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Dissociative Subtypes in Posttraumatic Stress Disorders and Hypnosis: Neurocognitive Parallels and Clinical Implications

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Abstract

Converging evidence suggests that heterogeneity in posttraumatic stress disorder (PTSD) arises from the presence of discrete subtypes of patients, one of which is characterized by elevated dissociative symptoms. A similar dissociative subtype has been observed among individuals displaying high hypnotic suggestibility. Here we highlight important parallels between these subtypes, drawing from research on a history of exposure to stressful life events and pathological symptomatology, cognitive functioning, hypnotic suggestibility, and functional neuroimaging and electrophysiology. Further understanding of these parallels can help elucidate the developmental paths and neurocognitive basis of heterogeneity in PTSD and high hypnotic suggestibility and refine the understanding and treatment of different subtypes of PTSD.

Keywords: automaticity, executive functioning, dissociation, hypnotizability, PTSD, therapy

Neglected heterogeneity within clinical populations represents a significant obstacle to advancing theory and treatment of a range of psychiatric conditions, including posttraumatic stress disorder (PTSD). Placing models of heterogeneity within a specific condition in a broader context by relating them to comparable models of germane or overlapping phenomena can illuminate both common mechanisms and effective treatment strategies. There is converging evidence for a subtype among PTSD patients characterized by pronounced dissociative symptoms and a corresponding subtype among individuals who exhibit high hypnotic suggestibility. Identifying similarities between these dissociative subtypes may help to elucidate important characteristics of the neurocognitive mechanisms underlying differential responses to trauma, which should result in improved targeting and refining of treatments for different subtypes of PTSD.

Dissociation, Trauma, and Hypnosis

The construct of *dissociation* encompasses experiential detachment and/or loss of awareness or control over mental processes that, under normal circumstances and for the age and developmental level of the person, should be available to conscious awareness, self-attribution, or control (Cardeña & Carlson, 2011; Dell & O'Neil, 2009). Although not necessarily pathological, dissociative phenomena are believed to underlie a variety of psychiatric conditions (Spiegel et al., 2013). Dissociation has long been seen to unify and suggest a relation between response to traumatic stress and hypnotic suggestibility (Nash, 1992). Indeed, multiple studies have demonstrated that hypnotic suggestibility is elevated in psychiatric conditions characterized by pronounced dissociative symptoms, including PTSD (Spiegel, Hunt, & Dondershine, 1988), acute stress disorder (Bryant, Guthrie, & Moulds, 2001), and conversion disorder (for a review, see Bell, Oakley, Halligan, & Deeley, 2011). There is also preliminary evidence from functional

neuroimaging for an overlap in the cortical activation patterns associated with dissociative symptoms and their analogues induced through hypnotic suggestions (for a review, see Oakley & Halligan, 2013). However, the generally weak association between dissociative tendencies and hypnotic suggestibility (Bell et al., 2011; Terhune, Cardeña, & Lindgren, 2011c) suggests that this relation may be indicative of a latent typology and/or dependent on moderating variables.

The Dissociative Subtype of PTSD

PTSD is a trauma-related disorder characterized by a range of psychological and physiological symptoms in the wake of direct or indirect exposure to actual or threatened death, serious injury, or sexual violence to the patient or to those emotionally close to him or her. Formal diagnosis is met when an individual exhibits for more than 1 month after the trauma (a) one or more intrusion symptoms (e.g., flashbacks), (b) avoidance of distressing cognitions or reminders associated with the traumatic events, (c) two or more negative alterations in cognition or mood (e.g., persistent negative trauma-related emotions such as guilt), and (d) two or more alterations in arousal and reactivity (e.g., hypervigilance; American Psychiatric Association, 2013). The majority of people exposed to potentially traumatizing events do not develop PTSD. Whether they do or do not has been related to demographics, trauma history, and such factors as the type of trauma (e.g., natural or human-made), its chronicity and severity, and the patient's relationship with the perpetrator (Cardeña, Butler, Reijman, & Spiegel, 2012). For example, in one study, PTSD rates among members of the military ranged from around 6% to 20% (Yehuda, Vermetten, McFarlane, & Lehrner, 2014), whereas in another, prisoners of war exposed to torture had an 84% lifetime rate of PTSD (Engdahl, Dikel, Eberly, & Blank, 1997). Despite general consensus regarding its validity, PTSD is characterized by heterogeneous symptomatology, and a highly diverse array of symptom constellations can fulfill a diagnosis (Galatzer-Levy & Bryant, 2013).

