THE RELATIONSHIP BETWEEN DISSOCIATION, PERSONALITY DISORDERS, AND NEUROCOGNITIVE DISORDER

by

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ABSTRACT

Peritraumatic dissociation is a disturbance of emotion and/or cognition during or immediately after a traumatic experience. Trait dissociation describes these same emotional/cognitive disturbances in daily functioning. The purpose of this study was to explore the relationships between dissociation, personality disorders, and neurocognitive disorder in trauma-exposed adults. It was hypothesized that both peritraumatic and trait dissociation would be moderately ($r \geq .30$) to strongly ($r \geq .50$) positively correlated with all 10 DSM-5 personality disorders and neurocognitive disorder. A total of 93 trauma-exposed participants (32 men, 60 women, 1 non-binary) were recruited on Amazon’s Mechanical Turk (MTurk). Participants completed the Brief Trauma Questionnaire (BTQ), PTSD Checklist for DSM-5 – Extended Criterion A (PCL-5), Dissociative Experiences Scale (DES), Peritraumatic Dissociation Experiences Questionnaire (PDEQ), and the Coolidge Axis II Inventory (CATI). Peritraumatic ($F(10, 82) = 2.79, p = .005$) and trait dissociation ($F(10, 82) = 6.01, p < .001$) were significantly associated with personality disorders. When controlling for PTSD, peritraumatic dissociation was significantly correlated with neurocognitive disorder ($r(90) = .28$), and borderline ($r(90) = .27$), dependent ($r(90) = .24$), histrionic ($r(90) = .21$), and schizotypal ($r(90) = .30$) personality disorders. Trait dissociation was also significantly correlated with neurocognitive disorder ($r(90) = .45$), and borderline ($r(90) = .43$), dependent ($r(90) = .24$), histrionic ($r(90) = .21$), and schizotypal ($r(90) = .30$) personality disorders.
.29), histrionic ($r(90) = .27$), narcissistic ($r(90) = .24$), paranoid ($r(90) = .22$), schizotypal ($r(90) = .40$), and antisocial ($r(90) = .25$) personality disorders. Overall, there were clear and significant patterns of a relationship between dissociation, personality disorders, and neurocognitive disorder.

*Keywords*: peritraumatic dissociation, trait dissociation, personality disorders, neurocognitive disorder
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CHAPTER I

INTRODUCTION

Dissociative reactions are classified into one of two categories: state or trait (Perry, Pollard, Blaicley, Baker, & Vigilante, 1995). Dissociation is a response to traumatic event where the individual mentally separates his/herself from their external environment, instead directing their focus to their internal world. Peritraumatic (state) dissociation refers to an impairment in awareness, memory, cognitions, sensations, and perceptions of time, the self, or the world during or directly following a traumatic event (Cardeña & Spiegel, 1993). Trait dissociation is defined as the continued utilization of dissociative responses to arousal states after the traumatic event has ceased (Perry et al., 1995). When reminded of a previous traumatic event through script-driven imagery, approximately 30% of trauma survivors displayed neurobiological changes reflecting state dissociation (Lanius, Bluhm, Lanius, & Pain, 2006). It is the purpose of the present study to investigate the relationship of both peritraumatic (state) and trait dissociation with one of the most common types of psychopathology: personality disorders. Although there have been changes to the diagnostic criteria for personality disorders over the years, the current edition of the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; *DSM-5*; American Psychiatric Association, 2013) recognizes 10 personality disorders. The lifetime prevalence rate of having at least one personality disorder is estimated to be 5-15% (Livesley & Larstone, 2018).
Several theories have addressed the mechanisms behind dissociation. Pierre Janet, in the late 1800s, was the first person to detail how state dissociation serves as a defense mechanism during a traumatic event (as cited in Van der Hart & Horst, 1989). Janet argued that one of his patients, Lucie, presented with two separate consciousness states, rather than lacking a state of consciousness altogether. Janet suggested that it is possible for an organism to be operated by multiple systems of consciousness. According to Janet, the nuclei of the dissociated states of consciousness emerge as a reaction to traumatic experiences and operate independently from the individual’s primary personality. As new concepts are integrated into these dissociated nuclei, they can be strengthened to the point where they can override the core personality, thus increasing the frequency that an individual will experience dissociative reactions.

Janet characterized dissociation as the consequence of an inability to incorporate new information (as cited in van der Hart & Horst, 1989). He believed that this reaction was caused by an individual being placed into a situation where they are unable to implement adaptive behaviors, such as during a traumatic event, and are forced to experience extreme emotions (e.g., terror or rage). He theorized that the newest, most disjointed memories would be dissociated from the other memories.

In 1940, Myers wrote that World War I soldiers suffering from acute trauma experienced a structural dissociation, which resulted in two distinct personality states: the “apparently normal” personality (ANP) and the “emotional” personality (EP) (as cited in Nijenhuis, van der Hart, & Steele, 2004). Myers defined the EP as having strong sensorimotor episodes combined with emotions that resemble the actual trauma. These strong sensory and emotional components cause the traumatized individual to feel as if
the memory is happening in the present in the form of a flashback, preventing the EP from translating the traumatic experience into narrative memory. In contrast, the ANP is characterized by avoidance of the trauma through memory impairment (partial or complete amnesia) and emotional numbing or detachment.

