.001, **p < 0.01, *p < 0.05

<table>
<thead>
<tr>
<th>2a. Dissociative PTSD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<td>Depression</td>
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<td>0.10</td>
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<td>0.13</td>
<td>*<em>0.64</em></td>
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<td>Cortisol PM4</td>
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<td>0.42</td>
<td>*<em>0.65</em></td>
<td>-0.27</td>
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<td>0.92***</td>
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<td>Cortisol PM5</td>
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Inflammatory Biomarkers, Mood States, and PTSD Subtypes

Upon examining inflammation and cytokine levels, there were no significant differences found across the diagnostic groups for IL-6, $F(2, 55) = 1.14, p = 0.33$; TNF-α, $F(2, 57) = 0.10, p = 0.22$; or CRP levels, $F(2, 57) = 0.24, p = 0.79$, when controlling for BMI. However, correlations between inflammatory factors, and clinical and psychosocial measures were assessed according to diagnostic groups (Table 3). Inflammatory factors did not relate to PTSD symptom severity, although this effect approached significance when examining CRP levels for the dissociative PTSD group only, $p = 0.058$. However, CRP levels were strongly and positively related with depression scores, $p = 0.01$, and childhood trauma exposure, $p = 0.048$, among the dissociative PTSD group, relations that were not found for the non-dissociative PTSD, $p = 0.83$, and $p = 0.26$, respectively, or healthy control group, $p = 0.16$, and $p = 0.58$, respectively. CRP also had a strong positive association to negative affect for the dissociative group, but this relation occurred in the opposite direction for the non-dissociative group. IL-6 strongly related to negative affect, $p = 0.009$, and childhood trauma scores, $p = 0.03$, among the dissociative PTSD group, however, once again, these relationships did not exist among the non-dissociative PTSD group, $p = 0.07$, and $p = 0.30$, respectively, or healthy control group, $p = 0.33$, and $p = 0.44$, respectively. For TNF-α, this cytokine strongly and negatively correlated to positive affect among healthy controls, $p = 0.03$, while this association was not seen among either of the PTSD groups, $p = 0.90$, and $p = 0.51$. 
Table 3

Zero-order Pearson correlations between PTSD symptom severity, depressive symptoms, anxiety symptoms, positive affect, negative affect, childhood trauma, traumatic life events, and inflammatory biomarkers (i.e., CRP, IL-6, TNF-α) among individuals with dissociative PTSD (3a), non-dissociative PTSD (3b), and healthy controls (3c). ***p < 0.001, **p < 0.01, *p < 0.05

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<td>0.52*</td>
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<td>-0.22</td>
<td>0.07</td>
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<td>0.10</td>
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<td>5. Negative affect</td>
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<tr>
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<td>0.60*</td>
<td>0.32</td>
<td>-0.29</td>
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<td>8. CRP</td>
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<td>0.41</td>
<td>0.20</td>
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<td>0.52</td>
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<td>0.50</td>
<td>0.41</td>
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Discussion

PTSD Symptom Severity

The current study examined symptom severity and profiles among PTSD subtypes, with a specific focus on understanding dissociative PTSD among individuals with military experience. Given that exposure to trauma, and more specifically, combat trauma is a risk factor for PTSD, it is recognized that military personnel are significantly more vulnerable to developing PTSD within their lifetime in comparison to non-military populations (Litz et al., 2018). Among the veteran population, the dissociative PTSD subtype tends to occur at elevated rates, along with increased severity of symptomatology (Averill et al., 2017; Haagen et al., 2018; Tsai et al., 2015). In the current study, all individuals with a PTSD diagnosis were active or past CAF military personnel, in which approximately thirty-five percent had a dissociative PTSD diagnosis. The sample distribution based on PTSD subtype is in accordance, but slightly higher than the current literature, in which it is estimated that among military personnel and veterans, 8-32% tend to meet the dissociative PTSD criteria for diagnosis (Armour et al., 2014; Tsai et al., 2015). Within the Canadian population, however, reports have suggested that only 13.7% of veterans present with dissociative symptoms (Armour, Karstoft & Richardson, 2014). Thus, the current sample presented with higher frequencies of dissociation symptomatology. This may be attributed to the elevated exposure to combat among the current sample, as 94.4% of those with a dissociative PTSD diagnosis in the current study reported having or witnessing exposure to a warzone. Indeed, among veterans, a significant association between dissociative symptoms and combat exposure was found, suggesting that dissociation may be especially pertinent to military personnel with exposure to combat (Herzog et al., 2020; Özdemir et al., 2015).
The dissociative PTSD group displayed significantly higher levels of PTSD symptom severity, which was confirmed by both self-reports and clinical diagnostic interviews. In this regard, the dissociative subtype displayed scores of approximately 50 on two different measures (the PCL-5 and the CAPS-5), which is well above the cut-off point of 33 for a diagnosis of PTSD. As expected, the dissociative PTSD group showed much greater depersonalization and derealization symptom severity relative to the non-dissociative PTSD group. Dissociative symptoms are considered severe and debilitating, disrupting various areas of an individual’s life (Roydeva & Reinders, 2021), including dysfunctional impairment, diminished awareness, and disrupted cognitive and attentional processes (Herzog, D’Andrea & Depierro, 2019). Accordingly, elevated PTSD severity is associated with greater dissociative symptomatology (Boyd et al., 2018; Patel et al., 2022; Wolf et al., 2012), a relationship that was also displayed in the current study. The dissociative PTSD subtype also seems to be more complex with not only elevated severity of PTSD, but more severe comorbid mental health symptomatologies as well (Kratzer et al., 2022).

**Symptom Profiles and Heterogeneity**

Considering that a large body of evidence suggests that PTSD is highly comorbid with several other mental health disorders, such as depression (Flory and Yehuda, 2015; Price et al., 2019), it was of interest to assess co-occurring depressive and anxiety profiles among PTSD subtypes. In the current study, individuals with a PTSD diagnosis displayed significantly elevated depressive symptoms compared to healthy controls. This is certainly in line with previous reports revealing that among those with a diagnosis of PTSD, 79.6% will also experience a major depressive episode in their lifetime (Sareen et al., 2021). Additionally, it was found that individuals with the dissociative PTSD subtype displayed elevated negative affect and depression scores, with a mean BDI score that met the cut-off for severe depression, compared to individuals with non-
dissociative PTSD. Indeed, an earlier report similarly revealed that veterans with dissociative PTSD show greater psychiatric comorbidity, which resulted in substantially lower quality of life (Tsai et al., 2015). Moreover, anxiety symptoms were also elevated among the two PTSD groups, indicating a high degree of comorbidity between PTSD and anxiety as well. The current findings emphasize the heterogeneity and comorbidity of mental health disorders, perhaps indicating shared psychosocial and underlying biological systems. To understand the high degree of comorbidity between mental health disorders and the neurobiological similarities that can exist across diagnoses, consideration of upstream shared risk and/or protective factors might be advantageous.

**Trauma Exposure**

In the current study, both PTSD groups displayed elevated traumatic life events, including a very high frequency (≥ 75%) of exposure to combat or a warzone, physical assault and an explosion or fire. These high rates of trauma exposure are concerning given that higher scores on the traumatic life events checklist (the LEC-5) strongly predicted greater PTSD symptom severity (Weis et al., 2022). Although in the current study, both PTSD groups has similarly high LEC-5 scores, suggesting that this does not explain the greater PTSD severity found in the dissociative subtype.

Beyond trauma emanating from combat exposure, when assessing childhood trauma, the dissociative PTSD group had greater experiences of adversity in childhood compared to the healthy control group, whereas the non-dissociative PTSD group did not show similarly elevated rates. Upon assessing childhood trauma subtypes, it was revealed that the dissociative PTSD group experienced elevated rates of sexual abuse and emotional neglect. Interestingly, relationships between sexual trauma in childhood and dissociative symptom expression have been reported (Scott et al., 2019), and these dissociative symptoms were carried into adulthood (Briere et al.,...
2017). Moreover, the dissociative PTSD subtype is more likely to be linked to experiences of childhood trauma when compared to individuals with PTSD but without dissociative symptomatology (Gidzgier et al., 2019; Ross & Armour, 2022). Furthermore, emotional neglect during childhood may lead to the lack of support required to learn how to regulate and cope with later stressors (Milot et al., 2010; Sistad et al., 2021), and has been linked to increased risk of developing mental illnesses in adulthood (Lee et al., 2018). In this regard, childhood trauma is a potent transdiagnostic risk factor for numerous psychiatric disorders (McLaughlin et al., 2020), whereby individuals who have such experiences are three times more likely to develop depression or anxiety and four and a half times more likely to develop PTSD compared to individuals who have not experienced childhood trauma (Afifi et al., 2014). Additionally, when individuals encountered multiple different types of childhood abuse, (i.e., three or more), the risk exponentially grew to be fifteen times more likely to develop PTSD (Afifi et al., 2014).

Several possible explanations exist that could account for the elevated rates of early life adversity among individuals with more severe PTSD features. For instance, adverse early life experiences can alter the course of stress exposure later in life, potentially increasing the risk for later trauma exposure (i.e., stress proliferation; Anisman, 2014; Pearlin et al., 2005), and possibly resulting in a sensitized or cumulative stress or trauma responses (Afifi et al., 2021). Indeed, among military personnel or veterans, deployment-related traumatic events had cumulative effects with earlier childhood traumas to greatly increase the risk of PTSD (Afifi et al., 2021). The interaction between psychological, social, and biological factors may contribute to the increased vulnerability of PTSD, where prolonged exposure to stressors causes irreversible damage to the HPA axis stemming from trauma-induced neurobiological alterations during pivotal developmental stages.

**Biomarker Profiles**

**Cortisol Levels**

In the present study, the dissociative PTSD group presented with significantly elevated cortisol levels at nighttime in comparison to the healthy control group, an effect not apparent among individuals with non-dissociative PTSD. In line with the current findings, it was reported that cortisol levels during the evening were elevated among individuals with PTSD as a result of trauma exposure, in comparison to those who have also been exposed to trauma but did not develop PTSD (Young et al., 2004; Young & Breslau, 2004). The literature relative to cortisol levels in those with PTSD tends to illustrate a flattened diurnal cortisol pattern, with higher concentrations of cortisol during the evening (Schumacher et al., 2018), although there are a limited number of studies that have assessed evening cortisol. One meta-analysis suggested lower afternoon/evening cortisol concentrations in PTSD individuals relative to healthy controls without exposure to trauma (Morris, Compas & Garber, 2012). Yet, another meta-analysis that examined cortisol during the day reported no differences in cortisol output among individuals with PTSD, trauma-exposed controls, and non-trauma exposed controls (Klaassens et al., 2012), or that no cortisol differences existed between PTSD and controls unless subgroup analyses were conducted (Bremner, Vermetten & Kelley, 2007; Meewisse et al., 2007; Yehuda et al., 1996).

In the current study cortisol concentrations assessed in the morning were also elevated among the PTSD groups compared to healthy controls. At first, this was a bit perplexing, as a number of studies have shown that individuals with PTSD are often characterized by a blunted cortisol awakening response (Enge et al., 2022; Speer et al., 2019). In this regard, the occurrence
of hypocortisolism among PTSD groups (Schumacher et al., 2019) supports the notion of an enhanced negative feedback mechanism due to a dysregulated HPA axis (Lee et al., 2022; Yehuda, 2002). However, the story is not that simple, as there are also reports that morning cortisol levels do not differ between trauma exposed subjects with PTSD and without PTSD (Young et al., 2004), and others show an elevated CAR similar to the current study (De Bellis et al., 1999; Lemieux & Coe, 1995).

The elevated cortisol concentrations in the morning and evening among individuals with dissociative PTSD may be due, in part, to the high depressive symptomatology in this subtype. In this regard, individuals with depression typically show elevated CAR (Murphy et al., 2022), and more generally hypercortisolism (Dekel et al., 2017; Ginzburg, Ein-Dor & Solomon, 2010). In line with this suggestion, a positive association was found between comorbid PTSD and MDD with elevated nighttime cortisol concentrations (Young & Breslau, 2004). Thus, it is certainly possible that the increased cortisol concentrations are owing to the elevated depressive symptoms among both PTSD groups, but especially the dissociative PTSD subtype.

Yet, adding to the complexity is the findings that among both PTSD groups, a strong negative correlation was found between cortisol levels and PTSD severity, and at the same time, a strong positive association occurred between cortisol and dissociative symptoms. Thus, it is also possible that the high rates of dissociative symptoms, which map onto high cortisol levels, are responsible for the elevated cortisol concentrations in the dissociative PTSD group. This suggestion is in accordance with one study, which revealed that dissociative PTSD is marked by significantly elevated cortisol levels (Seng et al., 2018). Taken together, the inconsistencies reported in the literature surrounding cortisol concentrations and PTSD may be due, in part, to the varying study criteria and protocols, including whether the healthy control group is trauma exposed.
or not (in the current study this was not the case for the majority of controls), whether the presence or absence of comorbid mental health conditions, such as depression, or dissociative symptoms are considered, and whether CAR samples are collected in the laboratory under rigorously controlled conditions, as in the current study, or at individuals’ homes where adherence to the diurnal cortisol protocol is consistently problematic (Halpern et al., 2012).

**Inflammation on Mood States and Trauma**

No differences were found relative to CRP, IL-6, or TNF-α levels across the diagnostic groups. Although it was anticipated that group differences would emerge, very little data exists on inflammation and the dissociative PTSD subtype. Nonetheless, CRP tended to positively correlate with PTSD symptom severity among the dissociative PTSD group only. This finding is in line with a previous report among women with type-2 diabetes, in which increased CRP levels were associated with dissociative symptoms and PTSD symptom severity (Powers et al., 2019). Further evidence suggests that elevated CRP is positively correlated with clinically worse courses of PTSD among a sample of combat exposed veterans (Lindqvist et al., 2017). Moreover, CRP levels were higher among men with combat related PTSD as opposed to combat exposed men without PTSD (Bersani et al., 2016). These findings suggest that immune activation may be a fundamental pathophysiological element of PTSD, rather than in response to combat trauma exposure. Although, it should be noted that CRP is not a biomarker specific to PTSD, given that it is also a well-established marker for depressive symptoms (Miller & Raison, 2016; Osimo et al., 2019; Pitharouli et al., 2021). In fact, in the current study, CRP was strongly associated with depressive symptoms and negative affect among the dissociative PTSD subtype. Thus, elevation of this general marker of inflammation might be owing to transdiagnostic features that cut across PTSD and MDD, perhaps emanating from shared trauma experiences.
Levels of inflammation, namely CRP and IL-6, mapped onto exposure to childhood trauma, again only among individuals with a dissociative PTSD diagnosis. This relation was specific to childhood trauma as no such associations were found when examining the traumatic life events scores. The impact of early life adversity on increased vulnerability to negative mental health illnesses has been discussed in the literature (Felitti et al., 1998; Nemeroff, 2016), however given that that elevated inflammation is associated with both childhood trauma (Coelho et al., 2014) and mental illnesses (Yuan et al., 2019), few studies have been able to disentangle the contribution of inflammation in this relationship. For example, Baumeister et al. (2016) found a significant relationship between childhood trauma scores and CRP levels, irrespective of psychiatric diagnosis, suggesting that childhood trauma may be a main driver of immune activation in relation to psychiatric symptomatologies. In line with this conclusion, while inflammatory markers were found to be associated with depression, once childhood trauma was controlled for, this relation was greatly diminished (Lu et al., 2013).