To account for this variability, Lanius and colleagues (2010) proposed that individuals with PTSD fall into two discrete subtypes with unique phenomenology, symptomatology, and neural mechanisms. The dissociative subtype is characterized by blunted affect and symptoms of depersonalization/derealization (persistent distortions in one's perception of their self or compelling experiences of the unreality of one's environment) in response to trauma cues, higher levels of re-experiencing and amnestic symptoms, earlier onset of PTSD symptomatology, higher comorbidity with other psychiatric conditions, and higher suicidality. In contrast, the more frequent, non-dissociative subtype experiences greater hyperarousal in response to trauma cues (Spiegel et al., 2013). Multiple studies using epidemiological data or finite mixture modeling, a method for partitioning cases into homogeneous classes, have provided convergent evidence for the dissociative subtype (Blevins, Weathers, & Witte, 2014; Frewen, Brown, Steuwe, & Lanius, 2015; Stein et al., 2013; Wolf et al., 2012). These studies suggest a PTSD subtype distinguished by elevated depersonalization/derealization, with a prevalence rate of 14% to 30% and a symptom profile characterized by memory disturbances, flashbacks, attentional difficulties, and higher psychiatric comorbidity than is found in non-dissociative PTSD. These and other results support the inclusion of a dissociative subtype of PTSD in the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM–5*; American Psychiatric Association, 2013).

Relatively little research has been conducted on the cognitive profile of the dissociative subtype, although a number of studies have begun to delineate its neurophysiological characteristics. Lanius and colleagues (2010) provided evidence that dissociative PTSD involves heightened frontal inhibition of the limbic system, in particular the amygdala, reflecting emotional over-modulation. Recent results showing increased connectivity between amygdala and frontal and

parietal regions in the dissociative PTSD subtype (Nicholson et al., 2015) are consistent with elevated frontal inhibition of limbic regions in this group. The observation that depersonalization/derealization symptoms among PTSD patients are associated with reduced connectivity in the default mode network and between the default mode and central executive networks (Tursich et al., 2015) suggests atypical executive functioning in this group.

The Dissociative Subtype of High Hypnotic Suggestibility

Hypnosis represents a valuable method for modulating the contents of consciousness and is known to have considerable therapeutic efficacy (Oakley & Halligan, 2013). Although individuals with high hypnotic suggestibility are traditionally assumed to reflect a relatively homogeneous group, there is increasing recognition that those in the small subset of the general population (approximately 10%–15%) that makes up this group are characterized by marked variability in the types of hypnotic suggestions to which they respond (McConkey & Barnier, 2004), their developmental trajectories (Hilgard, 1979), and their cognitive profiles (Terhune et al., 2011c). This heterogeneity inspired the proposal that there are two or more discrete subtypes within this group, one of which is characterized by elevated dissociative phenomena (Barber, 1999).

Despite an inconsistent association between dissociation and hypnotic suggestibility, multiple studies have identified a subset of highly suggestible individuals who exhibit elevated dissociative symptoms, including depersonalization/derealization (King & Council, 1998; Terhune et al., 2011c). Individuals within this dissociative subtype, who comprise approximately one-third of highly suggestible individuals, received scores very similar to those of patients with the dissociative PTSD subtype on a standardized measure of dissociative tendencies (Blevins et al., 2014), and nearly half of the former group's members met criteria for pathological

dissociation (Terhune et al., 2011c). Members of this subtype also displayed elevated pathological fantasizing and a greater history of stressful life events relative to non-dissociative highly suggestible individuals. These data cumulatively suggest a predisposition to psychopathology in this group. A latent profile analysis undertaken to clarify differential patterns of spontaneous experience following a hypnotic induction found convergent evidence (Terhune & Cardeña, 2010). Approximately 40% of highly suggestible individuals were included in a class characterized by greater alterations in awareness, reduced attention and volitional control, and elevated negative affect relative to other highly suggestible individuals.