Nijenhuis, van der Hart, and Steele (2004) expanded upon Myers’s theory that traumatic experiences result in the personality undergoing a structural dissociation. They attributed this dissociative reaction to be an evolutionary survival mechanism developed to protect the individual from danger (the EP’s primary function) and allow them to continue to function in their day-to-day lives (the ANP’s primary function). These mechanisms are especially prominent if the trauma happens at a young age or places the individual at risk of severe bodily harm. Overall, they viewed dissociation as the process in which an individual is unsuccessful at translating their traumatic experience into their memory and perceiving that they personally experienced the event. They argued that stress and conditioning may prevent traumatic memories from fully integrating into “psychobiological systems” (p. 7). For example, two roles of the hippocampus are to evaluate context and coordinate with the prefrontal cortex to inhibit reactions to threatening stimuli. Under stressful conditions, these structures can inhibit responses to a previously threatening conditioned stimulus, even when that stimulus is not currently placing that individual in danger.

Mattos, Pedrini, Fiks, and de Mellow (2016) theorized that peritraumatic dissociation resulted from an inability to synthesize information between one’s internal and external world. They analyzed peritraumatic dissociation experience data from the stories of eight survivors of urban violence (3 men, 5 women). They concluded that
during peritraumatic dissociation, a person exists in a state separate from the flow of time as a being without a sense of self (coined a “no self” or “strange self”). Within this separate space, bodily sensations and feelings are foreign. Attention is shifted to a void and perception of the outside world is skewed. The outside world appears to be unfamiliar and memory of the world during this time is impaired.

Similarly, Ataria (2014) viewed peritraumatic dissociation as being the result of an injury in one’s sense of time and their view of self. Specifically, he described four phenomenological aspects that comprise the self: the minimal self, sense of ownership, sense of agency, and sense of self. The minimal self refers to the ability to subjectively experience events from a first-person point-of-view, accurately perceiving an event as it happens directly to you and feeling connected to your physical body. During a dissociative event, there is a disconnection between the minimal self and the world, resulting in derealization (e.g., feeling as if you’re watching someone else in a film experience the event) or emotional detachment. Sense of ownership describes the continuous recognition that the body and inner world are separate from the external world. During dissociation, this disconnection from bodily sense of ownership is expressed as depersonalization (i.e., feeling separate from your body). Ataria defined a sense of agency as the awareness of individual goals and feeling in control of transferring intentions into physical actions. A complete deterioration of self of agency is subjectively experienced as a loss of control. A weakened sense of agency can lead to feelings of guilt and a belief from the victim that they contributed to the traumatic event. If the minimal self, the core component of the self, is damaged, long-term consequences
tend to be more severe as the individual continues to separate his/herself from his/her surroundings and their experiences begin to feel like being in a dream-like state.

Ataria (2014) stated that a coherent sense of time is dependent on the ability to see both a just-past (retention) and just-future (protention). The incorporation of these two concepts comprise consciousness, which in turn produces the extended moment. When a traumatic event occurs, the individual detaches from the world around them, resulting in their extended moment becoming limited to “now, not-now, and not-yet-now” (p. 338). Consequently, the disintegration of the temporal structure influences the ability to conceptually process, order, and provide meaning to information related to the trauma. A skewed perception of time creates a sense that the event continues to exist in the present moment, as the concept of the past and present are unable to create boundaries around the present moment to signal a start or end of the experience. The memory of the event is encoded in the body rather than the autobiographical self, which results in flashbacks feeling as if they are happening in the here-and-now.

State dissociation can be an adaptive response to a traumatic situation, but the repeated application of this defense mechanism to cope with emotionally arousing situations becomes maladaptive if it develops into a persistent trait (Perry et al., 1995). Children faced with a threatening situation are often less capable of implementing a fight-or-flight response than adults, which can result in a freeze or dissociative response. Younger children have fewer resources and thus are more likely to implement dissociation as a defense mechanism than older children or adults. This freeze response allows a child to prevent drawing attention to him/herself and decrease anxiety so that the child can create a strategy to respond to the threat. When the threat is ongoing, a child
will either will develop either a hyperarousal (fight-or-flight) or dissociative pattern of behavior. This pattern is solidified if the child continues to remain dissociated long after the threatening event has passed, which is more likely to occur if there is repeated exposure to the traumatic stimuli. The child will become sensitized to dissociative physiological (e.g., slowed heart rate) and neurobiological responses (e.g., opiate agonists influencing CNS activation); this automatic response may continue during periods of low arousal, long after the actual threat dissipates.

**Dissociation and Post-Traumatic Stress Disorder (PTSD)**

The connection between dissociation and PTSD has been studied extensively. Several researchers have found that both peritraumatic and trait dissociation were associated with increased risk or higher levels of PTSD symptomatology (McCanlies, Sarkisian, Andrew, Burchfiel, & Violanti, 2017; Thompson-Hollands, Jun, & Sloan, 2017; Sijbrandij et al., 2012). Multiple studies have found evidence that peritraumatic dissociation significantly predicted PTSD symptoms (Vásquez et al., 2012; Ozer, Best, Lipsey, & Weiss, 2003). It is important for this current study to assess this relationship as the presence of PTSD symptomatology is likely to exist alongside dissociation, and thus may potentially factor into any relationships found with personality disorders.