Why the link between childhood trauma and inflammation was only found among the dissociative group is not immediately apparent, however this could be due to the higher levels of childhood trauma and in particular sexual abuse in this group. In fact, childhood sexual abuse has been shown to activate immune inflammatory factors to a greater extent than other forms of abuse (D’Elia et al., 2018). Moreover, the dissociative group also displayed elevated symptom severity of depression, and PTSD severity, all of which might have contributed to the increased link between childhood trauma and inflammation among this clinical group. In this regard, understanding individual symptoms, life experiences, and biological factors may be required to inform personalized and more effective treatments.
Implications for PTSD Treatment Efficacy

The literature regarding the effectiveness of treatment methods for individuals with the dissociative subtype of PTSD, to date, has been inconsistent (Schiavone et al., 2018). For many years now, the gold standard for PTSD treatment has consisted of exposure-based techniques in addition to cognitive-based therapies (Lancaster et al., 2016). While some studies have shown that individuals with dissociation symptoms in relation to PTSD do respond to cognitive therapies (Resick et al., 2012), others suggest that treatment responses are diminished among individuals displaying high degrees of dissociative symptoms (Price et al., 2014). Upon direct comparison of treatment efficacy among patients with dissociative and non-dissociative PTSD, the dissociative group has poorer responses (Wolf, Lunney & Schnurr, 2016). Moreover, among veterans, treatment strategies are considered even less effective compared to the general population with PTSD (Haagen et al., 2015; Hansen, Ross & Armour, 2017). In this regard, all participants with PTSD in the current study were recruited from the OSI clinic where they were actively going through treatment for PTSD, and despite actively engaging in treatment, rates of PTSD, dissociative and depressive symptomatologies remained very high, particularly among the dissociative group. Thus, it may be that individuals with a dissociative PTSD diagnosis respond poorly to treatment, given the consistent high levels of symptom severity (Dorrepaal et al., 2012; Swart et al., 2020).

While cognitive behavioral therapies such as prolonged exposure (PE) are first line treatments for PTSD, many individuals continue to experience significant symptoms highlighting a continued need for additional treatment options (Lehrner et al., 2021). The efficacy of pharmacological treatment strategies available for PTSD to date remain disappointing. Selective serotonin reuptake inhibitors (SSRIs) are the first-line pharmacotherapy agents for PTSD and have
been suggested to benefit individuals with PTSD (Williams et al., 2022), both clinically and physiologically by reducing inflammation and HPA axis dysregulation (Sullivan & Neria, 2009), though it is not clear if SSRI’s will be effective for the dissociative PTSD subtype. Indeed, there remain important gaps in the evidence, and a continued need for more effective agents in the management of PTSD is required (Williams et al., 2022). This is especially the case for dissociative PTSD, as there are currently no empirically supported available treatments that are targeted and efficacious for treating this subtype. One meta-analysis indicated that pre-treatment dissociation does not moderate the effectiveness of psychotherapy for PTSD (Hoeboer et al., 2020), although they did not specifically examine dissociative PTSD but rather more generally dissociative symptoms. Overall, these findings suggest that dissociation may interfere with treatment efficacy, and as such, further delineating biological characteristics of PTSD subtypes may lead to improved treatment outcomes.

Limitations

While there were several strengths in the current study, including a comprehensive clinical and biological assessment of an understudied subtype of PTSD among military personnel, there were also several limitations. First, the sample size was considerably small, which likely resulted in low statistical power among certain findings. In this regard, a number of findings only approached significance. There was a low representation of females and ethnic minorities in the current study. Given that females are twice as likely to develop PTSD (van Ameringen et al., 2008), having more females in the current study would have been ideal. However, because this study selectively recruited military personnel, there were fewer females to recruit from due to lower representation in the military. Moreover, ethnicity mostly comprised individuals who identified as White or French-Canadian, which precluded the examination of important ethnic
differences. Of relevance to the current study, a meta-analysis revealed that ethnic differences may have a direct impact on inflammatory processes (Paalani et al., 2011). This further highlights the importance of biomarker studies within other ethnic minority groups so that everyone can benefit from precision medicine advances. While a healthy control group was included in the present study, which was advantageous as it allows for a baseline measurement on all questionnaires and biological markers, this group was not recruited to be a *trauma exposed* control group. While some of the healthy controls did experience trauma, this was minimal compared to the PTSD groups. Ideally, we would have had a trauma exposed military healthy control group, however, despite our efforts, this was a difficult group to recruit. While the current study captured CAR, ideally, we would have examined the full diurnal cortisol patterns across the day, however due to study logistics, with participants physically in the lab for sampling, this was not possible. Additionally, at the time of the study, a large number of participants reported receiving psychopharmacological treatment, potentially leading to the normalization of psychiatric symptomatologies and biomarkers assessed (Hannestad, DellaGioia & Bloch, 2011; Köhler et al., 2014). Nonetheless, we did control for pharmacological treatments in analyses and results remained unchanged. Despite these limitations, the current study provides a comprehensive characterization of a unique PTSD subtype, according to psychological and biological markers.

**Conclusions**

Taken together, the findings of the current study contribute to the growing understanding of PTSD, and in particular, the dissociative PTSD subtype among veteran populations. This study aimed to distinguish psychosocial and biological characteristics of PTSD subtypes. Overall, the findings of the current study suggest that dissociative PTSD presents with the highest levels of clinical symptom severity and comorbidity, while also displaying distinct cortisol concentrations.
and immune inflammatory symptom associations not found among the non-dissociative PTSD subtype. These findings identifying peripheral biomarker differences are complementary to reports that dissociative and non-dissociative PTSD display opposing brain activation patterns in regions linked to regulating emotion and arousal (Hill et al., 2021; Lanius et al., 2012). Taken together, the current study adds to the limited available evidence on dissociative PTSD, suggesting that PTSD subtypes may be differentiated on a clinical and neurobiological level, in an effort to inform more personalized and tailored treatment for individuals with PTSD in the future.
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cytokines found in major depressive disorder patients with childhood trauma exposure: a cytokine antibody array analysis. *Comprehensive psychiatry, 54*(7), 953–961.


Appendices

Appendix A. MAPS Recruitment Poster

Multidimensional Assessment of PTSD Subtypes (MAPS) and Depression

This study is conducted at the Royal Ottawa Mental Health Centre and involves a phone interview, a brain scan, a blood draw, and sleep recordings in one of our private rooms. You can participate if you have served in the Canadian Armed Forces, are between the ages of 18 and 65, and:

- Have recently been diagnosed with PTSD and/or depression, or
- Have no current diagnosis of a mental or sleep disorder

Participants will receive compensation for their time.
Contact us at: MAPS@theroyal.ca or 613-722-6521 ext 6086

REB # 2019037
Appendix B. Ethics Clearance Certificate

RESEARCH ETHICS BOARD LETTER OF APPROVAL

Date: 22 January 2020

Investigator Name: Dr. Zachary Kaminsky

Protocol ID Number: 2019037

Study Title: A Multidimensional Assessment of PTSD Subtypes (MAPS)

Submission Type: Initial Application

Review Type: ☑ Full Board Review ☐ Delegated Review

Date of Approval: 22 January 2020

Approval Expiry Date: 22 January 2021

Dear Dr. Kaminsky,

Thank you for submitting the above noted protocol to the Royal Ottawa Health Care Group Research Ethics Board for review. The study identified above has been reviewed by the REB and approval has been granted. This study is approved until the expiration date noted above.

The following documents are approved:

<table>
<thead>
<tr>
<th>Document Name/Title</th>
<th>Document Version Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Protocol v.1</td>
<td>December 17, 2019</td>
</tr>
<tr>
<td>Informed Consent form – Wave 1, v.1</td>
<td>December 20, 2019</td>
</tr>
<tr>
<td>Informed Consent Form – Wave 2, v. 1</td>
<td>December 17, 2019</td>
</tr>
<tr>
<td>Participant Screening Form - Wave 2 only, v. 1</td>
<td>December 20, 2019</td>
</tr>
<tr>
<td>Recruitment Brochure, v. 1</td>
<td>December 20, 2019</td>
</tr>
<tr>
<td>Appendix “Questionnaire Descriptions”, v. 1</td>
<td>December 20, 2019</td>
</tr>
</tbody>
</table>

Thank you for providing a copy of the REB approval letter for the optional bio-banking study that is being conducted in Montreal (CEAMS).

No changes to, or deviations from the approved documents should be initiated prior to submitting an appropriate amendment and obtaining written approval from the Research Ethics Board, except when necessary to eliminate immediate hazard(s) to study participants.

An Annual Progress Report must be submitted a minimum of 30 days prior to the date of study expiration if the study will continue beyond the expiration date.

If the study is completed by the expiry date noted above, a Study Closure/Termination report must be submitted to the REB.

The Royal Health Care Group 1145 Carling Avenue, Ottawa, ON K1Z 7K4 Telephone: 613.722.6521
Sincerely,

Dr. Dominique Bourge, MD
Acting Chair,
The Royal Health Care Group Research Ethic Board

Research Ethics Board Attestation

REB members who are involved in a research project under review recuse themselves from the meeting and do not take part in the review, discussion or decision related to their respective projects.

The Royal Ottawa Health Care Group Research Ethics Board complies with the requirements of the Tri-Council Policy Statement (TCPS2): Ethical Conduct for Research Involving Humans; International Council for Harmanisation of Technical Requirements for Pharmaceuticals for Human Use Guideline for Good Clinical Practice (ICH-GCP); Part C, Division 5 of the food and Drug Regulations; Part 4 of the Natural Health Products Regulations; Part 3 of the Medical Device Regulations and the Ontario Personal Health Information Protection Act (PHIPA 2004) and its applicable regulations.

You must retain a copy of this letter for your study file

The Royal Health Care Group  1145 Carling Avenue, Ottawa, ON K1Z 7K4  Telephone: 613.722.6521
Appendix C. Initial Contact Phone Script

MAPS - Initial Telephone Call Script

Hello, could I please speak to {insert patient name here}?

My name is {enter your name here}, I’m calling from the Royal’s Institute of Mental Health Research because you agreed to be contacted about potential research projects. Would now be a good time to have a quick chat about this?

The project that I would like to discuss with you is a collaboration with the Operational Stress Injury Clinic. Our research focuses on the biological signature of post-traumatic stress disorder and depression. For example, we are investigating sleep, brain activity, inflammation, DNA regulation and heart rate.

If you are interested and meet the selection criteria, you will be asked to come to the Royal for a set of 3 visits, followed by another set of 3 visits between 6-9 months later.

When you come, you would be asked to fill out questionnaires and answer some questions about mental health symptoms, and we will also have you give a blood sample, undergo a brain scan, and have your sleep assessed (both at home with a sleep watch and in our sleep laboratory here at the Royal for 2 nights).

We will also ask you to fill out some online questionnaires about 1 and 2 years after your first visit.

If you decide to participate and if you are eligible, you would receive $500 in compensation for completing this study.

Is this something that you could possibly be interested in?

If yes: Great! Can I ask you a few questions to make sure that you meet our selection criteria?

Go through the “MAPS Screener” form and confirm PTSD or Healthy or MDD Control group eligibility.

If no: Thank-you for your time.

If not eligible: Thanks for answering these questions. It seems like you do not meet some of the selection criteria for now, but we may eventually revise those criteria. Could we keep your information to reach out at a later time if these criteria loosen?

If eligible (first set of screening questions): Thanks for answering these questions. It seems like you meet our first set of selection criteria. I will send you a link to fill out some
questionnaires to assess the next step of eligibility criteria. Is there an email, I could use for this?

**If yes:** Great, thanks. Document their email address. Read their email address back to them to verify that what you have documented is correct.

**If no:** No problem, I can send you these questionnaires by the post if you prefer. Document their postal address in the. Read their postal address back to them to verify that what you have documented is correct.

Around what times are you **going to bed and falling asleep** these days?
Around what times are you **waking up**?

Once you complete these questionnaires, we will email you to confirm your eligibility. Meanwhile, if you have any questions, you can reach us at **613-722-6521 ext 6086** or **MAPS@theroval.ca**.

Thank you for your time!

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**FAQs**

<table>
<thead>
<tr>
<th>Q: How long will each visit last?</th>
<th>A: The first visit will last around 2.5 hours. The overnight visits will last between 12-16 hours.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Q: Does that mean that my name’s going to be in a paper somewhere?!</strong></td>
<td>A: No. All the data we will be collecting will be identified by an anonymous research code. Also, when we publish scientific articles, we report the data at the group level, meaning that your personal information will be mixed with that of all other participants.</td>
</tr>
<tr>
<td><strong>Q: So why do you need my name at all then?</strong></td>
<td>A: So that I can schedule your visits with us.</td>
</tr>
<tr>
<td><strong>Q: How many visits are involved and how long is the total study?</strong></td>
<td>A: There are 3 initial visits spanning over about 10 days, followed by another set of 3 visits between 6-9 months later. You will also be asked to complete some online questionnaires at 12 and 24 months after you begin the study.</td>
</tr>
<tr>
<td><strong>Q: Do I get the study results?</strong></td>
<td>A: Yes you will and the findings from this project are expected to be reported at scientific conferences and published in scientific journals.</td>
</tr>
<tr>
<td><strong>Q: Can I withdraw participation?</strong></td>
<td>A: Certainly, the research project is entirely voluntary you can withdraw at any time.</td>
</tr>
</tbody>
</table>
Appendix D. Informed Consent Form

Informed Consent Form for Participation in a Research Study – Wave 2 Version 4

Study Title: A Multidimensional Assessment of PTSD Subtypes (MAPS) – Wave 2

Principal Investigator: Zachary Kaminsky, Suicide Prevention Research, Institute of Mental Health Research
Phone: 613 722 6521 ext 7003 Email: zachary.kaminsky@theroyal.ca
Funders: Innovation for Defence Excellence and Security (IDEaS, Canadian Department of National Defence)

REB Number: 2019037

INTRODUCTION

In follow up to the telephone interview we conducted with you previously, you are being invited to participate in this study because you are a current or past member of the Canadian Armed Forces between 18 and 65 years old and have been deployed to a war zone since 2001.

This consent form provides you with information to help you make an informed choice. Please read this document carefully and ask any questions you may have. All your questions will be answered to your satisfaction before you decide whether to participate in this research study.

