



A review of the relation between dissociation, memory, executive functioning and social cognition in military members and civilians with neuropsychiatric conditions

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ABSTRACT

Dissociative experiences, involving altered states of consciousness, have long been understood as a consequence or response to traumatic experiences, where a reduced level of consciousness may aid in survival during and after a traumatic event. Indeed, the dissociative subtype of post-traumatic stress disorder (PTSD-DS) was added recently to the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5). Dissociative symptoms are present across a host of neuropsychiatric conditions, including PTSD, psychotic spectrum illnesses, anxiety and mood disorders. Transdiagnostically, the presence of dissociative symptoms is associated with a greater illness burden and reduced treatment outcomes. Critically, dissociative symptoms are related to impaired performance on measures of attention, executive functioning, memory, and social cognition and may contribute to the widespread cognitive dysfunction observed across psychiatric illnesses. Despite this knowledge, the relation between dissociative symptoms and reduced cognitive function remains poorly understood. Here, we review the evidence linking dissociative symptoms to cognitive dysfunction across neuropsychiatric disorders. In addition, we explore two potential neurobiological mechanisms that may underlie the relation between dissociative symptoms and cognitive dysfunction in trauma-related neuropsychiatric conditions. Specifically, we hypothesize that: 1) functional sensory deafferentation at the level of the thalamus, as observed in the defence cascade model of dissociation, may underlie reduced attention and arousal leading to progressive cognitive dysfunction and; 2) altered functional connectivity between key brain networks implicated in cognitive functioning may represent a critical neurobiological mechanism linking dissociative symptoms and cognitive dysfunction in patients with PTSD-DS and transdiagnostically.

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1. Introduction

Dissociation refers to a disturbance in the normal integration of consciousness, memory, identity, emotion, perception, body representation, motor control, and behaviour (APA, 2013). Whereas some theoretical frameworks describe dissociative experiences as involving a division within the sense of self (van der Hart et al.,

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2004; 2006), others highlight altered states of consciousness surrounding dissociative experiences (Cardena and Carlson, 2011; Frewen and Lanius, 2015; Holmes et al., 2005; Putnam, 1997; Spiegel, 1997; Spiegel et al., 2013; Steele et al., 2009). Core symptoms of dissociation include disengagement (not paying attention or “spacing out”), emotional constriction, memory disturbances, depersonalization (feeling outside of and as if you do not belong to your own body), derealization (feeling as though things around you are not real) and identity dissociation (Briere et al., 2005; Dell and Lawson, 2009; Lanius et al., 2012; Spiegel et al., 2013). Dissociative experiences have been conceptualized as lying on a continuum from normal integration of consciousness, followed by depersonalization/derealization, through to identity fragmentation (Bernstein and Putnam, 1986; Bremner and Marinar, 1998; Spiegel, 1997). One recent theory suggests that dissociative experiences may be separated into two distinct forms, involving detachment (e.g., altered states of consciousness) and compartmentalization (e.g., inability to control deliberately processes such as memory) (Holmes et al., 2005). Other researchers have noted the distinction between altered states of consciousness and structural dissociation (e.g., divisions in personality), while noting that the two may co-occur in trauma-related disorders (Steele et al., 2009). Regardless of theoretical orientation, trauma has long been recognized as an antecedent to dissociative symptoms, where in the early 20th century Pierre Janet first described dissociation as the most direct defence against overwhelming traumatic experiences (Janet, 1901). Indeed, the trauma model of dissociation suggests that dissociation is a psychobiological response to threat or danger that allows an organism to engage in automatized behaviour, enhancing analgesia, depersonalization, and removal of oneself from traumatic or catastrophic experiences with the aim of enhancing survival during and after the event (Dalenberg et al., 2012). Accordingly, dissociation allows for psychological escape when physical escape is not possible (Putnam, 1997). In addition to their association with traumatic life events, dissociative symptoms are frequently associated with disrupted development of attachment relationships (Dutra et al., 2009; Liotti, 2006, 2004; Schore, 2002, 2009).