Ozer et al. (2003) conducted a meta-analysis of 68 empirical studies to assess the predictive value of peritraumatic dissociation with PTSD in trauma survivors. Seven predictors were examined: (1) a history of trauma, (2) normal psychological functioning before the trauma, (3) existing psychopathology in relatives, (4) belief that one’s life was in danger at the time of the trauma, (5) perceived support after the experience, (6) heightened emotions at the time of or immediately following the trauma, and (7)
peritraumatic dissociation. All seven predictors were significant, with peritraumatic
dissociation emerging as the strongest predictor of PTSD symptoms (weighted $r = .35$).

Ursano et al. (1999) researched the relationship between peritraumatic
dissociation and PTSD (acute and chronic) in 122 survivors of severe motor vehicle
accidents (64 men, 58 women). Participants were assessed one month and three months
post-accident using the Structured Clinical Interview for DSM-III-R (SCID), the SCID
PTSD supplement, and the Peritraumatic Dissociative Experiences Questionnaire – Rater
Version (PDEQ; Marmar, Weiss, & Metzler, 1997; Birmes et al., 2005). The PDEQ
assesses state dissociative symptoms such as absorption, depersonalization, and
derealization. Researchers found that 96 participants reported experiencing at least one
symptom of peritraumatic dissociation. The most reported symptom was time distortion
(56.6%). Individuals who were White, unmarried, or younger were significantly more
likely to report peritraumatic dissociation symptoms. Participants who experienced
peritraumatic dissociation were at 4.12 times increased risk for acquiring acute PTSD and
4.86 times increased risk for acquiring chronic PTSD. Whereas the number of
peritraumatic dissociation symptoms was not associated with an increased risk of
developing acute PTSD, peritraumatic dissociation symptoms did significantly increase
the risk of developing chronic PTSD (Wald $\chi^2 = 4.60$, df = 1, $p = 0.03$, odds ratio = 1.35,
95% CI = 1.03 –1.77). One limitation of this study is that the exclusion criteria included
brain trauma or coma, but not other types of major bodily injuries, so the experiences of
survivors with and without long-term physical damage could differ greatly.

McCanlies et al. (2017) investigated the relationship between peritraumatic
dissociation, depression, and PTSD in 328 police officers (249 men, 79 women). They
also assessed the influence of prior traumatic experiences (predating law enforcement employment). Participants were assessed using the Posttraumatic Stress Disorder Checklist – Civilian version (PCL-C), Center for Epidemiological Studies – Depression scale (CES-D), PDEQ, and a modified Brief Trauma Questionnaire (BTQ; Schnurr, Vielhauer, Weathers, & Findler, 1999). They discovered a significant positive relationship between peritraumatic dissociation and PTSD symptomology in both individuals with and without prior trauma experience. There was also a significant positive relationship between peritraumatic dissociation and depressive symptoms, but only with individuals who had experienced a previous traumatic event. However, these results may have been affected by the disproportionally large amount of men compared to women in the sample, as peritraumatic dissociation has been shown to be higher in women than in men (McDonald et al., 2013).

Criterion D for PTSD from the DSM-5 requires that an individual must experience a shift in thoughts or feelings to reflect a belief that they have been negatively affected by the traumatic event. Thompson-Hollands et al. (2017) assessed the relationship between peritraumatic dissociation and negative posttraumatic cognitions in 169 adults (74 men, 95 women) with previous trauma exposure (e.g., reports of childhood sexual abuse, assault/robbery/physical threats during adulthood, motor vehicle accident, combat, intimate partner violence, adult sexual abuse, childhood physical abuse, or other traumatic events). Participants were assessed using the Life Events Checklist for the DSM-5 (LEC-5), the Clinician-Administered PTSD Scale for the DSM-5 (CAPS-5), PDEQ, and Posttraumatic Cognitions Inventory (PTCI). They found that peritraumatic dissociation only predicted negative beliefs about the self. Negative thoughts about the
self also served as a partial mediator between peritraumatic dissociation and intensity of PTSD symptoms. One limitation of the study addressed by these authors was that participants often underwent traumatic events multiple times in their lives, thus running the risk that these individuals could confuse symptoms of peritraumatic dissociation with persistent dissociation.