The dissociative subtype is further distinguished by its cognitive profile. This group exhibited poorer baseline working memory capacity and cognitive control and increased mind wandering following a hypnotic induction (Marcusson-Clavertz, Terhune, & Cardeña, 2012; Terhune, Cardeña, & Lindgren, 2011b; Terhune et al., 2011c). They also experienced greater distortions in agency (Terhune et al., 2011c) and appeared to use fewer attentional resources (King & Council, 1998) when responding to hypnotic suggestions, suggesting greater automaticity, in keeping with a long-theorized link between dissociation and automatisms (Dell, 2010). Finally, the dissociative subtype also displayed greater responsiveness to suggestions for posthypnotic amnesia (implying greater suggestion-mediated inhibition; Terhune & Brugger, 2011) and for hallucinations such as analgesia and auditory hallucinations (implying atypical monitoring; Terhune et al., 2011c). Relative to individuals with low hypnotic suggestibility, highly suggestible individuals have been found to exhibit reduced frontal-parietal functional connectivity (Terhune, Cardeña, & Lindgren, 2011a; see also Cardeña, Jonsson, Terhune, & Marcusson-Clavertz, 2013; Jamieson & Burgess, 2014) and reduced anterior-default-mode network activity (McGeown, Mazzoni, Venneri, & Kirsch, 2009) following an induction.

However, there are, as yet, no neurophysiological data to distinguish the dissociative subtype from the remainder of highly suggestible individuals.

Parallels Between Dissociative Subtypes

Although imperfect, there are clear parallels between the dissociative subtypes of PTSD and high hypnotic suggestibility that hint at overlapping mechanisms. Both groups display pronounced dissociative phenomena, including experiences of depersonalization/derealization. Higher comorbidity for psychiatric conditions and a greater likelihood of having experienced physical or sexual abuse in the dissociative PTSD subtype parallel a greater predisposition to psychopathology and a greater history of stressful life events in the dissociative highly suggestible subtype. Similarly, the more prevalent flashbacks, amnestic symptoms, and attentional difficulties in the dissociative PTSD subtype have analogues in the dissociative highly suggestible type. Members of the latter group are particularly responsive to hallucination suggestions, experience greater involuntariness during suggestions for visual imagery, and display a greater history of pathological fantasizing; they exhibit greater responsiveness to posthypnotic amnesia suggestions and have poorer working memory; and they have poorer attention following a hypnotic induction.

The parallels in cognitive functioning between the two groups are less clear but strongly suggestive. The brain regions implicated in depersonalization/derealization symptoms among PTSD patients (Tursich et al., 2015) are known to support cognitive functions that are disrupted in the dissociative highly suggestible subtype, including cognitive control, sustained attention, and working memory (Marcusson-Clavertz et al., 2012; Terhune et al., 2011b, 2011c). The hypnotic suggestibility profile of the dissociative PTSD subtype has not been explored, but other psychiatric patients prone to dissociative states exhibit greater responsiveness to posthypnotic

amnesia suggestions (Bryant et al., 2001; Frischholz, Braun, Lipman, & Sachs, 1992), as do members of the dissociative highly suggestible subtype (Terhune & Brugger, 2011). We speculate that the observation of elevated hypnotic suggestibility among PTSD patients (Spiegel et al., 1988) is driven by the dissociative PTSD subtype. Given these parallels, it would be worthwhile to determine whether the dissociative highly suggestible subtype is more prone to developing PTSD.

Implications for Therapy

The apparent parallels between these two dissociative subtypes have potential implications for the treatment of PTSD patients with pronounced dissociative symptoms. These patients present high comorbidity for other psychiatric disorders, such as depression, and display elevated suicidality, and thus are likely to require a different treatment course than those with fewer dissociative symptoms (Lanius et al., 2010). It is of particular importance to target dissociativity as a central aspect of treatment in this group, and hypnotic techniques for the treatment of dissociative and posttraumatic symptomatology have empirical support (Cardeña, Maldonado, Van der Hart, & Spiegel, 2009). One probable reason for this is that the elevated hypnotic suggestibility among posttraumatic and dissociative patients likely strengthens the effectiveness of hypnotic approaches because hypnotic suggestibility predicts treatment efficacy (Cardeña et al., 2009). Hypnotic strategies can be used to increase attentional control, enhance present-centeredness, develop functional coping strategies, and manage dissociative experiences that patients might experience as out of their control. Hypnosis can also be integrated into various therapeutic strategies based on individuals' dissociative tendencies (Cardeña et al., 2009; Lynn, Malaktaris, Maxwell, Mellinger, & Van der Kloet, 2012). Although limited, the literature on the treatment of dissociative symptoms suggests that hypnotic techniques can attenuate dissociative