Dissociation is associated classically with trauma-related disorders following both civilian and military trauma exposure, including borderline personality disorder (BPD) (Bremner, 2005; Meares, 2012; Vermetten and Spiegel, 2014; Winter et al., 2015), dissociative disorders (Brand et al., 2012; Dell and O’Neil, 2009; Spiegel et al., 2013; van der Hart et al., 2006) and post-traumatic stress disorder (PTSD) (Bremner and Brett, 1997; Dalenberg and Carlson, 2012; Ginzburg et al., 2006; Lanius et al., 2010, 2012; Stein et al., 2013; Wolf et al., 2012a, 2012b). In response to recent work indicating that a subset of approximately 15–30% of patients with PTSD present with symptoms of depersonalization and derealization (Armour et al., 2014; Blevins et al., 2014; Frewen et al., 2015; Lanius et al., 2010, 2012; Putnam et al., 1996; Spiegel et al., 2013; Steuwe et al., 2012; Tsai et al., 2015; Wolf et al., 2012a, 2012b), the recently revised Diagnostic and Statistical Manual of Mental Disorders (DSM-5) now includes a dissociative subtype of PTSD (PTSD-DS). Notably, dissociative symptomatology can also be present in syndromes less frequently associated with trauma including major depressive disorder (MDD) (Bob et al., 2008; Molina-Serrano et al., 2008; Mula et al., 2007; Sar et al., 2013; Parlar et al., 2016), anxiety disorders (Ball et al., 1997; Marquez et al., 2001; Mula et al., 2007; Sierra et al., 2012), obsessive compulsive disorder (OCD) (Belli, 2014; Belli et al., 2012; Rufer et al., 2006a; Semiz et al., 2014; Watson et al., 2004), bipolar disorder (Hariri et al., 2015; Mula et al., 2009; Oedegaard et al., 2008), alcohol and drug abuse and dependence (Evren et al., 2011, 2008, 2007; Tamar-Gurol et al., 2008) and schizophrenia (Haugen and Castillo, 1999; Holowka et al., 2003; Sar et al., 2010; Spitzer et al.,

1997; Yu et al., 2010). Taken together, the widespread appearance of dissociative symptoms suggests high rates of trauma exposure across neuropsychiatric conditions and points to the need for careful assessment of dissociation as a transdiagnostic psychiatric symptom.

Given that dissociation is associated with a disrupted integration of consciousness, memory, and behaviour, involving symptom clusters of memory disturbance and disengagement, it follows that individuals who experience dissociative symptoms would experience disruptions in cognitive function, affecting memory, attention, and executive functioning. This observation is in line with widespread reports of cognitive dysfunction across psychiatric disorders associated with dissociative symptoms, including schizophrenia (Millan et al., 2012; Wykes et al., 2011), MDD (Marazziti et al., 2010; Millan et al., 2012; Rock et al., 2014), bipolar disorder (Lee et al., 2014; Millan et al., 2012), OCD (Shin et al., 2014), and both civilian and combat-related PTSD (Aupperle et al., 2012; Millan et al., 2012; Polak et al., 2012; Scott et al., 2014). Notably, although the results of one systematic review pointed towards greater cognitive dysfunction among individuals with combat-related as compared to civilian PTSD (Polak et al., 2012), a recent quantitative meta-analysis reported no differences in severity of cognitive dysfunction across trauma etiologies (Scott et al., 2014). Critically, poor cognitive functioning is thought to contribute to the development and maintenance of these disorders, where, for example, executive dysfunction impacts negatively on response to pharmacological and non-pharmacological treatments for psychiatric disorders including mood disorders and PTSD (Dunkin et al., 2000; Polak et al., 2012; Wild and Gur, 2008) (but see Walter et al. (2010)). Here, the ability to engage in and successfully complete treatment relies heavily on higher-order cognitive processes. Indeed, leading treatment interventions for affective disorders, including PTSD and depression (e.g. cognitive behavioural therapy), rely heavily upon cognitive processing resources (e.g. working memory; attention) that are impacted negatively by these conditions.

A growing body of evidence points towards a relation between dissociative symptoms, including altered states of consciousness and identity fragmentation, and cognitive dysfunction in trauma-related psychiatric conditions. Specifically, dissociative symptoms have been linked to reduced attention, executive functioning, and memory performance in healthy individuals (Amrhein et al., 2008; Bergouignan et al., 2014; Brewin et al., 2013; Bruce et al., 2007; Freyd et al., 1998; Olsen and Beck, 2012), trauma-exposed individuals from general (Cromer et al., 2006) and military populations (Morgan et al., 2006), and in military and civilian psychiatric samples, including individuals with PTSD (Chae et al., 2011; De Bellis et al., 2013; DePrince et al., 2009; Kaplow et al., 2008; Minshew and D’Andrea, 2015; Rivera-Vélez et al., 2014; Roca et al., 2006; Twamley et al., 2009), BPD (Haaland and Landrø, 2009; Winter et al., 2015), MDD (Parlar et al., 2016), DID (Dorahy et al., 2006, 2005, 2002), and DPD (Guralnik et al., 2007, 2000). The nature of the relation between dissociation and cognitive dysfunction, however, remains poorly elucidated.

Our primary objective was therefore to review emerging evidence supporting the link between dissociative symptoms and cognitive dysfunction among healthy individuals and military and civilian samples with trauma-related neuropsychiatric conditions. In addition to surveying the results of studies involving participants with civilian or military-related PTSD, we examine findings across the broad range of psychiatric conditions that are associated with dissociative symptoms. Here, we begin by reviewing the evidence for PTSD-DS, as well as for considering dissociation as a transdiagnostic feature across psychiatric conditions. The evidence linking dissociation to cognitive dysfunction is then identified. We next introduce a neurobiological model of dissociation that

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