Măirean and Ceobanu (2017) studied the influence of peritraumatic state dissociation and state anxiety on thought suppression and intrusions in 148 college students (22 men, 126 women). Peritraumatic anxiety refers to anxiety experienced during or immediately following the traumatic event, which is associated with future risk of intrusive thoughts. Participants completed the Dissociative Experiences Scale, revised (DES-II), Dissociative States Scale (DSS), Emotion Regulation Questionnaire (ERQ), The White Bear Suppression Inventory (WBSI), Positive and Negative Affect Schedule (PANAS), and the State Anxiety Scale (STAI-S) prior to viewing a film that showed traumatic scenes from the aftermath of actual motor vehicle accidents. After viewing the footage, participants completed the PANAS, STAI-S, and DSS for a second time. Participants who were less adept at suppressing their thoughts prior to the trauma film exposure were significantly more likely to have a higher number of intrusive thoughts. This relationship was mediated by peritraumatic anxiety. Intrusive images were predicted by both state anxiety and peritraumatic dissociation. Intrusive thoughts were only predicted by state anxiety, not peritraumatic dissociation. Similar to the McCanlies et al. (2017) study, there was a large discrepancy between genders tested, in this case there were more women than men. These authors addressed this limitation, but did not analyze gender differences, which may have influenced their findings.
Werner and Griffin (2012) studied the influence of peritraumatic and trait dissociation on PTSD symptoms of 92 female sexual assault survivors ($n = 62$ at follow-up). Participants completed the 1-week symptom status version of the CAPS (CAPS-SX) and the PDEQ during their initial assessment ($M = 28.2$ days after the trauma, range $= 5$ - 87 days) in order to assess the predictive value of peritraumatic and acute trait dissociation for chronic PTSD. At follow-up ($M = 224.9$ days after the trauma, range $= 160$ – 796 days), they completed the current and lifetime diagnosis version of the CAPS (CAPS-DX) to assess the predictive value of persistent trait dissociation for chronic PTSD. During both assessment periods, 2 hours after completing the CAPS, they were instructed to recall specific details about the assault for 5 min before taking the Clinician-Administered Dissociative States Scale (CADSS). Their results showed that both peritraumatic and trait dissociation were found to be predictive of 39% of the variance found in PTSD symptoms at follow-up. Specifically, peritraumatic dissociation accounted for 4% of the variance, whereas trait dissociation contributed to 8%. These authors only looked at female sexual assault survivors, so these findings are unable to be extended to male survivors or survivors of other traumas.

Sijbrandij et al. (2012) examined the PDEQ’s factor structure. Participants consisted of three separate groups who had been previously exposed to trauma: police officers ($n = 219; 142$ men, $77$ women), civilians ($n = 158; 88$ men, $70$ women), and treatment-seeking civilians ($n = 185; 76$ men, $109$ women). Participants completed the PDEQ, Self-Rating Scale for PTSD (SRS-PTSD), and the Structured Interview for PTSD (SI-PTSD). They found that the PDEQ, with the exception of two items, could be broken down into two factors: Altered Awareness and Derealization. Altered Awareness was
associated with ineffective information processing at the time of the traumatic incident, while inaccurate perception of the event was associated with Derealization. During follow-up at 26.5 weeks, PTSD symptoms were predicted by Derealization, not Altered Awareness, and only with the police sample. One important element to keep in mind when interpreting these results is that the sampled participants used for this study may not be representative of the population as a whole, as they were referred by outside sources without a standard selection process in place. Additionally, the types of traumas participants had been exposed to were vastly different, ranging from sexual assaults to a loved one unexpectedly dying. A majority of the traumatic events experienced by the police officers, such as unsuccessful CPR or witnessing a suicide, were not mentioned in the other two samples, making it unwise to assume that the experiences from all three samples are similar enough to group together.

After experiencing a trauma, it has been claimed that individuals typically fall into one of four PTSD symptom trajectory categories: resistant/resilient, recovering, delayed-onset, or chronic (Pietrzak et al., 2014). Galatzer-Levy, Madan, Neylan, Henn-Haase, and Marmar (2011) assessed 178 active-duty police officers who had life-threatening experiences to see if peritraumatic and trait dissociation affected symptom trajectories. Participants were evaluated using a modified version (relevant to police officers) of the PTSD Checklist-Military Version (PCL-M), PDEQ, DES (Bernstein & Putnam, 1986), and Critical Incident History Questionnaire (CIHQ). Participants were tested at initial exposure, 6 months, 12 months, 18 months, and 24 months post-trauma. These researchers discovered that both trait dissociation and peritraumatic dissociation separated those who were classified into the resilient category from those who were
distressed-improving (recovery). However, the resilient and distressed-worsening (chronic) outcomes were predicted only by peritraumatic dissociation, not trait dissociation. One limitation addressed by the researchers was that this sample tended to be extremely resilient (88.1%) compared to the general population. For example, Pietrzak et al. (2014) found that out of 4,035 World Trade Center police responders, 77.8% were resistant/resilient, and out of 6,800 non-traditional responders, 58% were resistant/resilient. Therefore, the results from this particular sample are unlikely to be representative of the general population.

In summary, there is evidence that supports a relationship between dissociation and PTSD. Both peritraumatic and trait dissociation predicted PTSD symptoms, with peritraumatic dissociation more strongly predicting PTSD than trait dissociation. Therefore, it is expected that participants in the present study with peritraumatic or trait dissociative symptoms will also exhibit symptoms of PTSD.