Please take your time in making your decision. You may find it helpful to discuss it with your friends and family.

Taking part in this study is voluntary. Deciding not to take part or deciding to leave the study later will not result in any penalty or affect current or future health care at the Royal Ottawa Mental Health Care Centre (i.e. “the Royal”).

IS THERE A CONFLICT OF INTEREST?
There are no conflicts of interest to declare related to this study.

WHY IS THIS STUDY BEING DONE?
The purpose of this study is to better understand the relationship between biological factors and mental health in people with post-traumatic stress disorder (PTSD) as compared to people with depression and healthy people. This study will assess if the combination of measures linked to gene regulation, sleep, blood markers, the heart, brain and mind can be used to identify the presence of PTSD and different profiles of PTSD. How these factors may predict changes across time will also be assessed.

HOW MANY PEOPLE WILL TAKE PART IN THIS STUDY?
It is anticipated that about 122 people will take part in this study, from one research site located at the Royal’s Institute of Mental Health Research (Ontario, Canada).

This study should take 24 months to complete and the final results should be known in about 2 years. There is a possibility the study will end early in the unlikely event that the funding agency terminates funding early.

WHAT WILL HAPPEN DURING THIS STUDY?

First Visit

You have already completed a telephone interview, and filled out questionnaires about mental health and sleep. You have been invited to this visit to determine if you are eligible to further participate in this study.

During this visit, you will be provided with the present detailed informed consent form to review. If you agree to participate in this study and sign the consent form, you will undergo a phone interview about your mental well-being. This interview should last for about 15 to 45 minutes.

It is only once these steps are completed that we will know if you are eligible for the study.

There are four time points for this study:

1. **Point 1** (Visits 1A, 2A, 3A)
2. **Point 2** (6 to 9 months after point 1; Visits 1B, 2B)
3. **Point 3** (12 months after point 1)
4. **Point 4** (24 months after point 1)

Study Procedures and Assessments

Before visits 1, you will be asked to refrain from:
- drinking alcohol in the 24h prior to the visit
- eating, consuming caffeine or smoking 1 hour prior to the visit
- doing vigorous exercise on the day of the visit

Before visits 2 and 3, you will be asked to refrain from the following:
- Eating, drinking, smoking, chewing gum, brushing your teeth or flossing at least 30
minutes before your appointment
  o Using lip balm, lip gloss and/or lipstick on the day of your visit (they can damage the saliva samples that we collect)
  o Taking any naps or drinking alcohol on the day of the visit
  o Having coffee, tea, energy drinks, Coke/Pepsi or chocolate (anything that contains caffeine) as of midday on the day of the visit.

Phone Interview – This interview will be used to confirm that you meet the last set of selection criteria for the study.

Questionnaires - Questionnaires are an important method of collecting information from you. Throughout the study, questionnaires will be completed that focus on your sleep habits, fatigue, concentration and memory, mental well-being (e.g. mood, anxiety), smoking, exercise, alcohol use, caffeine use and general health. The number and length of the questionnaires vary with each specific visit. Some of the questionnaires may be completed online via a link that will be provided to you.

Physical Measurements – Your blood pressure, height and weight will be measured. Measurements will also be taken of your neck, waist and hip circumference. This will occur at your first visit and after 6-9 months.

Blood Sample – A blood sample will be obtained by inserting a needle into a vein in your arm. A total of 16mL (1.1 tablespoons) will be collected. The blood sample will be used to assess markers of inflammation, cardiovascular and genetic changes. A snack will be offered following the blood sample.

Sleep Watch, Temperature and Heart Rate Monitoring – The sleep watch is a monitor that looks like a watch. It measures movement to estimate activity and sleeping patterns. Your temperature and heart rate will be monitored by a small device that you can wear on your chest (like a belt). You will be asked to wear both of these monitors at the same time for approximately one week (after visit 1A and again after visit 1B).

Daily Sleep and Mood Log – You will fill this out on a daily basis for approximately 1 week to provide information about your sleep, mood and daily activities. This will be done before going to bed and again after waking up. It takes about 2 to 5 minutes to complete.

Mock Scanner Experience – The Royal has a “mock” scanner that allows participants to experience what it feels like to go through a real scanner. If you have never had a scan at the Royal before, you will go through the mock scanner. If you have had a scan before and would feel better trying the mock scanner before you have the real scan, you may choose to do so.

Sleep Lab Visits – There are two overnight visits that occur at baseline (time point 1) and one that occurs at the 6-9 month follow up (time point 2), for a total of three overnight visits. You will stay in one of the private rooms in the Sleep Research Unit. Electrodes will be applied on your scalp to record brain activity (EEG) during sleep, near your eyes, on your chin, and on your chest (to
measure heart rate). Elastic belts will be placed on your chest and abdomen to measure breathing. You will have small sensors around your fingers to measure skin conductance and oxygen level. Your body temperature will be recorded with five small sensors located on your neck, hand, abdomen, thigh, and foot. Your heart rate, respiration, alertness and skin conductance will be measured continuously across the visit. During the night you will be able to contact the research team via an intercom if necessary. On one of these nights, electrodes will be placed on your legs, and small sensors will be placed under your nose. On the other nights, you will not have the legs or nose sensors.

You will complete questionnaires before bedtime and after waking up. EEG will also be recorded when you are awake while resting, while looking at pictures and while you listen to sounds (e.g. beeps). Your blood pressure and stress levels will be measured. A light breakfast will be provided and you will be able to shower before leaving the lab if you wish.

Saliva Samples – Saliva samples allow us to measure changes in gene expression and hormones related to sleep, wake and stress (including melatonin and cortisol). Saliva samples will be taken during each overnight sleep lab visit.

Pregnancy Tests- All females of child bearing potential must complete a urine pregnancy test before taking part in the scanning procedure.

Brain Scans (MRI) – Your brain will be scanned at the Brain Imaging Centre at the Royal. This will create a 3D picture of your brain using magnetic fields. You will fill out a safety questionnaire before you go into the scanner. You will lie in a narrow tube that is open at both ends. You will be able to talk to the research team at all times via an intercom. Padding will be placed around your head as you will need to remain still. As the scanner is noisy, you will be provided with earplugs. Before the scanning session you will provide us with a list of personal trauma-related words. These words will be presented to you on a computer screen during the scanning session so we can see how your brain processes them. The scans can be terminated at any point if you experience any discomfort. You will not be injected with any substance or exposed to radiation. Two scans will be done throughout the duration of the study (visit 2A and visit 2B).

Light Response Measurements – This involves flashing a light in the eye and measuring changes in your pupil size and in the electrical activity of your eye. Some aspects of these light responses are linked to the nervous system and are thought to be reflective of mental health. During this test, a little adhesive strip is placed on the upper portion of the cheek, underneath one of your eyes. There will not be any direct contact with your eye.

Attention, Memory and Thinking Tests – You will complete a series of cognitive tasks on paper and on the computer. This will take approximately 1 hour.

Treatment Tracking – You will be provided with a link to complete an online treatment log in which you will document all the treatments you receive, including changes in medications and/or medication dosages until the end of the study. You will be reminded (via email) to fill out this log every 3 months. If you agree, you can also provide the researchers with a copy of your pharmacy records. If you are attending the Operational Stress Injury (OSI) Program at the Royal, the specific treatments you receive and changes in your diagnoses will also be documented from your medical
chart. If you are receiving care outside of the Royal, the researchers will ask your permission to contact your care provider to obtain information about your treatments and changes in your diagnoses. If your treatment involves using a positive airway pressure (PAP) machine, we will ask your permission to collect information about your PAP machine (e.g. the name of your PAP supply company), and to download the electronic data from your PAP machine (either from the machine itself or remotely via your PAP supply company using the anonymous serial number of your PAP machine).

Other Time Points
At 12 and 24 months after Point 1, you will receive a link via email to do a repeat of some of the online questionnaires. These questionnaires should take about 1 hour and 15 minutes to complete. If you prefer, you can also choose to fill them out on paper mailed by regular post with a pre-paid return envelope. You will also be asked to do a computer-based assessment of your attention, memory and thinking skills at the 12- and 24-month time points. This will last about 1 hour. You will have the option of doing this from home online, or you may visit the Sleep Research Unit to use one of our computers. If you are using a PAP machine, we will download your PAP data via your PAP supplier at the 12- and 24- month time points using the anonymous serial number of your PAP machine.

Saliva and blood samples
Saliva and blood samples will only be used for the purposes highlighted above. The samples will not be sold. Once these tests have been completed, any leftover samples will be destroyed. Reports about any research tests done with your samples will not be given to you, your doctor, or other health care provider(s). These reports will not be put in your medical records.

- How will blood samples be identified? To protect your identity, your samples will be identified only by your anonymous research code. Despite protections being in place, there is a risk of unintentional release of information. Due to technological advances in genetics, there may be a risk that the genetic information in the samples could be linked back to you.
Can I withdraw these blood samples? If you no longer want your samples to be used in this research, you should tell Dr Kaminsky or a member of his team, who will ensure the samples are destroyed. If tests have already been done on your samples it will not be possible to withdraw those results. However, no further testing will be done.

Optional Components
There are three additional study tasks/assessments that you may wish to participate in. They include the following:

- Give an additional 23mL of your blood (1.6 tablespoon) during the same blood draw session. This additional sample will be shared with the Biobank of the Canadian Sleep and Circadian Network (CSCN). You will receive more information about the Biobank through another information and consent form. The sharing of this portion of your blood samples is meant to allow researchers to work together and increase nationwide research efforts. The research data provided to the CSCN will be identified by an anonymous research code. The data will not include information that can directly identify you, such as your name, address or phone number. The CSCN will however receive the separate Biobank consent form you will have signed to enable them to use your blood. They will not have any means of linking this information to your anonymous coded data.

- Keep a dream log between Visits 1 and 3. You will be asked to write down the content of your dreams when you wake up. These dream descriptions will be automatically analyzed by a computer to identify the presence of specific dream themes.

- Provide your Twitter and Facebook handle, if you have one. This is the name from which you tweet, such as: @HariSeldon2040. Using this information and your consent, we will access your Twitter or Facebook post timeline and download your social media posts over the course of the study and approximately 6 months prior to you beginning the study. We will score them with our models, turning them into numbers. This will be done only after the study is over. **We will not read your posts.** We will retain a copy of your posts in binary format (a format that is not readable by human eyes). This copy will be kept so that we can run and test additional scoring models on the data.

If you wish to participate in some or all of these additional tasks, please indicate this at the end of the form by “checking” the appropriate boxes.

**HOW LONG WILL PARTICIPANTS BE IN THE STUDY?**
Your participation on this study will last for about 24 months.

**CAN PARTICIPANTS CHOOSE TO LEAVE THE STUDY?**
You can choose to end your participation in this research (called withdrawal) at any time without having to provide a reason. If you choose to withdraw from the study, you are encouraged to contact the research team.
You may withdraw your permission to use information that was collected about you for this study at any time by letting the research team know. However, this would also mean that you withdraw from the study.

If you wish, you can withdraw your data from the study by letting one of the research staff know. If you withdraw your data from the study, it will not contribute towards the results of the study.

**WHAT ARE THE RISKS OR HARMS OF PARTICIPATING IN THIS STUDY?**

Participating in this part of the project is considered to be of low risk.

Questionnaires: The topics discussed in the questionnaires may cause some emotional discomfort. Please inform members of the research team if this is the case.

EEG: The placement of electrodes on the head is not painful, although there may be minor discomfort when the skin is rubbed. The skin may be slightly reddened after the electrodes are removed. This reddening will disappear within a few hours.

Brain Scan: You may feel a bit uncomfortable in the scanner if you dislike small spaces. You will do a safety check before you enter the scanner. This is to ensure you have no metal on or in you. The scanner makes loud noises. You will be given earplugs to minimize the scanner noise. You will have access to an emergency button in case you feel uncomfortable or need to stop the scanning session for any reason. The magnetic field in the scanner is very strong. Some precautions are thus required. This is why you must complete a detailed questionnaire to ensure there is nothing that would make scanning unsafe for you (e.g. if you have a cardiac pacemaker, aneurysm clip, metal prosthesis, metal in your eye or body, or strong claustrophobia). The technologist will verify these exclusion criteria before scanning. Brain scans may present certain risks for the health of embryos and fetuses. Women who are pregnant or breastfeeding are excluded from this part of the study. Women who have a high chance of being pregnant must do a pregnancy test before the brain scans.

Social Media: If you choose to provide us with your Twitter or Facebook handle, you should be aware that social media post-based information is unique to you and can be used to identify you. Measures are in place to protect your privacy (i.e.: no information will be shared with anyone outside the research team, data will reside in a format readable only by computers and not human eyes, and data will be labelled with a password-protected code that is selectively shared within the research team).

**WHAT ARE THE BENEFITS OF PARTICIPATING IN THIS STUDY?**

You may not receive direct benefit from participating in this study. The researchers hope the information learned from this study will help other people with post-traumatic stress disorder in the future.
HOW WILL PARTICIPANT INFORMATION BE KEPT CONFIDENTIAL?

If you decide to participate in this study, the research team will only collect the information they need for this study.

Records identifying you at this centre will be kept confidential and, to the extent permitted by the applicable laws, will not be disclosed or made publicly available, except as described in this consent document.

Authorized representatives of the following organizations may look at your original (identifiable) medical records at the site where these records are held, to check that the information collected for the study is correct and follows proper laws and guidelines.

- The Royal’s research ethics board who oversees the ethical conduct of this study in Ontario
- Representatives of the Royal’s Institute of Mental Health Research, to oversee the safety and quality of research at this location

Information that is collected about you for the study (called study data) may also be sent to the organizations listed above or other collaborating researchers at other institutions at the discretion of the PI. Your name, address, or other information that may directly identify you will not be used. The records received by these organizations will be de-identified and may contain your anonymous participant code and sex.

If the results of this study are published, your identity will remain confidential. It is expected that the information collected during this study will be used in analyses and will be published/presented to the scientific community at meetings and in journals.

Even though the likelihood that someone may identify you from the study data is very small, it can never be completely eliminated.

WHAT IS THE COST TO PARTICIPANTS?
Participation in this study will not involve any additional costs to you or your private health care insurance. You will be reimbursed for expenses including transportation and parking expenses, as necessary.

ARE STUDY PARTICIPANTS PAID TO BE IN THIS STUDY?
Research participants are not paid to be in a study. We will however provide compensation for your time. If you decide to participate in this study, you will receive $25, $75, and $150 for completing Visits 1A, 2A, and 3A, respectively, for a total of $250 at Point 1, and $25 and $225 for completing Visits 1B and 2B, respectively, for a total of $250 at Point 2. Additionally, you will be compensated a $30 Amazon gift card for completing the online follow-up questionnaire at Point 3. This gift card will be sent to you electronically via email, or by post if needed. Please note, in order to register your gift card your email will need to be provided to Amazon.