and other PTSD symptoms and comorbid conditions. Accordingly, hypnotic strategies may represent a particularly effective adjunct in the treatment of the dissociative PTSD subtype. Tailoring therapeutic strategies to different PTSD subtypes will likely produce better results than having a general one-size-fits-all strategy for all individuals (Yehuda et al., 2014).

Future Directions

Despite the parallels highlighted here, there remain many unanswered questions regarding the relation between posttraumatic stress and hypnosis. A striking similarity between the two dissociative subtypes is that both are characterized by a history of prior trauma or stressful life events, but it remains unclear how such early experiences shape response to subsequent trauma. Elucidating how developmental and genetic factors interact and contribute to the unique cognitive profiles of the dissociative subtypes and their response to traumas will aid in the identification of individuals at risk for a pronounced dissociative response to trauma.

The neurocognitive profile of the dissociative PTSD subtype has not yet been comprehensively delineated but may be informed by research on the dissociative highly suggestible subtype. Research on the latter and on the functional networks implicated in depersonalization/derealization has suggested that deficits in cognitive control and distortions in agency are likely to be observed in the dissociative PTSD subtype. It will be critical to specifically link atypical cognition and neurophysiological patterns with particular symptoms. There is consistent evidence from behavioral studies and functional neuroimaging attesting to the utility of hypnotic suggestion for experimentally inducing a diverse set of psychological conditions including dissociative phenomena (e.g., psychogenic amnesia; Oakley & Halligan, 2013). It is probable that the dissociative highly suggestible subtype will be more responsive to

suggestions targeting dissociative experiences, enabling the possibility of experimentally studying symptoms of the dissociative PTSD subtype in the laboratory.

Two lines of research that are likely to be highly generative concern how widespread the dissociative PTSD subtype is and whether it is best understood as a qualitatively distinct subgroup. The *DSM–5* did not include a dissociative subtype of acute stress disorder, but there is preliminary evidence for such a subgroup, with parallels to the dissociative PTSD subtype (Hansen, Armour, Wang, Elklit, & Bryant, 2015). Research on this group will be pivotal for understanding heterogeneous responses to trauma. More broadly, further work exploring dissociative subtypes in other psychiatric conditions such as borderline personality, conversion, and panic disorders is needed to determine if this subgroup is unique to particular conditions or if dissociation is better conceptualized cross-diagnostically across a range of conditions (Farina & Liotti, 2013). Although the evidence for a dissociative subtype that is highly suggestible and at an increased risk for PTSD seems robust, it has yet to be conclusively shown that the dissociative subtypes reflect discrete subgroups. Indeed, it remains plausible that PTSD and high hypnotic suggestibility are each uniformly characterized by a core mechanism or set of mechanisms and that heterogeneity in these conditions derives from the interaction of continuous ancillary variables (Woody, Barnier, & McConkey, 2005), such as variability in dissociative tendencies. Further attention to such a perspective is likely to strengthen research on variability in both populations.

Recommended Reading

Bell, V., Oakley, D. A., Halligan, P. W., & Deeley, Q. (2011). (See References). An article that highlights the common thread of dissociation in different psychiatric disorders and hypnosis.

Lanius, R. A., Vermetten, E., Loewenstein, R. J., Brand, B., Schmahl, C., Bremner, J. D., & Spiegel, D. (2010). (See References). An article that presents the dissociative typology of PTSD.

Lynn, S. J., Rhue, J. W., & Kirsch, I. (2010). *Handbook of clinical hypnosis* (2nd ed.). Washington, DC: American Psychological Association. A volume that presents an authoritative review of the clinical use of hypnosis and its therapeutic efficacy.

Terhune, D. B., Cardeña, E., & Lindgren, M. (2011c). (See References). An article that presents one of the first studies to systematically test predictions regarding a dissociative subtype among highly suggestible individuals.

Declaration of Conflicting Interests

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