**Peritraumatic Dissociation and Gender**

Female gender has been found to be predictive of peritraumatic dissociation. McDonald et al. (2013) administered the PDEQ to 243 trauma hospital patients (53 men, 190 women) who experienced a motor vehicle accident (58%), assault (6%), traumatic fall (17%), or other traumatic accident (19%). They found that female gender significantly predicted higher Awareness and Derealization subscale scores. Derealization scores were also significantly predicted by the amount of warning participants received prior to the traumatic event. As mentioned with previous studies, these results must be interpreted with caution as the sample of men was smaller than women.
Pacella et al. (2011) assessed the influence of avoidant coping on peritraumatic dissociation and PTSD symptomology in motor vehicle accident survivors. Participants completed the self-report PDEQ, Brief COPE, CAPS, SCID-IV, and an injury severity score. Participants were assessed at baseline ($N = 356$; 211 men, 145 women), 6 weeks ($n = 251$; 139 men, 112 women), 6 months ($n = 195$; 103 men, 92 women), and 1 year ($n = 169$; 89 men, 80 women) post-trauma. They discovered that avoidant coping partially mediated the relationship between peritraumatic dissociation and PTSD symptoms both 6 ($n = 193$) and 12 months ($n = 167$) after a motor vehicle accident. At 6 months, this partial mediation was significant only for women, but at 12 months, there was no significant difference between genders. However, the composition of the sample changed drastically throughout the study as dropout was more likely to occur with those with high peritraumatic dissociation and in men ($n = 122$) as opposed to women ($n = 65$). Therefore, due to the inconsistency between samples, the difference between genders at 6 compared to 12 months could be related to factors other than gender. There may also be individual factors unaccounted for that may affect the likelihood of choosing to remain in a study throughout its duration.

The results of these studies provide support that gender differences exist with peritraumatic dissociation. Specifically, women are more likely to experience higher levels of peritraumatic dissociation than men. Thus, there is a potential risk that gender differences may skew the reported peritraumatic dissociation levels in participants for the present study.
The Neurobiology of Dissociation

Individuals who experience dissociative symptoms exhibit different neurobiological responses compared to the general population. Several researchers have examined the neurobiology of dissociation, primarily with people diagnosed with PTSD. When exposed to recordings of their trauma narratives, individuals with the dissociative subtype of PTSD experience abnormally high activation in both their anterior cingulate cortex and medial prefrontal cortex (Bremner et al., 1998). However, individuals with PTSD without the dissociative subtype experience abnormally low activation in both of these cortices when exposed to their trauma narratives (Hopper, Frewen, van der Kolk, & Lanius, 2007). The medial prefrontal cortex and anterior cingulate cortex assist with emotional processing (Etkin, Egner, & Kalisch, 2010). Negative emotion is appropriately assessed and expressed through processes in the dorsal-caudal regions of both cortices. On the other hand, the ventral-rostral regions of these cortices can constrain negative emotions by decreasing reactivity in the limbic system. Therefore, people with the dissociative subtype of PTSD will tend to overregulate through suppressing more negative emotions, whereas those with PTSD without dissociation will underregulate their emotional responses to traumatic stimuli. However, it has not been demonstrated that high or low activation in both the anterior cingulate cortex and medial prefrontal cortex is sensitive or specific to PTSD in any of its forms. Furthermore, these areas of the brain may be active or inactive under other circumstances or baseline brain activity.

Differences in CNS activation exists between hyperarousal and dissociation (Perry et al., 1995). Both hyperarousal and dissociation are associated with higher levels of epinephrine and other stress steroids. Dissociation is also associated with increased
activation of dopaminergic systems (e.g., mesolimbic and mesocortical), along with heightened levels of vagal tone, with lowered blood pressure and heart rate. Endogenous opioid systems are involved in dissociative reactions. These opioids increase pain tolerance, yet interfere with sensory processes (e.g., perceptions of time and environment). The activation of these opioid systems prevents sensory integration in the superior and inferior colliculus, eliciting a freeze response and reducing responsiveness to outside stimuli (Lanius, Paulsen, & Corrigan, 2014). Further freezing and heightened pain tolerance occur when the opioids reach the ventrolateral periaqueductal gray matter (PAG) (i.e., area of the brain responsible for pain modulation). Endogenous cannabinoids are also active during a traumatic event, specifically in the midbrain PAG and prefrontal cortex (PFC). This results in the thalamus being unable to provide the cortex with accurate sensory information and impairing its ability to integrate this information. The release of opioids may lower gamma oscillations in the thalamus and colliculi, resulting in inefficient information processing and impaired cognitive temporal binding.

These neurobiological responses found in both peritraumatic and trait dissociation can negatively affect neurocognitive functioning (Lanius et al., 2014). The opioid interaction with the thalamus decreases integration and processing of sensory information. Additionally, suppressing emotional responses may also negatively influence neurocognitive functioning as emotions are important for cognitive processing; attention is drawn to emotionally salient stimuli in order to make judgments and determine which information is important to integrate into memory (Dolcos, Jordan, &
Dissociation and Neurocognitive Functioning

Neurocognitive disorder encompass problems with language, attention, executive functioning, perceptual motor functions, learning, and memory (according to the DSM-5). There are mixed results describing the influence of dissociation (peritraumatic and trait) on neurocognition, specifically with attention, memory, and executive functioning. McKinnon et al. (2016) reviewed research that assessed the effect of dissociation (state and trait) on cognition. In nine separate studies that compared healthy samples, higher levels of dissociation were primarily associated with lower levels of attention, executive functioning, and memory (i.e., verbal, episodic, and working). However, they noted four studies that provided contradictory or mixed evidence: higher dissociation in healthy participants demonstrated better verbal working memory, divided attention, and selective attention (e.g., higher recall of neutral words) compared to those with lower dissociative tendencies.