WHAT ARE THE RIGHTS OF PARTICIPANTS IN A RESEARCH STUDY?
You will be told, in a timely manner, about new information that may be relevant to your willingness to stay in this study.

You have the right to be informed of the results of this study once the entire study is complete. You will receive a copy of the final study results if you ask for this in the signature pages below.

Your rights to privacy are legally protected by federal and provincial laws that require safeguards to ensure that your privacy is respected.

By signing this form you do not give up any of your legal rights against the researcher or involved institutions for compensation, nor does this form relieve the researcher or their agents of their legal and professional responsibilities.

You will be given a copy of this signed and dated consent form prior to participating in this study.

WHAT IF RESEARCHERS DISCOVER SOMETHING ABOUT A RESEARCH PARTICIPANT?

During the study, the researchers may learn something about you that they didn’t expect. For example, the researchers may find out that you have another medical condition. If any new clinically important information about your health is obtained as a result of your participation in this study, you will be given the opportunity to decide whether you wish to be made aware of that information.

The brain imaging scan is being done for research purposes only and will not be reviewed for clinical purposes. The technical staff involved in the study are not trained or qualified to diagnose pathologies. During brain imaging procedures however, there is a small chance of discovering a potential abnormality during the scan. In the rare case of an unexpected finding, your images will be reviewed by a radiologist. If follow-up is deemed necessary, you will be contacted directly by the principal investigator and asked to provide permission for the findings to be shared with your primary physician. Your physician can then provide you with a referral for further testing and clinical follow-up. If you do not have a primary physician, a study physician will provide you with a referral and follow-up.

If you express severe thoughts of suicide or if the results of your questionnaires suggest concerning new symptoms, the researchers will relay this information to your care provider at the ROMHC or the care provider you identified below. If you do not have a care provider or if your care provider is not reachable, the researchers will contact one of the study psychiatrists, Dr Jakov Shlik, or his delegates. If you express suicidal thoughts with intent to die and clinicians are not reachable, we will accompany you to emergency services in a nearby hospital.

If signs of a previously unknown sleep disorder are observed, one of the study doctors will review your sleep results and will liaise with you to offer a referral for further assessment and treatment.

If you feel distressed or suicidal at any time, you can contact the following resources:
Distress Centre: 613-238-3311
Mental Health Crisis Line: 613-722-6914.

WHOM DO PARTICIPANTS CONTACT FOR QUESTIONS?

If you have questions about taking part in this study, or if you suffer a research-related injury, you can talk to the research team, or the person who is in charge of the study at this institution. That person is:

Caitlin Higginson                              Phone: 613-722-6521 ext. 6086 Email: MAPS@theroyal.ca

This study has been reviewed and approved by the Royal’s Institute of Mental Health Research REB as study #2019037. If you have any ethical concerns about the study, or the way it is conducted, please contact the REB office: kristi.wilde@theroyal.ca

**Study Title:** A Multidimensional Assessment of PTSD Subtypes (MAPS)

**SIGNATURES**

- All of my questions have been answered,
- I understand the information within this informed consent form,
- I allow access to my medical records and specimens and related personal health information as explained in this consent form,
- I do not give up any of my legal rights by signing this consent form,
- I understand that my health care provider may be informed of study participation,
- I agree to take part in this study.

<table>
<thead>
<tr>
<th>Optional Components</th>
<th>Time</th>
<th>Compensation</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Receiving more information about donating additional blood to the Biobank of the <em>Canadian Sleep and Circadian Network</em></td>
<td>N/A</td>
<td>$0</td>
</tr>
</tbody>
</table>
| □ Social media data download (Twitter and Facebook; please see page 6) Twitter ID/Handle:  
Facebook ID/Handle: (Please print) | N/A | $0 |
| □ Dream Log (~5min/day between each Visit 1 and 3) | 2 x ~2weeks at home | $0 |

□ I agree for the research team to collect information about the treatment(s) I receive at the Operational Stress Injury (OSI) Program of the Royal until the end of my participation in this study.
☐ I agree for the research team to collect information about the treatment(s) I receive from the following care providers outside of the Royal until the end of my participation in this study.
   Name of external care provider: ______________________________
   Contact details (telephone and email if known):
   ____________________________________________________________

☐ I agree to be contacted by IMHR Researchers to be offered other research opportunities

☐ I agree for staff from the IMHR Sleep Research Unit to use the information collected as part of this study to determine if I may be eligible to participate in other studies

In case of emergency, the researchers can contact my designated care provider:
   Name of care provider: _______________________
   Contact details (telephone and email if external from ROMHC):
   ____________________________________________________________

Signature of Participant ____________________ Printed Name ____________________ Date ________________

Signature of Person Conducting the Consent Discussion ____________________ Printed Name & Role ____________________ Date ________________

Study Title: Multidimensional Assessment of PTSD Subtypes (MAPS)

Optional Social media data download – Additional consent

We would like your permission to store your binary social media post data for future use and future studies. Below, you may also choose to make your anonymized social media post data sharable to other investigators including some who are not currently working on this project. Unless you choose this option, your social media post data will NOT be shared with other investigators. Your social media post data will only be labelled with a unique number assigned to you when you enroll in the study. All other identifiers will be removed. In the future your social media post data will be used along with the clinical information collected during the study to generate and improve computer models that may predict other mental illnesses or psychological constructs. Because information about you will be “de-identified” you will not receive any results, even if the findings may be clinically significant. Analyses done on your data will be conducted at the Royal Ottawa Mental Health Centre’s Institute of Mental Health Research, within the Suicide Prevention Research Unit Laboratories located at 1145 Carling Avenue, Ottawa Ontario Canada, K1Z 7K4 under the direction of Dr. Zachary Kaminsky.

☐ Yes, I agree to allow my social media post data to be stored for use in future studies.
☐ Yes, I agree to allow my social media post data to be shared with other investigators.

☐ No, I do not agree to allow my social media post data to be shared with other investigators. It should only be used by the current study team members.

__________________  ____________________
Signature of Participant                  Printed Participant Name

☐ No, I do not agree to allow my social media post data to be stored for use in future studies.

__________________
Signature of Participant

**Study Title:** *Multidimensional Assessment of PTSD Subtypes (MAPS)*

**Request to be informed of final project findings**

*I would like to receive summaries of the project findings

__________________
Initials of Participant

Participant’s email (or postal) address: ________________________________

__________________
__________________
__________________
Signature of ImpartialWitness  Printed Name  Date

**Participant Assistance**

**Complete the following section only if the participant is unable to read or requires an oral translation:**

☐ The consent form was read to the participant. The person signing below attests that the study as set out in this form was accurately explained to the participant, and any questions have been answered.

__________________  ____________________  ____________
Signature of ImpartialWitness  Printed Name  Date

__________________
Relationship to Participant

**Complete the following declaration only if the participant has limited proficiency in the language in which the consent form is written and interpretation was provided as follows:**
☐ The person signing below acted as an interpreter and attests that this study as set out in the consent form is accurately sight-translated and/or interpreted and that interpretation was provided on questions, responses and in additional discussion arising from this process.

____________________  ____________________  __________________
Signature of Interpreter  Printed Name  Date

Please note: More information regarding assistance provided during the consent process should be noted in the medical record for the participant if applicable, noting the role or relationship of the impartial witness.
### Appendix E. Participant Screening Form and Verbal Consent

#### Participant Screening Form & Verbal Consent Script

<table>
<thead>
<tr>
<th>Name: ______________________________</th>
<th>Email:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phone Number: ____________________</td>
<td>Best time to reach:</td>
</tr>
</tbody>
</table>

---

#### Multidimensional Assessment of PTSD Subtypes

Participant Screening Form (Wave 2 only)

<table>
<thead>
<tr>
<th>ID Code: M_SCR - __________</th>
<th>Date (DD-MM-YYYY):</th>
</tr>
</thead>
</table>

**Recruitment source:**
- □ OSI List
- □ Clinician Referral: ________________________
- □ Advertisements
- □ Other: ____________________________________

**Sex:** Male / Female

### Screener Questions

<table>
<thead>
<tr>
<th>Selection Criteria</th>
<th>Individual Responses (<strong>Be precise and thorough in documenting responses.</strong>)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inclusion criteria in GREEN</strong></td>
<td><strong>Exclusion criteria in RED</strong></td>
</tr>
</tbody>
</table>

1. **What is your current age?**
   - Age in years: _______

2. **Are you a current or past member of the Canadian Armed Forces?**
   - Yes / No

3. **Have you been deployed to a war zone since 2001?**
   - Yes / No
   - *If yes, what was your return date from your last war zone deployment: ____________________*

4. **Do you have current diagnoses of a mental illness?**
   - PTSD or Unipolar Depressive syndrome (MDD, dysthymia) or None
   - Yes / No
   - *If yes (list all):___________________________
   - _____________________________
   - _____________________________
   - _____________________________

5. **Within the last 6 months, have you had a diagnosis of substance abuse disorder (for either alcohol or drugs)?**
   - No
   - Yes / No
<table>
<thead>
<tr>
<th>6. Do you currently have a medical illness?</th>
<th>No</th>
<th>Yes / No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes / No</td>
<td></td>
</tr>
<tr>
<td>If yes (list all):</td>
<td>____________________________</td>
<td></td>
</tr>
<tr>
<td></td>
<td>____________________________________</td>
<td></td>
</tr>
<tr>
<td></td>
<td>____</td>
<td></td>
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<tr>
<td></td>
<td>______________________</td>
<td></td>
</tr>
<tr>
<td></td>
<td>____</td>
<td></td>
</tr>
<tr>
<td>7. Do you have a neurological condition</td>
<td>No</td>
<td>Yes / No</td>
</tr>
<tr>
<td>(e.g., epilepsy, Alzheimer’s disease,</td>
<td>Yes / No</td>
<td></td>
</tr>
<tr>
<td>Parkinson’s disease, etc.)?</td>
<td>If yes (list all):</td>
<td></td>
</tr>
<tr>
<td></td>
<td>____________________________</td>
<td></td>
</tr>
<tr>
<td></td>
<td>____________________________________</td>
<td></td>
</tr>
<tr>
<td></td>
<td>____</td>
<td></td>
</tr>
<tr>
<td>8. Have you ever suffered a head Injury?</td>
<td>No</td>
<td>Yes / No</td>
</tr>
<tr>
<td>8.a. If yes, did you lose consciousness</td>
<td>Yes / No</td>
<td></td>
</tr>
<tr>
<td>for more than 5 minutes?</td>
<td>If yes, did you lose conscious-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ness for more than 5 minutes?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes / No</td>
<td></td>
</tr>
<tr>
<td>9. What medications are you currently</td>
<td>See Maps Exclusion Drugs List</td>
<td></td>
</tr>
<tr>
<td>taking?</td>
<td>Medication name:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Last dosage change:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>____________________________</td>
<td></td>
</tr>
<tr>
<td></td>
<td>____________________________________</td>
<td></td>
</tr>
<tr>
<td></td>
<td>____</td>
<td></td>
</tr>
<tr>
<td>10. When was the last time you have been</td>
<td>If yes, can enter the study</td>
<td></td>
</tr>
<tr>
<td>on a trans-meridian trip (i.e., crossing</td>
<td>after 3 days/ jet lag hour</td>
<td></td>
</tr>
<tr>
<td>time zones)?</td>
<td>Yes / No</td>
<td></td>
</tr>
</tbody>
</table>
|                                          | If yes:
<p>|                                          | When did you come back?       |</p>
<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. Have you ever worked night or rotating shifts?</td>
<td>No (unless study starts &gt;1month after last overnight shift)</td>
</tr>
<tr>
<td>12. Are you able to go without caffeine, alcohol or nicotine for 24hrs straight (i.e., overnight)?</td>
<td>Yes / No</td>
</tr>
<tr>
<td>13. Are you able to go ~ 3 weeks without using recreational drugs? (except cannabis)</td>
<td>Yes / No</td>
</tr>
<tr>
<td>HEALTHY CONTROLS</td>
<td></td>
</tr>
<tr>
<td>14. Do you have any diagnosis of a sleep disorder or major sleep problems</td>
<td>No / Yes</td>
</tr>
</tbody>
</table>

Additional Notes:

MAPS: Verbal Consent for screening Questionnaires/Interviews

Script read to the potential participant:
Many thanks for answering these questions.

The next step to determine if you meet the criteria for this study would be to complete some screening questionnaires about mental health and sleep. These should take between 5 and 15 minutes to fill out.

One way to go about this would be for me to email you a link via which you can access the questionnaires online on a secured website. I will also give you an anonymous research screening code, so that you do not have to put your name anywhere on the questionnaire.
If you prefer, I can also send you these questionnaires by post with a pre-paid return envelope.

Once we have received these questionnaires we will confirm if you would be eligible for the 3\textsuperscript{rd} and last step of the screening process. If eligible for the 3\textsuperscript{rd} step, you will be invited to come to our laboratory to undergo a face-to-face interview in order to determine if you meet the last set of criteria. This interview should last for about 15-45 minutes.

It is only once these 3 steps are completed that we will know if you are eligible for the study. You will not receive any financial compensation for this screening process.
One thing that is important to keep in mind is that you can choose not to participate in this study. You can also choose to stop the study at any time, including during the screening process. Your
decision to participate or not in this study will not affect the care you may receive at the Royal Ottawa Mental Health Centre.

Do you have any question about this?

I would need to get your verbal consent to ensure you agree to fill out the screening questionnaires before I can send them to you.

Do you agree to fill out the screening questionnaires to see if you may be eligible for the study?

□ Yes / □ No

Name of potential participant: _________________________________
Name of person obtaining verbal consent: _________________________________
Date: _____________________

Maps Exclusion Drugs Criteria

<table>
<thead>
<tr>
<th>Stimulants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adderall (Dextroamphetamine)</td>
</tr>
<tr>
<td>Concerta (Methylphenidate)</td>
</tr>
<tr>
<td>Desoxyn (Methamphetamine)</td>
</tr>
<tr>
<td>Dexedrine, Dextrostat (Dextroamphetamine)</td>
</tr>
<tr>
<td>Ephedrine, MDMA (Amphetamine)</td>
</tr>
<tr>
<td>Phentermine (Alphadiphentylamine)</td>
</tr>
<tr>
<td>Procentra (Dextroamphetamine)</td>
</tr>
<tr>
<td>Methylphenidate (Ritalin, Concerta)</td>
</tr>
<tr>
<td>Selegline (L-Deprenyl)</td>
</tr>
<tr>
<td>Vyvanse (Dextroamphetamine)</td>
</tr>
<tr>
<td>*Crank, Crystal meth</td>
</tr>
<tr>
<td>*Speed</td>
</tr>
</tbody>
</table>

Note: Brand name in alphabetical order (generic name in brackets); *refers to street names

Please detach from screener and store in consent form cabinet
Appendix F. Measures

Demographics

What is your biological sex?
  o Male
  o Female

Current Status:
  o Active Personnel
  o On medical or psychiatric leave of absence
  o Veteran

Are you currently sick with a cold? (e.g. runny or stuffy nose)
  o Yes
  o No

How many days ago did your cold start? ________________________________

Are you currently sick with a flu (e.g. fever, cough, sore throat, runny or stuffy nose, muscle or body aches, headaches and/or fatigue)
  o Yes
  o No

How many days ago did your flu start? ________________________________

Please select the option that best reflects your current situation:
  o I have periods at least some of the time (i.e. pre-menopausal or peri-menopausal)
  o I have no periods because of factors unrelated to my age (e.g. medication, illness, etc.)
  o My periods have completely stopped naturally (i.e. post-menopause)

Habitual length of cycle (from the start of your periods to the start of your next periods, e.g. 28 days, 35 days, etc.):
  o Number of days: _________________________________________

Are you currently menstruating?
  o Yes
  o No

When did your last period start (how many days ago)? ______________________
When did your last period end (how many days ago)? ______________________

Do you currently take any form of hormonal based contraception (birth control)?
At what age did you start taking hormonal based contraception? ______________________

Which one(s) are you currently taking?