One of these studies was conducted by Brewin, Ma, and Colson (2013). They performed two experiments to test whether peritraumatic dissociation impaired cognitive performance. The first study consisted of 60 undergraduate students (19 men, 41 women) who were separated into either the control ($n = 15$) or experimental groups ($n = 45$). All of the students participated in a 5 min time estimation task, which was used to evaluate time perception. Participants in the experimental group were given a mirror gazing task while the control group was instructed to view a video depicting 40 scenic photos. The goal of the mirror gazing task was to manipulate perception to mimic
depersonalization (e.g., distorted perceptions of facial features or feeling that the reflected face was not his/her own). Participants then repeated the time estimation task before completing the Clinician-Administered Dissociative States Scale (CADSS) (a measure of state dissociation), “Feature Match” task (measures perceptual attention), forward digit span test (measures short-term verbal and spatial memory), Corsi-block test (measures short-term verbal and spatial memory), and experience of mirror-gazing questionnaire. They were provided the DES to assess trait dissociation, which was completed one week later. There was a positive correlation between DES and CADSS scores, $r(56) = .43$, $p < .01$. There were no significant correlations between DES scores and any scores on the cognitive measures. There were no significant differences between groups on time perception, perceptual attention, and spatial span. However, the experimental group had significantly lower digit span scores than the control group. Additionally, CADSS scores were weakly negatively correlated with time estimation and digit span. Peritraumatic dissociation was negatively correlated with digit span scores significantly more than spatial span scores. These authors suggested these differences were attributed to strengthened image-based memory and encoding deficits in the contextualized memory system found in PTSD, known as the dual representation theory of PTSD. Dissociation was theorized to negatively affect contextualized memory more than image-based memory, which was supported by peritraumatic dissociation having a significantly higher negative correlation with verbal memory compared to either perceptual attention or spatial span scores. Several confounding factors could have had an influence in study one: only the first 30 participants were randomly assigned between the two groups, thus causing an unequal distribution of control versus experimental subjects, there was a small
sample size overall, and all participants were undergraduate students, making the data difficult to generalize to the broader population.

For the second study, 40 undergraduates (5 men, 35 women) completed both the PANAS and CADSS before being assigned either the mirror gazing task \((n = 20)\) or to sit silently \((n = 20)\) (Brewin, Ma, & Colson, 2013). They then completed a second CADSS, the Weschler Memory Scale 4\textsuperscript{th} edition logical memory subtest (story A), a drawing task, a second recall of the story from the memory subtest, a third CADSS, a second PANAS, and an experience of mirror-gazing questionnaire. There was no main effect of experimental condition on recall scores, but there was evidence of a main effect of time (lower scores with delayed recall) and an interaction effect between experimental condition and time. Peritraumatic dissociation was negatively correlated with verbal memory, specifically with delayed recall, but not with immediate recall. These studies provide support that peritraumatic dissociation is related to deficits in deficits in verbal memory delayed recall in a healthy sample. While the participants were more evenly distributed between groups in experiment two compared to experiment one, the sample size remained extremely small, along with there being significantly more women than men, thus retaining the same concerns as mentioned for their first study.

In contrast to the Brewin, Ma, and Colson (2013) experiments, McKinnon et al. (2016) also addressed opposing evidence found by de Ruiter, Phaf, Elzinga, and van Dyck (2004), which showed that a high dissociative style could provide an advantage on verbal working memory span tasks. Undergraduate psychology students \((N = 119; \text{32 men, 87 women})\) completed a working memory task and the Dissociation Questionnaire (DIS-Q) (a measure of trait dissociation). The students classified as high dissociators
performed better on the working memory span task compared to students who were medium or low dissociators. Total DIS-Q scores were also significantly positively correlated with working memory span. Similar to the Brewin, Ma, and Colson (2013) studies, the participants were selected from a convenience sample, making them more homogeneous than the general population and reflecting an imbalance in participant genders.

McKinnon et al. (2016) also analyzed experiments conducted with trauma-exposed populations. These results were mixed as well. One study conducted with 24 foster care children (age range: 5- to 8-years old) found that higher levels of trait dissociation were negatively correlated with inhibition and attention. Another study assessed 110 trauma-exposed children; the results supported trait dissociation as a significant predictor of lower executive functioning and IQ. However, a third study found mixed results when they analyzed 21 high trait dissociators and 24 low trait dissociators after directed forgetting and divided attention tasks (DePrince & Freyd, 2004). Despite the high dissociators reporting significantly higher levels of trauma exposure than low dissociators, high dissociators recalled lower numbers of trauma-related words and higher numbers of neutral to-be-remembered words during divided attention tasks. Additionally, compared to low dissociators, high dissociators were able to recognize a higher number of neutral and lower number of trauma to-be-forgotten words during divided attention tasks. There was also no evidence of an interaction between dissociation level (high or low) and remember-forget directions, which implied inhibition was not a factor for the memory deficit found in high dissociators for trauma-related words compared to neutral words. This suggests that trauma-related words were
not encoded by high dissociators when their attention was divided, which resulted in memory impairment.