- Standard birth control pill, please specify name and how long you have been using this: ______________________
- Evra Patch, please specify name and how long you have been using this: ______________________
- NuvaRing, please specify name and how long you have been using this: ______________________
- Depo-Provera Shot, please specify name and how long you have been using this: ______________________
- Mini (progestin-only) birth control pill, please specify name and how long you have been using this: ______________________
- IUD (hormonal), please specify name and how long you have been using this: ______________________
- Other, please specify name and how long you have been using this: ______________________

Were you on any other type of hormonal based contraception prior to this one?

- Yes, please specify name and length of use: ______________________
- No ______________________

Are you currently pregnant?

- Yes ______________________
- No ______________________

For how long have you been pregnant?

- Number of weeks: ______________________

Do you foresee becoming pregnant in the next two months?

- Yes ______________________
- No ______________________

Have you had a pregnancy in the last year?

- Yes ______________________
- No ______________________

When did the pregnancy start and end?

- Start: ______________________
- End: ______________________
How many hours do you exercise per week? _________________________________

Have you exercised in the last 24 hours?

- Yes
- No

What form of exercise was it? _________________________________

Around what time did you stop? _________________________________

Are you currently taking any medications (including natural remedies, over the counter medications, and cannabis products)?

- Yes
- No

If you are currently taking any medications (including natural remedies, over the counter medications)…

Please list your current medications (including natural remedies and cannabis products)

- Medication name _________________________________
- Dosage _________________________________
- Reason _________________________________
- Approximate date started _________________________________
- How helpful has this treatment been for you so far?
  - Not helpful at all
  - Slightly helpful
  - Somewhat helpful
  - Very helpful
  - Extremely helpful

Are you currently undergoing any other type of treatment (e.g. groups, talk therapy, sleep intervention)?

- Yes
- No

If you are currently undergoing any other type of treatment (e.g. groups, talk therapy, sleep intervention)…

Please list all other current treatments

- Treatment type _________________________________
- Treatment name _________________________________
- Type of treatment provider _________________________________
- Approximate start date _________________________________
- Frequency
  - Once a week
Every two weeks
Once a month
Less than once a month
Other (please specify _____________________)

How helpful has this treatment been for you so far?
Not helpful at all
Slightly helpful
Somewhat helpful
Very helpful
Extremely helpful
Beck Depression Inventory (BDI)

The BDI-II contains 21 questions, each answer is being scored on a scale value of 0 to 3. The cut-offs used differ from the original: 0-13: minimal depression; 14-19: mild depression; 20-28: moderate depression; and 29-63: severe depression. Higher total scores indicate more severe depressive symptoms.

Instructions: This questionnaire consists of 21 groups of statements. Please read each group of statements carefully, and then pick out the one statement in each group that best describes the way you have been feeling during the past two weeks, including today. Circle the number beside the statement you have picked. If several statements in the group seem to apply equally well, circle the highest number for that group. Be sure that you do not choose more than one statement for any group, including Item 16 (Changes in Sleeping Pattern) or Item 18 (Changes in Appetite).

1. Sadness
   ___ 0 = I do not feel sad.
   ___ 1 = I feel sad much of the time.
   ___ 2 = I am sad all the time.
   ___ 3 = I am so sad or unhappy that I can’t stand it.

2. Pessimism
   ___ 0 = I am not discouraged about my future.
   ___ 1 = I feel more discouraged about my future than I used to be.
   ___ 2 = I do not expect things to work out for me.
   ___ 3 = I feel my future is hopeless and will only get worse.

3. Past Failure
   ___ 0 = I do not feel like a failure.
   ___ 1 = I have failed more than I should have.
   ___ 2 = As I look back, I see a lot of failures.
   ___ 3 = I feel I am a total failure as a person.

4. Loss of Pleasure
   ___ 0 = I get as much pleasure as I ever did from the things I enjoy.
   ___ 1 = I don’t enjoy things as much as I used to.
   ___ 2 = I get very little pleasure from the things I used to enjoy.
   ___ 3 = I can’t get any pleasure from the things I used to enjoy.

5. Guilty Feelings
   ___ 0 = I don’t feel particularly guilty.
   ___ 1 = I feel guilty over many things I have done or should have done.
   ___ 2 = I feel quite guilty most of the time.
   ___ 3 = I feel guilty all of the time.

6. Punishment Feelings
___ 0 = I don’t feel I am being punished.
___ 1 = I feel I may be punished.
___ 2 = I expect to be punished.
___ 3 = I feel I am being punished.

7. Self-Dislike
___ 0 = I feel the same about myself as ever.
___ 1 = I have lost confidence in myself.
___ 2 = I am disappointed in myself.
___ 3 = I dislike myself.

8. Self-Criticalness
___ 0 = I don’t criticize or blame myself more than usual.
___ 1 = I am more critical of myself than I used to be.
___ 2 = I criticize myself for all of my faults.
___ 3 = I blame myself for everything bad that happens.

9. Suicidal Thoughts or Wishes
___ 0 = I don’t have any thoughts of killing myself.
___ 1 = I have thoughts of killing myself, but I would not carry them out.
___ 2 = I would like to kill myself.
___ 3 = I would kill myself if I had the chance.

10. Crying
___ 0 = I don’t cry anymore than I used to.
___ 1 = I cry more than I used to.
___ 2 = I cry over every little thing.
___ 3 = I feel like crying, but I can’t.

11. Agitation
___ 0 = I am no more restless or wound up than usual.
___ 1 = I feel more restless or wound up than usual.
___ 2 = I am so restless or agitated that it’s hard to stay still.
___ 3 = I am so restless or agitated that I have to keep moving or doing something.

12. Loss of Interest
___ 0 = I have not lost interest in other people or activities.
___ 1 = I am less interested in other people or things than before.
___ 2 = I have lost most of my interest in other people or things.
___ 3 = It’s hard to get interested in anything.

13. Indecisiveness
___ 0 = I make decisions about as well as ever.
___ 1 = I find it more difficult to make decisions than usual.
___ 2 = I have greater difficulty in making decisions than I used to.
___ 3 = I have trouble making any decisions.
14. Worthlessness
   ___ 0 = I do not feel I am worthless.
   ___ 1 = I don’t consider myself as worthwhile and useful as I used to.
   ___ 2 = I feel more worthless as compared to other people.
   ___ 3 = I feel utterly worthless.

15. Loss of Energy
   ___ 0 = I have as much energy as ever.
   ___ 1 = I have less energy than I used to have.
   ___ 2 = I don’t have enough energy to do very much.
   ___ 3 = I don’t have enough energy to do anything.

16. Changes in Sleeping Pattern
   ___ 0 = I have not experienced any change in my sleeping pattern.
   ___ 1a = I sleep somewhat more than usual.
   ___ 1b = I sleep somewhat less than usual.
   ___ 2a = I sleep a lot more than usual.
   ___ 2b = I sleep a lot less than usual.
   ___ 3a = I sleep most of the day.
   ___ 3b = I wake up 1-2 hours early and can’t get back to sleep.

17. Irritability
   ___ 0 = I am no more irritable than usual.
   ___ 1 = I am more irritable than usual.
   ___ 2 = I am much more irritable than usual.
   ___ 3 = I am irritable all the time.

18. Changes in Appetite
   ___ 0 = I have not experienced any change in my appetite.
   ___ 1a = My appetite is somewhat less than usual.
   ___ 1b = My appetite is somewhat greater than usual.
   ___ 2a = My appetite is much less than before.
   ___ 2b = My appetite is much greater than usual.
   ___ 3a = I have no appetite at all.
   ___ 3b = I crave food all the time.

19. Concentration Difficulty
   ___ 0 = I can concentrate as well as ever.
   ___ 1 = I can’t concentrate as well as usual.
   ___ 2 = It’s hard to keep my mind on anything for very long.
   ___ 3 = I find I can’t concentrate on anything.

20. Tiredness or Fatigue
   ___ 0 = I am no more tired or fatigued than usual.
   ___ 1 = I get more tired or fatigued more easily than usual.
2 = I am too tired or fatigued to do a lot of the things I used to do.
3 = I am too tired or fatigued to do most of the things I used to do.

21. Loss of Interest in Sex
0 = I have not noticed any recent change in my interest in sex.
1 = I am less interested in sex than I used to be.
2 = I am much less interested in sex now.
3 = I have lost interest in sex completely.
Beck Anxiety Inventory (BAI)

**Instructions:** Below is a list of common symptoms of anxiety. Please carefully read each item in the list. Indicate how much you have been bothered by that symptom during the past month, including today, by circling the number in the corresponding space in the column next to each symptom.

**Rating scale:**
Not At All
Mildly: “it didn’t bother me much”
Moderately: “it wasn’t pleasant at times”
Severely: “it bothered me a lot”

<table>
<thead>
<tr>
<th>Numbness or tingling</th>
<th>Not At All</th>
<th>Mildly</th>
<th>Moderately</th>
<th>Severely</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Feeling hot</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Wobbliness in legs</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Unable to relax</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Fear of worst happening</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Dizzy or lightheaded</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Heart pounding / racing</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Unsteady</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Terrified or afraid</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Nervous</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Feeling of choking</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Hands trembling</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Shaky / unsteady</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Fear of losing control</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Difficulty in breathing</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Fear of dying</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Scared</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Indigestion</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Faint / lightheaded</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Face flushed</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Hot / cold sweats</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
### Positive and Negative Affect Schedule (PANAS-SF)

Indicate the extent you have felt this way over the past week.

<table>
<thead>
<tr>
<th></th>
<th>Very slightly or not at all</th>
<th>A little</th>
<th>Moderately</th>
<th>Quite a bit</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interested</td>
<td>□ 1</td>
<td>□ 2</td>
<td>□ 3</td>
<td>□ 4</td>
<td>□ 5</td>
</tr>
<tr>
<td>Distressed</td>
<td>□ 1</td>
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<td>Excited</td>
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<td>Upset</td>
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<td>Strong</td>
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<td>Guilty</td>
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<td>Scared</td>
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<td>Hostile</td>
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<td>Enthusiastic</td>
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<td>Proud</td>
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<td>Irritable</td>
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<td>Alert</td>
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<td>Ashamed</td>
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PTSD Checklist for DSM-5 (PCL-5)

Below is a list of problems that people sometimes have in response to a very stressful experience. Keeping your worst event in mind, please read each problem carefully and then circle one of the numbers to the right to indicate how much you have been bothered by that problem in the past month.

<table>
<thead>
<tr>
<th>In the past month, how much were you bothered by:</th>
<th>Not at all</th>
<th>A little bit</th>
<th>Moderately</th>
<th>Quite a bit</th>
<th>Extremely</th>
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</thead>
<tbody>
<tr>
<td>1. Repeated, disturbing, and unwanted memories of the stressful experience?</td>
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<tr>
<td>2. Repeated, disturbing dreams of the stressful experience?</td>
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<tr>
<td>3. Suddenly feeling or acting as if the stressful experience were actually happening again (as if you were actually back there reliving it)?</td>
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<td>4. Feeling very upset when something reminded you of the stressful experience?</td>
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<tr>
<td>5. Having strong physical reactions when something reminded you of the stressful experience (for example, heart pounding, trouble breathing, sweating)?</td>
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<tr>
<td><strong>6. Avoiding memories, thoughts, or feelings related to the stressful experience?</strong></td>
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<tr>
<td><strong>7. Avoiding external reminders of the stressful experience (for example, people, places, conversations, activities, objects, or situations)?</strong></td>
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<td><strong>8. Trouble remembering important parts of the stressful experience?</strong></td>
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<td><strong>9. Having strong negative beliefs about yourself, other people, or the world (for example, having thoughts such as: I am bad, there is something seriously wrong with me, no one can be trusted, the world is completely dangerous)?</strong></td>
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<td><strong>10. Blaming yourself or someone else for the stressful experience or what happened after it?</strong></td>
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<td><strong>11. Having strong negative feelings such as fear, horror,</strong></td>
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<td>anger, guilt, or shame?</td>
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<td>12. Loss of interest in activities that you used to enjoy?</td>
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<td>13. Feeling distant or cut off from other people?</td>
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<td>14. Trouble experiencing positive feelings (for example, being unable to feel happiness or having loving feelings for people close to you)?</td>
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<td>15. Irritable behavior, angry outbursts, or acting aggressively?</td>
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<td>16. Taking too many risks or doing things that could cause you harm?</td>
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<td>17. Being &quot;super alert&quot; or watchful or on guard?</td>
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<td>18. Feeling jumpy or easily startled?</td>
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<td>19. Having difficulty concentrating?</td>
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<td>20. Trouble falling or staying asleep?</td>
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</table>
Clinician-Administered PTSD Scale for DSM-5 (CAPS-5)

**Criterion A:**

Exposure to actual or threatened death, serious injury, or sexual violence in one (or more) of the following ways:

1. Directly experiencing the traumatic event(s).
2. Witnessing, in person, the event(s) as it occurred to others.
3. Learning that the traumatic event(s) occurred to a close family member or close friend. In cases of actual or threatened death of a family member or friend, the event(s) must have been violent or accidental.
4. Experiencing repeated or extreme exposure to aversive details of the traumatic event(s) (e.g., first responders collecting human remains; police officers repeatedly exposed to details of child abuse). Note: Criterion A4 does not apply to exposure through electronic media, television, movies, or pictures, unless this exposure is work related.

[Administer Life Events Checklist or other structured trauma screen]

I’m going to ask you about the stressful experiences questionnaire you filled out. First I’ll ask you to tell me a little bit about the event you said was the worst for you. Then I’ll ask how that event may have affected you over the past month. In general I don’t need a lot of information – just enough so I can understand any problems you may have had. Please let me know if you find yourself becoming upset as we go through the questions so we can slow down and talk about it. Also, let me know if you have any questions or don’t understand something. Do you have any questions before we start?

The event you said was the worst was (EVENT). What I’d like for you to do is briefly describe what happened.

*Index event (specify):*

________________________

**What happened?** *(How old were you? How were you involved? Who else was involved? Was anyone seriously injured or killed? Was anyone’s life in danger? How many times did this happen?)*

**Exposure type:**

_____ Experienced
_____ Witnessed
Learned about
Exposed to aversive details

Life threat?
NO  YES (self ___ other ___ )

Serious injury?
NO  YES (self ___ other ___ )

Sexual violence?
NO  YES (self ___ other ___ )

Criterion A met?
NO  PROBABLE  YES

For the rest of the interview, I want you to keep (EVENT) in mind as I ask you about different problems it may have caused you. You may have had some of these problems before, but for this interview we’re going to focus just on the past month. For each problem I’ll ask if you’ve had it in the past month, and if so, how often and how much it bothered you.

Criterion B:
Presence of one (or more) of the following intrusion symptoms associated with the traumatic event(s), beginning after the traumatic event(s) occurred:

Item 1 (B1): Recurrent, involuntary, and intrusive distressing memories of the traumatic event(s). Note: In children older than 6 years, repetitive play may occur in which themes or aspects of the traumatic event(s) are expressed.

In the past month, have you had any unwanted memories of (EVENT) while you were awake, so not counting dreams? (Rate 0=Absent if only during dreams)

How does it happen that you start remembering (EVENT)?

[If not clear:] (Are these unwanted memories, or are you thinking about (EVENT) on purpose?) (Rate 0=Absent unless perceived as involuntary and intrusive)
How much do these memories bother you?

Are you able to put them out of your mind and think about something else?

[If not clear:] *(Overall, how much of a problem is this for you? How so?)* Circle: Distress = Minimal Clearly Present Pronounced Extreme

How often have you had these memories in the past month?

# of times __________

1. 0 Absent
2. 1 Mild / subthreshold
3. 2 Moderate / threshold
4. 3 Severe / markedly elevated
5. 4 Extreme / incapacitating

_key rating dimensions = frequency / intensity of distress_

**Moderate** = at least 2 X month / distress clearly present, some difficulty dismissing memories

**Severe** = at least 2 X week / pronounced distress, considerable difficulty dismissing memories

**Item 2 (B2):** Recurrent distressing dreams in which the content and/or affect of the dream are related to the event(s). Note: In children, there may be frightening dreams without recognizable content.

In the past month, have you had any unpleasant dreams about (EVENT)? Describe a typical dream. *(What happens?)*

[If not clear:] *(Do they wake you up?)*
[If yes:] *(What do you experience when you wake up? How long does it take you to get back to sleep?)*
[If reports not returning to sleep:] *(How much sleep do you lose?)*

How much do these memories bother you?

Circle: Distress = Minimal Clearly Present Pronounced Extreme

**How often have you had these dreams in the past month?** # of times __________

1. 0 Absent
2. 1 Mild / subthreshold
3. 2 Moderate / threshold
4. 3 Severe / markedly elevated
5. 4 Extreme / incapacitating
**Key rating dimensions = frequency / intensity of distress**

**Moderate** = at least 2 X month / distress clearly present, less than 1 hour sleep loss

**Severe** = at least 2 X week / pronounced distress, more than 1 hour sleep loss

**Item 3 (B3):** Dissociative reactions (e.g., flashbacks) in which the individual feels or acts as if the traumatic event(s) were recurring. (Such reactions may occur on a continuum, with the most extreme expression being a complete loss of awareness of present surroundings.) Note: In children, trauma-specific reenactment may occur in play.

*In the past month, have there been times when you suddenly acted or felt as if (EVENT) were actually happening again?*

[If not clear:] *(This is different than thinking about it or dreaming about it – now I’m asking about flashbacks, when you feel like you’re actually back at the time of (EVENT), actually reliving it.)*

**How much does it seem as if (EVENT) were happening again?** *(Are you confused about where you actually are?)*

**What do you do while this is happening?** *(Do other people notice your behavior? What do they say?)*

**How long does it last?**

Circle: Dissociation = **Minimal Clearly Present Pronounced Extreme**

*How often has this happened in the past month?* # of times __________

1. 0 Absent
2. 1 Mild / subthreshold
3. 2 Moderate / threshold
4. 3 Severe / markedly elevated
5. 4 Extreme / incapacitating

**Key rating dimensions = frequency / intensity of dissociation**

**Moderate** = at least 2 X month / dissociative quality clearly present, may retain some awareness of surroundings but relives event in a manner clearly distinct from thoughts and memories

**Severe** = at least 2 X week / pronounced dissociative quality, reports vivid reliving, e.g., with images, sounds, smells

**Item 4 (B4):** Intense or prolonged psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event(s).
In the past month, have you gotten emotionally upset when something reminded you of (EVENT)?

What kinds of reminders make you upset? How much do these reminders bother you?

Are you able to calm yourself down when this happens? (How long does it take?)

[If not clear:] (Overall, how much of a problem is this for you? How so?)

Circle: Distress = Minimal Clearly Present Pronounced Extreme

How often has this happened in the past month? # of times __________

1. 0 Absent
2. 1 Mild / subthreshold
3. 2 Moderate / threshold
4. 3 Severe / markedly elevated
5. 4 Extreme / incapacitating

Key rating dimensions = frequency / intensity of distress

Moderate = at least 2 X month / distress clearly present, some difficulty recovering

Severe = at least 2 X week / pronounced distress, considerable difficulty recovering

Item 5 (B5): Marked physiological reactions to internal or external cues that symbolize or resemble an aspect of the traumatic event(s).

In the past month, have you had any physical reactions when something reminded you of (EVENT)?

Can you give me some examples? (Does your heart race or your breathing change? What about sweating or feeling really tense or shaky?)

What kinds of reminders trigger these reactions? How long does it take you to recover?

Circle: Physiological reactivity = Minimal Clearly Present Pronounced Extreme How often has this happened in the past month? # of times __________

1. 0 Absent
2. 1 Mild / subthreshold
3. 2 Moderate / threshold
4. 3 Severe / markedly elevated
5. 4 Extreme / incapacitating

Key rating dimensions = frequency / intensity of physiological arousal
**Moderate** = at least 2 X month / reactivity clearly present, some difficulty recovering

**Severe** = at least 2 X week / pronounced reactivity, sustained arousal, considerable difficulty recovering

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**Criterion C:**

Persistent avoidance of stimuli associated with the traumatic event(s), beginning after the traumatic event(s) occurred, as evidenced by one or both of the following:

**Item 6 (C1):** Avoidance of or efforts to avoid distressing memories, thoughts, or feelings about or closely associated with the traumatic event(s).

**In the past month, have you tried to avoid thoughts or feelings about (EVENT)?**

**What kinds of thoughts or feelings do you avoid?**  
**How hard do you try to avoid these thoughts or feelings? (What kinds of things do you do?)**  
[If not clear:] (Overall, how much of a problem is this for you? How would things be different if you didn’t have to avoid these thoughts or feelings?)

Circle: Avoidance = Minimal Clearly Present Pronounced Extreme **How often in the past month?** # of times 

1. 0 Absent  
2. 1 Mild / subthreshold  
3. 2 Moderate / threshold  
4. 3 Severe / markedly elevated  
5. 4 Extreme / incapacitating

**Key rating dimensions = frequency / intensity of avoidance**

**Moderate** = at least 2 X month / avoidance clearly present

**Severe** = at least 2 X week / pronounced avoidance

**Item 7 (C2):** Avoidance of or efforts to avoid external reminders (people, places, conversations, activities, objects, situations) that arouse distressing memories, thoughts, or feelings about or closely associated with the traumatic event(s).
In the past month, have you tried to avoid things that remind you of (EVENT), like certain people, places, or situations?

What kinds of things do you avoid?
How much effort do you make to avoid these reminders? (Do you have to make a plan or change your activities to avoid them?)
[If not clear: ] (Overall, how much of a problem is this for you? How would things be different if you didn’t have to avoid these reminders?)

Circle: Avoidance = Minimal Clearly Present Pronounced Extreme

How often in the past month? # of times __________

1. 0 Absent
2. 1 Mild / subthreshold
3. 2 Moderate / threshold
4. 3 Severe / markedly elevated
5. 4 Extreme / incapacitating

Key rating dimensions = frequency / intensity of avoidance

Moderate = at least 2 X month / avoidance clearly present

Severe = at least 2 X week / pronounced avoidance

Criterion D:

Negative alterations in cognitions and mood associated with the traumatic event(s), beginning or worsening after the traumatic event(s) occurred, as evidenced by two (or more) of the following:

Item 8 (D1): Inability to remember an important aspect of the traumatic event(s) (typically due to dissociative amnesia and not to other factors such as head injury, alcohol, or drugs).

In the past month, have you had difficulty remembering some important parts of (EVENT)? (Do you feel there are gaps in your memory of (EVENT)?)

What parts have you had difficulty remembering?
Do you feel you should be able to remember these things?
[If not clear:] *(Why do you think you can’t? Did you have a head injury during (EVENT)? Were you knocked unconscious? Were you intoxicated from alcohol or drugs?)* (Rate 0=Absent if due to head injury or loss of consciousness or intoxication during event)

[If still not clear:] *(Is this just normal forgetting? Or do you think you may have blocked it out because it would be too painful to remember?)* (Rate 0=Absent if due only to normal forgetting)

Circle: Difficulty remembering = *Minimal Clearly Present Pronounced Extreme*

**In the past month, how many of the important parts of (EVENT) have you had difficulty remembering?** *(What parts do you still remember?)*

# of important aspects __________

**Would you be able to recall these things if you tried?**

1.  0 Absent
2.  1 Mild / subthreshold
3.  2 Moderate / threshold
4.  3 Severe / markedly elevated
5.  4 Extreme / incapacitating

**Key rating dimensions = amount of event not recalled / intensity of inability to recall**

**Moderate** = at least one important aspect / difficulty remembering clearly present, some recall possible with effort

**Severe** = several important aspects / pronounced difficulty remembering, little recall even with effort

**Item 9 (D2):** Persistent and exaggerated negative beliefs or expectations about oneself, others, or the world (e.g., “I am bad,” “No one can be trusted,” “The world is completely dangerous,” “My whole nervous system is permanently ruined”).

**In the past month, have you had strong negative beliefs about yourself, other people, or the world?**

**Can you give me some examples?** *(What about believing things like “I am bad,” “there is something seriously wrong with me,” “no one can be trusted,” “the world is completely dangerous”?)*

**How strong are these beliefs?** *(How convinced are you that these beliefs are actually true? Can you see other ways of thinking about it?)*

Circle: Conviction = *Minimal Clearly Present Pronounced Extreme* **How much of the time in the past month have you felt that way, as a*
percentage? % of time __________

Did these beliefs start or get worse after (EVENT)? (Do you think they’re related to (EVENT)? How so?) Circle: Trauma-relatedness = Definite Probable Unlikely

1. 0 Absent
2. 1 Mild / subthreshold
3. 2 Moderate / threshold
4. 3 Severe / markedly elevated
5. 4 Extreme / incapacitating

Key rating dimensions = frequency / intensity of beliefs

Moderate = some of the time (20-30%) / exaggerated negative expectations clearly present, some difficulty considering more realistic beliefs

Severe = much of the time (50-60%) / pronounced exaggerated negative expectations, considerable difficulty considering more realistic beliefs

Item 10 (D3): Persistent, distorted cognitions about the cause or consequences of the traumatic event(s) that lead the individual to blame himself/herself or others.

In the past month, have you blamed yourself for (EVENT) or what happened as a result of it? Tell me more about that. (In what sense do you see yourself as having caused (EVENT)? Is it because of something you did? Or something you think you should have done but didn’t? Is it because of something about you in general?)

What about blaming someone else for (EVENT) or what happened as a result of it? Tell me more about that. (In what sense do you see (OTHERS) as having caused (EVENT)? Is it because of something they did? Or something you think they should have done but didn’t?)

How much do you blame (YOURSELF OR OTHERS)?

How convinced are you that (YOU OR OTHERS) are truly to blame for what happened? (Do other people agree with you? Can you see other ways of thinking about it?)

(Rate 0=Absent if only blames perpetrator, i.e., someone who deliberately caused the event and intended harm)

Circle: Conviction = Minimal Clearly Present Pronounced Extreme

How much of the time in the past month have you felt that way, as a percentage? % of time __________

1. 0 Absent
2. 1 Mild / subthreshold
3. 2 Moderate / threshold
4. 3 Severe / markedly elevated
5. 4 Extreme / incapacitating

**Key rating dimensions = frequency / intensity of blame**

**Moderate** = some of the time (20-30%) / distorted blame clearly present, some difficulty considering more realistic beliefs

**Severe** = much of the time (50-60%) / pronounced distorted blame, considerable difficulty considering more realistic beliefs

**Item 11 (D4):** Persistent negative emotional state (e.g., fear, horror, anger, guilt, or shame).

In the past month, have you had any strong negative feelings such as fear, horror, anger, guilt, or shame?

Can you give me some examples? *(What negative feelings do you experience?)* How strong are these negative feelings?

How well are you able to manage them?

[If not clear:] *(Overall, how much of a problem is this for you? How so?)* Circle: Negative emotions = Minimal Clearly Present Pronounced Extreme

How much of the time in the past month have you felt that way, as a percentage? % of time

________________

Did these negative feelings start or get worse after *(EVENT)*? *(Do you think they’re related to *(EVENT)*? How so?)*

Circle: Trauma-relatedness = Definite Probable Unlikely

1. 0 Absent
2. 1 Mild / subthreshold
3. 2 Moderate / threshold
4. 3 Severe / markedly elevated
5. 4 Extreme / incapacitating

**Key rating dimensions = frequency / intensity of negative emotions**

**Moderate** = some of the time (20-30%) / negative emotions clearly present, some difficulty managing

**Severe** = much of the time (50-60%) / pronounced negative emotions, considerable difficulty managing
**Item 12 (D5):** Markedly diminished interest or participation in significant activities.

*In the past month, have you been less interested in activities that you used to enjoy?*

*What kinds of things have you lost interest in or don’t do as much as you used to? (Anything else?)*

*Why is that? (Rate 0=Absent if diminished participation is due to lack of opportunity, physical inability, or developmentally appropriate change in preferred activities)*

*How strong is your loss of interest? (Would you still enjoy (ACTIVITIES) once you got started?)*

Circle: Loss of interest = *Minimal* *Clearly Present* *Pronounced* *Extreme* Overall, in the past month, how many of your usual activities have you

been less interested in, as a percentage? % of activities __________ What kinds of things do you still enjoy doing?