The studies reviewed by McKinnon et al. (2016) suggest that a majority of research supports a relationship between dissociation and neurocognitive deficits. These deficits can be attributed to the neurobiological changes found during dissociative states. The opioid and monoamine systems interacting with the thalamus may impair sensory processing. Attentional focus is altered with the activation of the noradrenergic system and ketamine, resulting in detachment and perceptual distortions of sensory stimuli. Opioids are also linked with impairments in memory encoding and retrieval. Therefore, activation of these systems during dissociative states may explain the deficits in attention, memory, and executive functioning.

**Dissociation and Personality Disorders**

Symptoms of personality disorders tend to be relatively stable over time in adolescents and young adults (Shiner, 2009). These symptoms are highest during early adolescence, then decrease as the individual grows through adolescence into early adulthood. Personality disorders in adults are also highly comorbid. Personality disorders are often associated with particular Big 5 traits, specifically, high levels of neuroticism and low levels of agreeableness and conscientiousness. Similar to personality disorder symptoms, neuroticism also peaks during adolescence. High levels of neuroticism suggest emotional dysregulation. Cognitive deficits in personality disorders are related to faulty mental representations (related to self and others) and coping strategies. These mental representations are evident in personality disorders, such as with an inflated view of self in narcissistic personality disorder, general mistrust of
others in paranoid personality disorder, perceived societal expectations related to
perfectionism in obsessive-compulsive personality disorder, and peculiar beliefs about
the world in schizotypal personality disorder. Dysfunctional coping patterns (e.g.,
withdrawing into fantasy worlds or dissociation) are linked with high neuroticism
coupled with low conscientiousness. One study found that neuroticism significantly
predicted and was significantly correlated with trait dissociation (Irwin, 1998).
Childhood trauma is also highly prevalent in people with personality disorders; in a study
conducted by Bierer et al. (2003), 78% of the personality disordered sample also
experienced a childhood trauma, primarily emotional abuse and neglect. Childhood
trauma may also contribute to these dysfunctional or dissociative coping strategies (Perry
et al., 1995). Hence, it is likely that people with personality disorders are more likely to
have higher neuroticism, cognitive deficits, and dysfunctional coping patterns, which
increases the likelihood that they would experience higher levels of both peritraumatic
and trait dissociation (as personality disorders are relatively stable over time, so these
dysfunctional coping strategies would presumably remain stable as well without
treatment). Unfortunately, there is a lack of research that analyzes the relationship
between dissociation and the DSM-5 personality disorders. Much of the existing research
is centered around borderline and schizotypal personality disorders.

**Borderline Personality Disorder (BPD)**

A large amount of research on dissociation and personality disorders focuses on
borderline personality disorder (BPD). Bichescu-Burian, Steyer, Steinert, Grieb, and
Tschöke (2017) investigated whether peritraumatic dissociation contributed to
dissociative symptoms found in BPD. They compared a trauma-exposed sample of 28
females with BPD and 15 without psychopathology. Participants completed the Mini-International Neuropsychiatric Interview (M.I.N.I), CAPS, Structured Clinical Interview for *DSM-IV* Dissociative Disorders-Revised (SCID-D), SCID-I, SCID-II, Childhood Trauma Questionnaire (CTQ), PDEQ, and German versions of the Borderline Symptom List (BSL), DES, and the Symptom Checklist-90-Revised (SCL-90-R). Participants were instructed to reference the personal traumatic event described on their trauma-related script when completing the PDEQ. Participants with a score higher than 1.5 on the PDEQ (*n* = 15) were placed into the high dissociation reaction group, whereas participants under the cutoff score were assigned to the low dissociation group (*n* = 13). Participants described three personal events: a personal trauma, a neutral, mundane experience, and a pleasurable, typical event, which were translated into 30 s audio files. They were instructed to imagine the event as they listened to the audio and to continue visualizing the event after the audio ended until the end of the memory. Participants recorded their emotional responses directly after each script. Compared to participants with only BPD or the control groups, participants who had both BPD and peritraumatic dissociation dissociated significantly more often and were significantly more likely to believe that all their scripts resulted in dissociation. Limitations addressed by these authors include the sample potentially consisting of more severe cases as they were recruited by an inpatient hospital and psychiatry staff, along with a difference in the types of memories used for different scripts (e.g., episodic for trauma and semantic for commonplace events).

Jaeger et al. (2017) studied the cooccurrence of BPD and trait dissociation in an inpatient population. A total of 103 patients (18 men, 85 women) residing in specialized
acute inpatient care crisis intervention units completed the Borderline Symptom List (BSL-95), a German version of the DES (FDS), and the SCL-90-R. Patients with BPD experienced trait dissociative symptoms at a significantly higher rate than the average scores of inpatients diagnosed with dissociative spectrum disorders. There was also a positive correlation between severity of BPD symptoms and trait dissociative symptoms. Patients fell into one of three symptom clusters: severe (class 1; high BSL and FDS scores), moderate (class 2; high BSL and low FDS scores), and low (class 3; low BSL and FDS scores). The severe class scored highest in the absorption and derealization/depersonalization subscales of the FDS. The moderate class had similar BSL scores to the severe class; however, the patients in this group had low FDS scores and were significantly more likely to have an adjustment disorder than patients in the other groups. These researchers theorized that adjustment disorders were higher in this group because they were unable to frequently utilize dissociation as a coping mechanism during times of extreme stress. This study was limited by the lack of data collection on the type of traumatic event experienced by the patients, all participants being current inpatients, and there being a large amount of comorbidity with disorders other than BPD within the sample. Additionally, although it was not assessed in the study, it is possible that these differences exist due to high rates of childhood sexual trauma found in people with BPD (ranging from 40 to 70%), which can contribute to dissociative symptoms (e.g., amnesia) (Mosquera, Gonzalez, & van der Hart, 2012).