*Did this loss of interest start or get worse after (EVENT)? (Do you think it’s related to (EVENT)? How so?)*

Circle: Trauma-relatedness = *Definite* *Probable* *Unlikely*

1. 0 *Absent*
2. 1 *Mild* / subthreshold
3. 2 *Moderate* / threshold
4. 3 *Severe* / markedly elevated
5. 4 *Extreme* / incapacitating

**Key rating dimensions = percent of activities affected / intensity of loss of interest**

**Moderate** = some activities (20-30%) / loss of interest clearly present but still has some enjoyment of activities

**Severe** = many activities (50-60%) / pronounced loss of interest, little interest or participation in activities

**Item 13 (D6):** Feelings of detachment or estrangement from others.

*In the past month, have you felt distant or cut off from other people? Tell me more about that.*

*How strong are your feelings of being distant or cut off from others? (Who do you feel closest to? How many people do you feel comfortable talking with about personal things?)*

Circle: Detachment or estrangement =
Minimal Clearly Present Pronounced Extreme

How much of the time in the past month have you felt that way, as a percentage? % of time __________

Did this feeling of being distant or cut off start or get worse after (EVENT)? (Do you think it’s related to (EVENT)? How so?)
Circle: Trauma-relatedness = Definite Probable Unlikely

1. 0 Absent
2. 1 Mild / subthreshold
3. 2 Moderate / threshold
4. 3 Severe / markedly elevated
5. 4 Extreme / incapacitating

Key rating dimensions = frequency / intensity of detachment or estrangement

Moderate = some of the time (20-30%) / feelings of detachment clearly present but still feels some interpersonal connection

Severe = much of the time (50-60%) / pronounced feelings of detachment or estrangement from most people, may feel close to only one or two people

Item 14 (D7): Persistent inability to experience positive emotions (e.g., inability to experience happiness, satisfaction, or loving feelings).

In the past month, have there been times when you had difficulty experiencing positive feelings like love or happiness?

Tell me more about that. (What feelings are difficult to experience?)
How much difficulty do you have experiencing positive feelings? (Are you still able to experience any positive feelings?) Circle: Reduction of positive emotions =

Minimal Clearly Present Pronounced Extreme

How much of the time in the past month have you felt that way, as a percentage? % of time __________

Did this trouble experiencing positive feelings start or get worse after (EVENT)? (Do you think it’s related to (EVENT)? How so?)
Circle: Trauma-relatedness = Definite Probable Unlikely

1. 0 Absent
2. 1 Mild / subthreshold
3. 2 Moderate / threshold
4. 3 Severe / markedly elevated
5. 4 Extreme / incapacitating

**Key rating dimensions = frequency / intensity of reduction in positive emotions**

- **Moderate** = some of the time (20-30%) / reduction of positive emotional experience clearly present but still able to experience some positive emotions
- **Severe** = much of the time (50-60%) / pronounced reduction of experience across range of positive emotions

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**Criterion E:**

Marked alterations in arousal and reactivity associated with the traumatic event(s), beginning or worsening after the traumatic event(s) occurred, as evidenced by two (or more) of the following:

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**Item 15 (E1):** Irritable behavior and angry outbursts (with little or no provocation) typically expressed as verbal or physical aggression toward people or objects.

**In the past month, have there been times when you felt especially irritable or angry and showed it in your behavior?**

**Can you give me some examples?** (How do you show it? Do you raise your voice or yell? Throw or hit things? Push or hit other people?)

Circle: **Aggression = Minimal Clearly Present Pronounced Extreme How often in the past month?** # of times __________

**Did this behavior start or get worse after (EVENT)?** (Do you think it’s related to (EVENT)? How so?) Circle: **Trauma-relatedness = Definite Probable Unlikely**

1. 0 Absent
2. 1 Mild / subthreshold
3. 2 Moderate / threshold
4. 3 Severe / markedly elevated
5. 4 Extreme / incapacitating

---

**Key rating dimensions = frequency / intensity of aggressive behavior**

- **Moderate** = at least 2 X month / aggression clearly present, primarily verbal
Severe = at least 2 X week / pronounced aggression, at least some physical aggression

Item 16 (E2): Reckless or self-destructive behavior.

In the past month, have there been times when you were taking more risks or doing things that might have caused you harm?

Can you give me some examples?
How much of a risk do you take? (How dangerous are these behaviors? Were you injured or harmed in some way?)
Circle: Risk = Minimal Clearly Present Pronounced Extreme

How often have you taken these kinds of risks in the past month?

# of times __________

Did this behavior start or get worse after (EVENT)? (Do you think it’s related to (EVENT)? How so?) Circle: Trauma-relatedness = Definite Probable Unlikely

1. 0 Absent
2. 1 Mild / subthreshold
3. 2 Moderate / threshold
4. 3 Severe / markedly elevated
5. 4 Extreme / incapacitating

Key rating dimensions = frequency / degree of risk

Moderate = at least 2 X month / risk clearly present, may have been harmed

Severe = at least 2 X week / pronounced risk, actual harm or high probability of harm

Item 17 (E3): Hypervigilance.

In the past month, have you been especially alert or watchful, even when there was no specific threat or danger? (Have you felt as if you had to be on guard?)

Can you give me some examples? (What kinds of things do you do when you’re alert or watchful?)

[If not clear:] (What causes you to react this way? Do you feel like you’re in danger or threatened in some way? Do you feel that way more than most people would in the same situation?)

Circle: Hypervigilance = Minimal Clearly Present Pronounced Extreme How much of the time in the past month have you felt that way, as a
percentage? % of time __________

Did being especially alert or watchful start or get worse after (EVENT)?

(Do you think it’s related to (EVENT)? How so?)
Circle: Trauma-relatedness = Definite Probable Unlikely

1. 0 Absent
2. 1 Mild / subthreshold
3. 2 Moderate / threshold
4. 3 Severe / markedly elevated
5. 4 Extreme / incapacitating

Key rating dimensions = frequency / intensity of hypervigilance

Moderate = some of the time (20-30%) / hypervigilance clearly present, e.g., watchful in public, heightened awareness of threat

Severe = much of the time (50-60%) / pronounced hypervigilance, e.g., scans environment for danger, may have safety rituals, exaggerated concern for safety of self/family/ home

Item 18 (E4): Exaggerated startle response.

In the past month, have you had any strong startle reactions? What kinds of things made you startle?

How strong are these startle reactions? (How strong are they compared to how most people would respond? Do you do anything other people would notice?)

How long does it take you to recover?

Circle: Startle = Minimal Clearly Present Pronounced Extreme
How often has this happened in the past month? # of times __________

Did these startle reactions start or get worse after (EVENT)? (Do you think it’s related to (EVENT)? How so?)
Circle: Trauma-relatedness = Definite Probable Unlikely

1. 0 Absent
2. 1 Mild / subthreshold
3. 2 Moderate / threshold
4. 3 Severe / markedly elevated
5. 4 Extreme / incapacitating

Key rating dimensions = frequency / intensity of startle
Moderate = at least 2 X month / startle clearly present, some difficulty recovering

Severe = at least 2 X week / pronounced startle, sustained arousal, considerable difficulty recovering

Item 19 (E5): Problems with concentration.

In the past month, have you had any problems with concentration? Can you give me some examples?
Are you able to concentrate if you really try?

[If not clear:] (Overall, how much of a problem is this for you? How would things be different if you didn’t have problems with concentration?)

Circle: Problem concentrating = Minimal Clearly Present Pronounced Extreme

How much of the time in the past month have you had problems with concentration, as a percentage? % of time __________

Did these problems with concentration start or get worse after (EVENT)?

(Do you think they’re related to (EVENT)? How so?) Circle: Trauma-relatedness = Definite Probable Unlikely

1. 0 Absent
2. 1 Mild / subthreshold
3. 2 Moderate / threshold
4. 3 Severe / markedly elevated
5. 4 Extreme / incapacitating

Key rating dimensions = frequency / intensity of concentration problems

Moderate = some of the time (20-30%) / problem concentrating clearly present, some difficulty but can concentrate with effort

Severe = much of the time (50-60%) / pronounced problem concentrating, considerable difficulty even with effort

Item 20 (E6): Sleep disturbance (e.g., difficulty falling or staying asleep or restless sleep).

In the past month, have you had any problems falling or staying asleep? What kinds of problems? (How long does it take you to fall asleep? How often do you wake up in the night? Do you wake up earlier than you want to?) How many total hours do you sleep each night?
How many hours do you think you should be sleeping?
Circle: Problem sleeping = Minimal Clearly Present Pronounced Extreme How often in the past month have you had these sleep problems?

# of times __________

Did these sleep problems start or get worse after (EVENT)? (Do you think they’re related to (EVENT)? How so?)
Circle: Trauma-relatedness = Definite Probable Unlikely

1. 0 Absent
2. 1 Mild / subthreshold
3. 2 Moderate / threshold
4. 3 Severe / markedly elevated
5. 4 Extreme / incapacitating

**Key rating dimensions = frequency / intensity of sleep problems**

**Moderate** = at least 2 X month / sleep disturbance clearly present, clearly longer latency or clear difficulty staying asleep, 30-90 minutes loss of sleep

**Severe** = at least 2 X week / pronounced sleep disturbance, considerably longer latency or marked difficulty staying asleep, 90 min to 3 hrs loss of sleep

---

**Criterion F:**

Duration of the disturbance (Criteria B, C, D, and E) is more than 1 month.

---

**Item 21:** Onset of symptoms.

**Item 22:** Duration of symptoms.

[If not clear:] **When did you first start having (PTSD SYMPTOMS) you’ve told me about?** (How long after the trauma did they start? More than six months?)

[If not clear:] **How long have these (PTSD SYMPTOMS) lasted altogether?**

---

**Criterion G:**

The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.
Item 23: Subjective distress.

Overall, in the past month, how much have you been bothered by these (PTSD SYMPTOMS) you’ve told me about? [Consider distress reported on earlier items]

1. 0 None
2. 1 Mild, minimal distress
3. 2 Moderate, distress clearly present but still manageable
4. 3 Severe, considerable distress
5. 4 Extreme, incapacitating distress

Item 24: Impairment in social functioning.

Total # months delay in onset _________

With delayed onset (> 6 onths)? NO YES

Total # months duration _________

Duration more than 1 month? NO YES

In the past month, have these (PTSD SYMPTOMS) affected your relationships with other people? How so? [Consider impairment in social functioning reported on earlier items]

1. 0 No adverse impact
2. 1 Mild impact, minimal impairment in social functioning
3. 2 Moderate impact, definite impairment but many aspects of social functioning still intact
4. 3 Severe impact, marked impairment, few aspects of social functioning still intact
5. 4 Extreme impact, little or no social functioning

Item 25: Impairment in occupational or other important area of functioning.

[If not clear:] Are you working now?

[If yes:] In the past month, have these (PTSD SYMPTOMS) affected your work or your ability to work? How so?

[If no:] Why is that? (Do you feel that your (PTSD SYMPTOMS) are related to you not working now? How so?)

[If unable to work because of PTSD symptoms, rate at least 3=Severe. If unemployment is not due to PTSD symptoms, or if the link is not clear, base rating only on impairment in other important areas of functioning]
Have these (PTSD SYMPTOMS) affected any other important part of your life? [As appropriate, suggest examples such as parenting, housework, schoolwork, volunteer work, etc.]

How so?

1. 0 No adverse impact
2. 1 Mild impact, minimal impairment in occupational/other important functioning
3. 2 Moderate impact, definite impairment but many aspects of occupational/other important functioning still intact
4. 3 Severe impact, marked impairment, few aspects of occupational/other important functioning still intact
5. 4 Extreme impact, little or no occupational/other important functioning

Global Ratings

Item 26: Global validity.

Estimate the overall validity of responses. Consider factors such as compliance with the interview, mental status (e.g., problems with concentration, comprehension of items, dissociation), and evidence of efforts to exaggerate or minimize symptoms.

1. 0 Excellent, no reason to suspect invalid responses
2. 1 Good, factors present that may adversely affect validity
3. 2 Fair, factors present that definitely reduce validity
4. 3 Poor, substantially reduced validity
5. 4 Invalid responses, severely impaired mental status or possible deliberate “faking bad” or “faking good”

Item 27: Global severity.

Estimate the overall severity of PTSD symptoms. Consider degree of subjective distress, degree of functional impairment, observations of behaviors in interview, and judgment regarding reporting style.

1. 0 No clinically significant symptoms, no distress and no functional impairment
2. 1 Mild, minimal distress or functional impairment
3. 2 Moderate, definite distress or functional impairment but functions satisfactorily with effort
4. 3 Severe, considerable distress or functional impairment, limited functioning even with effort
5. 4 Extreme, marked distress or marked impairment in two or more major areas of functioning

Item 28: Global improvement.

Rate total overall improvement since the previous rating. Rate the degree of change, whether or not, in your judgment, it is due to treatment.
1. 0 Asymptomatic
2. 1 Considerable improvement
3. 2 Moderate improvement
4. 3 Slight improvement
5. 4 No improvement
6. 5 Insufficient information

Specify whether with dissociative symptoms: The individual’s symptoms meet the criteria for posttraumatic stress disorder, and in addition, in response to the stressor, the individual experiences persistent or recurrent symptoms of either of the following:

**Item 29 (1):** Depersonalization: Persistent or recurrent experiences of feeling detached from, and as if one were an outside observer of, one’s mental processes or body (e.g., feeling as though one were in a dream; feeling a sense of unreality of self or body or of time moving slowly).

In the past month, have there been times when you felt as if you were separated from yourself, like you were watching yourself from the outside or observing your thoughts and feelings as if you were another person?

[If no:] *(What about feeling as if you were in a dream, even though you were awake? Feeling as if something about you wasn’t real? Feeling as if time was moving more slowly?)*

Tell me more about that.

**How strong is this feeling?** *(Do you lose track of where you actually are or what’s actually going on?)*

**What do you do while this is happening?** *(Do other people notice your behavior? What do they say?)*

**How long does it last?**

Circle: Dissociation = *Minimal Clearly Present Pronounced Extreme*

[If not clear:] *(Was this due to the effects of alcohol or drugs? What about a medical condition like seizures?)* [Rate 0=Absent if due to the effects of a substance or another medical condition]

**How often has this happened in the past month?** # of times ______

**Did this feeling start or get worse after (EVENT)?** *(Do you think it’s related to (EVENT)? How so?)*

Circle: Trauma-relatedness = *Definite Probable Unlikely*

1. 0 Absent
2. 1 Mild/subthreshold
3. 2 Moderate/threshold
4. 3 Severe/markedly elevated
5. 4 Extreme/incapacitating
Key rating dimensions = frequency / intensity of dissociation

Moderate = at least 2 X month / dissociative quality clearly present but transient, retains some realistic sense of self and awareness of environment

Severe = at least 2 X week / pronounced dissociative quality, marked sense of detachment and unreality

Item 30 (2): Derealization: Persistent or recurrent experiences of unreality of surroundings (e.g., the world around the individual is experienced as unreal, dreamlike, distant, or distorted).

In the past month, have there been times when things going on around you seemed unreal or very strange and unfamiliar?

[If no:] (Do things going on around you seem like a dream or like a scene from a movie? Do they seem distant or distorted?)

Tell me more about that.

How strong is this feeling? (Do you lose track of where you actually are or what’s actually going on?)

What do you do while this is happening? (Do other people notice your behavior? What do they say?) How long does it last?

Circle: Dissociation = Minimal Clearly Present Pronounced Extreme

[If not clear:] (Was this due to the effects of alcohol or drugs? What about a medical condition like seizures?) [Rate 0=Absent if due to the effects of a substance or another medical condition]

How often has this happened in the past month? # of times __________

Did this feeling start or get worse after (EVENT)? (Do you think it’s related to (EVENT)? How so?)

Circle: Trauma-relatedness = Definite Probable Unlikely

1. 0 Absent
2. 1 Mild / subthreshold
3. 2 Moderate / threshold
4. 3 Severe / markedly elevated
5. 4 Extreme / incapacitating

Key rating dimensions = frequency / intensity of dissociation

Moderate = at least 2 X month / dissociative quality clearly present but transient, retains some realistic sense of environment
Severe = at least 2 X week / pronounced dissociative quality, marked sense of unreality

A. Exposure to actual or threatened death, serious injury, or sexual violence

Criterion A met? 0 = NO 1 = YES

B. Intrusion symptoms (need 1 for diagnosis)

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Sev</th>
<th>Sx (Sev &gt; 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) B1 – intrusive memories</td>
<td>0</td>
<td>1 = YES</td>
</tr>
<tr>
<td>(2) B2 – distressing dreams</td>
<td>0</td>
<td>1 = YES</td>
</tr>
<tr>
<td>(3) B3 – dissociative reactions</td>
<td>0</td>
<td>1 = YES</td>
</tr>
<tr>
<td>(4) Cued psychological distress</td>
<td>0</td>
<td>1 = YES</td>
</tr>
<tr>
<td>(5) B5 – cued physiological reactions</td>
<td>0</td>
<td>1 = YES</td>
</tr>
</tbody>
</table>

B subtotals B Sev = #B Sx =

C. Avoidance symptoms (need 1 for diagnosis)

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Sev</th>
<th>Sx (Sev &gt; 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(6) C1 – Avoidance of memories, thoughts, feelings</td>
<td>0</td>
<td>1 = YES</td>
</tr>
<tr>
<td>(7) C2 – Avoidance of external reminders</td>
<td>0</td>
<td>1 = YES</td>
</tr>
</tbody>
</table>

C subtotals C Sev = #C Sx =

D. Cognitions and mood symptoms (need 2 for diagnosis)

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Sev</th>
<th>Sx (Sev &gt; 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(8) D1 – Inability to recall important aspect of event</td>
<td>0</td>
<td>1 = YES</td>
</tr>
<tr>
<td>(9) D2 – Exaggerated negative beliefs or expectations</td>
<td>0</td>
<td>1 = YES</td>
</tr>
<tr>
<td>(10) D3 – Distorted cognitions leading to blame</td>
<td>0</td>
<td>1 = YES</td>
</tr>
<tr>
<td>(11) D4 – Persistent negative emotional state</td>
<td>0</td>
<td>1 = YES</td>
</tr>
<tr>
<td>(12) D5 – Diminished interest or participation in activities</td>
<td>0</td>
<td>1 = YES</td>
</tr>
<tr>
<td>(13) D6 – Detachment or estrangement from others</td>
<td>0</td>
<td>1 = YES</td>
</tr>
<tr>
<td>(14) D7 – Persistent inability to experience positive emotions</td>
<td>0</td>
<td>1 = YES</td>
</tr>
</tbody>
</table>

D subtotals D Sev = #D Sx =

E. Arousal and reactivity symptoms (need 2 for diagnosis)

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Sev</th>
<th>Sx (Sev &gt; 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(15) E1 – Irritable behavior and angry outbursts</td>
<td>0</td>
<td>1 = YES</td>
</tr>
</tbody>
</table>
(16) E2 – Reckless of self-destructive behavior  0 = NO 1 = YES
(17) E3 – Hypervigilance  0 = NO 1 = YES
(18) E4 – Exaggerated startle response  0 = NO 1 = YES
(19) E5 – Problems with concentrations  0 = NO 1 = YES
(20) E6 – Sleep disrurbance  0 = NO 1 = YES

E subtotals  \( E_{Sev} = \)  \#\( E_{Sx} = \)

**PTSD totals**

Totals  \( Total\ Sev \)  \( Total\ #\ Sx \)

Sum of subtotals (B+C+D+E)

**F. Duration of disturbance**

(22) Duration of disturbance > 1 month?  0 = NO 1 = YES

**G. Distress or impairment (need 1 for diagnosis)**

Criterion  \( Sev \)  \( Sx\ (Sev > 2)\ )?

(23) Subjective distress  0 = NO 1 = YES
(24) Impairment in social functioning  0 = NO 1 = YES
(25) Impairment in occupational functioning  0 = NO 1 = YES

G subtotals  \( G_{Sev} = \)  \#\( G_{Sx} = \)

**Global ratings**

(26) Global validity
(27) Global severity
(28) Global improvement

**Dissociative symptoms (need 1 for subtype)**

Symptom  \( Sev \)  \( Sx\ (Sev > 2)\ )?

(29) 1 – Depersonalization  0 = NO 1 = YES
(30) 2 – Derealization  0 = NO 1 = YES

Dissociative subtotals  \( Diss\ Sev = \)  \#\( Diss\ Sx = \)

**PTSD diagnosis**

PTSD diagnosis
PTSD PRESENT – ALL CRITERIA (A-G) MET?  0 = NO  1 = YES

With dissociative symptoms  0 = NO  1 = YES

(21) With delayed onset (> 6 months)  0 = NO  1 = YES
# The Dissociative Subtype of PTSD Scale (DSPS)

The following questions ask about experiences you may or may not have had. For each question, you will be asked about the frequency and severity of the symptom in the past month. There are no right or wrong answers to these questions; just respond with what is true for you.

<table>
<thead>
<tr>
<th>Symptom</th>
<th>a. Has this EVER happened?</th>
<th>b. Has this happened in the PAST MONTH?</th>
<th>In this past month:</th>
<th>c. How often has this happened?</th>
<th>In the past month:</th>
<th>d. How strong is that feeling?</th>
<th>e. Did this only occur when you were tired or on medications or drugs that made you tired?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Have there been times where you felt disconnected from your own body, as if your body were not your own?</td>
<td>Yes</td>
<td>Yes</td>
<td>0 1 2 3 4</td>
<td>0 1 2 3 4</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>2. Have you felt “checked out,” that is, as if you were not really present and aware of what was going on around you?</td>
<td>Yes</td>
<td>Yes</td>
<td>0 1 2 3 4</td>
<td>0 1 2 3 4</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>3. Have there been times when you felt like you were outside of your own body, as if you could look at yourself from the outside?</td>
<td>Yes</td>
<td>Yes</td>
<td>0 1 2 3 4</td>
<td>0 1 2 3 4</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>4. Have you “lost time”,</td>
<td>Yes</td>
<td>Yes</td>
<td>0 1 2 3 4</td>
<td>0 1 2 3 4</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Question</td>
<td>Yes</td>
<td>No</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
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<tr>
<td>that is, been unable to account for large portions of your day or had trouble accounting for what you did for portions of your day?</td>
<td>No</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Have there been times when you looked in the mirror and did not recognize yourself physically?</td>
<td>Yes</td>
<td>Yes</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6. Have there been times when you were in a familiar place, yet it seemed strange and unfamiliar to you?</td>
<td>Yes</td>
<td>Yes</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7. Have there been times when your body did not feel real?</td>
<td>Yes</td>
<td>Yes</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8. Have there been times when the world around you (other people, objects, places) did not seem real?</td>
<td>Yes</td>
<td>Yes</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9. Have there been times when your body felt very strange and unfamiliar to you, as if it were not</td>
<td>Yes</td>
<td>Yes</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Question</td>
<td>Yes</td>
<td>No</td>
<td></td>
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<tr>
<td>-------------------------------------------------------------------------</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>10. Have there been times when you felt lost, disoriented, or confused in a location you know well?</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Have there been times (other than when you were tired, sleepy, or on medications or drugs that made you drowsy) when you felt as if you were in a daze or a fog?</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Have there been times when you felt like you were watching the world around you as an outsider, as if it were a movie, but the world did not seem real?</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Have you had trouble remembering how you got somewhere (i.e., finding yourself at work, at home, at a store, or elsewhere without remembering how you got there)?</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Question</td>
<td>Yes</td>
<td>No</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
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<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Have you traveled there?</td>
<td>Yes</td>
<td>No</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Have you had trouble remembering important details about your worst traumatic event?</td>
<td>Yes</td>
<td>No</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Have you thought that you should be able to remember more about this worst traumatic event?</td>
<td>Yes</td>
<td>No</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
Life Events Checklist for the DSM-5

Instructions: Listed below are a number of difficult or stressful things that sometimes happen to people. For each event check one or more of the boxes to the right to indicate that: (a) it happened to you personally; (b) you witnessed it happen to someone else; (c) you learned about it happening to a close family member or close friend; (d) you were exposed to it as part of your job (for example, paramedic, police, military, or other first responder); (e) you’re not sure if it fits; or (f) it doesn’t apply to you. Be sure to consider your entire life (growing up as well as adulthood) as you go through the list of events.

<table>
<thead>
<tr>
<th>Event</th>
<th>Happened to me</th>
<th>Witnessed it</th>
<th>Learned about it</th>
<th>Part of my job</th>
<th>Not sure</th>
<th>Doesn’t apply</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Natural disaster (for example, flood, hurricane, tornado, earthquake)</td>
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<td>2. Fire or explosion</td>
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<td>3. Transportation accident (for example, car accident, boat accident, train wreck, plane crash)</td>
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<td>4. Serious accident at work, home, or during recreational activity</td>
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<td>5. Exposure to toxic substances (for example, dangerous chemicals, radiation)</td>
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<td>6. Physical assault (for example, being attacked, hit, slapped, kicked, beaten up)</td>
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<td>7. Assault with a weapon (for example, being shot, stabbed, threatened with a knife, gun, bomb)</td>
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<td>8. Sexual assault (rape, attempted rape, made to perform any type of sexual act through force or threat of harm)</td>
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<td>9.</td>
<td>Other unwanted or uncomfortable experience sexual experience</td>
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<td>10.</td>
<td>Combat or exposure to a war-zone (in the military or as a civilian)</td>
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<td>11.</td>
<td>Captivity (for example, being kidnapped, abducted, held hostage, prisoner of war)</td>
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<td>12.</td>
<td>Life-threatening illness or injury</td>
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<td>13.</td>
<td>Severe human suffering</td>
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<td>14.</td>
<td>Sudden violent death (for example, homicide, suicide)</td>
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<tr>
<td>15.</td>
<td>Sudden accidental death</td>
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<tr>
<td>16.</td>
<td>Serious injury, harm, or death you caused to someone else</td>
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<td>17.</td>
<td>Any other very stressful event or experience</td>
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</tbody>
</table>
**Child Trauma Questionnaire (CTQ)**

**Instructions:** Please indicate how often the following statements were true during your childhood (from when you were born until you were 17) using the scale below.
1 = never true, 2 = rarely true, 3 = sometimes true, 4 = often true, 5 = very often true/always true

**Section 1: When I was growing up...**

<table>
<thead>
<tr>
<th></th>
<th>Never (1)</th>
<th>Rarely (2)</th>
<th>Sometimes (3)</th>
<th>Often (4)</th>
<th>Very Often/Always (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I was hit hard enough to have to see a doctor (1)</td>
<td></td>
<td></td>
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<tr>
<td>I was hit hard enough to leave bruises (2)</td>
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<td>I was punished with hard objects (29)</td>
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<tr>
<td>I was physically abused (3)</td>
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<tr>
<td>I was hit hard enough to be noticed (4)</td>
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</tbody>
</table>
### Section 2: When I was growing up...

<table>
<thead>
<tr>
<th></th>
<th>Never (1)</th>
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<th>Sometimes (3)</th>
<th>Often (4)</th>
<th>Very Often/Always (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I was called names by family members (1)</td>
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<tr>
<td>My parents wished I was never born (2)</td>
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<td>I felt hated by my family (29)</td>
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<tr>
<td>My family said hurtful things (3)</td>
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<td>I was emotionally abused (4)</td>
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</tbody>
</table>

### Section 3: When I was growing up...

<table>
<thead>
<tr>
<th></th>
<th>Never (1)</th>
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<th>Sometimes (3)</th>
<th>Often (4)</th>
<th>Very Often/Always (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I was touched sexually (1)</td>
<td></td>
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<tr>
<td>I was hurt if I didn’t do something sexual (2)</td>
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<tr>
<td>I was made to do sexual things (29)</td>
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<tr>
<td>I was molested (3)</td>
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<tr>
<td>I was sexually abused (4)</td>
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</tbody>
</table>
### Section 4: When I was growing up...

<table>
<thead>
<tr>
<th></th>
<th>Never (1)</th>
<th>Rarely (2)</th>
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<th>Often (4)</th>
<th>Very Often/Always (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I felt loved (1)</td>
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<td>I was made to feel important (2)</td>
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<td>I was looked out for (29)</td>
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<td>My family felt close (3)</td>
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<td>My family was a source of strength (4)</td>
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</tbody>
</table>

### Section 5: When I was growing up...

<table>
<thead>
<tr>
<th></th>
<th>Never (1)</th>
<th>Rarely (2)</th>
<th>Sometimes (3)</th>
<th>Often (4)</th>
<th>Very Often/Always (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I was not given enough to eat (1)</td>
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<td>I got taken care of (2)</td>
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<td>My parents were drunk or high (29)</td>
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<td>I wore dirty clothes (3)</td>
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<td>I got taken to the doctor (4)</td>
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</table>
Primary Care PTSD Screen for DSM-5 (PC-PTSD-5)

Sometimes things happen to people that are unusually or especially frightening, horrible, or traumatic. For example:
- A serious accident or fire
- A physical or sexual assault or abuse
- An earthquake or flood
- A war
- Seeing someone be killed or seriously injured
- Having a loved one die through homicide or suicide

Have you ever experienced this kind of event?  YES  NO

If no, screen total = 0. Please stop here.
If yes, please answer the questions below.

In the past month, have you…

1. Had nightmares about the event(s) or thought about the event(s) when you did not want to?

   YES  NO

2. Tried hard not to think about the event(s) or went out of your way to avoid situations that reminded you of the event(s)?

   YES  NO

3. Been constantly on guard, watchful, or easily startled?

   YES  NO

4. Felt numb or detached from people, activities, or your surroundings?

   YES  NO

5. Felt guilty or unable to stop blaming yourself or others for the event(s) or any problems the event(s) may have caused?

   YES  NO