Zanarini, Frankenburg, Jager-Hyman, Reich, and Fitzmaurice (2008) assessed change in trait dissociative symptoms in patients with BPD over the course of 10 years. Patients \(N = 362\); 83 men, 279 women) diagnosed with BPD \(n = 290\) and other Axis II
disorders ($n = 72$) were administered the DES during their inpatient admission and every 2 years for 10 years. Analyses revealed that 92% of the patients with BPD who had high trait dissociative experiences (classified as scores above 30) at baseline showed a reduction in symptoms during the 10 years; however, 38% of these patients with reduced symptoms also had a return in high DES scores. Out of the patients with low or moderate DES scores at baseline, only 8% had high DES scores within the 10-year follow-up. Patients with other Axis II disorders tended to score low at baseline with a 43% decline in scores at the 10-year follow-up. BPD patients scored an average of 29.2 on absorption, 16.9 on depersonalization, and 13.5 on the amnesia DES subscales. At the 10-year follow-up, BPD patients scored an average of 11.2 on absorption, 6.6 on depersonalization, and 3.6 on the amnesia subscales. The sample gathered for this study was predominately female and they had all experienced high levels of symptom severity, resulting in inpatient care, at the start of the study, thus raising the possibility that these results would not be applicable to most men with BPD or those with less severe BPD symptoms.

In summary, research has supported a significant relationship between BPD and both peritraumatic and trait dissociation. Severe borderline symptoms were associated with high levels of absorption, depersonalization, and derealization. People with BPD and peritraumatic dissociation were also significantly more likely to dissociate when listening to their trauma scripts compared to people with BPD without peritraumatic dissociation. Therefore, it is expected that the relationship between BPD and dissociative symptoms will also be evident in the present study.
Schizoid and Schizotypal Personality Disorder and Schizotypy

There is a lack of research surrounding the relationship of peritraumatic dissociation with schizoid and schizotypal personality disorders, as well as with schizotypy (i.e., a tendency to manifest psychotic symptoms). Psychological trauma can increase the risk of later experiencing eccentric perceptions and beliefs (Berenbaum, Thompson, Milanak, Boden, & Bredemeier, 2008). These eccentric perceptions and beliefs are also associated with absorption and dissociation (depersonalization/derealization). Peculiar perceptions and beliefs are a hallmark of Cluster A disorders (schizotypal personality disorder, schizoid personality disorder, and avoidant personality disorder) (American Psychiatric Association, 2013). Thus, individuals with Cluster A personality disorders may have a higher chance of previously experiencing a traumatic event and utilizing dissociation as a defense mechanism (both at the time of trauma and in their normal functioning).

Novović, Mišić-Pavkov, Smederevac, Drakić, and Lukić (2013) analyzed a case of a man, diagnosed with schizoid personality disorder, who had committed a parricide (i.e., the murder of his parents). He was administered the SCID-IV for Axis I and Axis II disorders, Weschler Individual Test of Intelligence, an inventory comparable to the Minnesota Multiphasic Personality Inventory (MMPI-202), the Rorschach Inkblot Test, and The Behavioral Inhibition System and Behavioral Activation System Questionnaire (BIS/BAS scales). Their results showed that he displayed symptoms of peritraumatic dissociation (e.g., depersonalization during his “out of body experience”) while he committed the parricide (p. 116). Whereas this single case demonstrated that an individual with schizoid personality disorder had experienced peritraumatic dissociation,
the results cannot be generalized to an entire population. As well, other factors existed for this individual that are not present in most individuals with schizoid personality disorder, as violence and/or murder are not official symptoms in the *DSM-5* for SPD.

Berenbaum et al. (2008) assessed the relationship between psychological trauma and schizotypal symptoms in 303 adults (142 men, 161 women) gathered from a previous study (*n* = 214) and local advertisements (*n* = 89). Participants were evaluated for schizotypal personality disorder during a semi-structured interview using the Personality Disorder Interview-IV (PDI-IV) and *DSM-IV* criteria. Trait dissociation was measured with the SCID-D and the DES Taxon subscale (DES-T). The CAPS was used to measure PTSD symptoms. Their data revealed a significant positive correlation between schizotypal symptoms and trait dissociation in both genders. Trait dissociation also served as a mediator between childhood maltreatment and schizotypal symptoms for both genders, but this relationship only reached significance in women. The relationship between PTSD Criterion A and schizotypal symptoms was also significantly mediated by dissociation for women, but not for men. These results provide some support that dissociation after a trauma directly influences symptoms of schizotypal personality disorder. One factor that may have affected these results was that the sample was collected from a previous study that also assessed schizotypal symptoms, thus potentially drawing attention to the importance of schizotypal symptoms. The authors also noted that most participants did not completely meet the schizotypal personality disorder diagnostic criteria.

Despite the lack of research related specifically to schizoid and schizotypal personality disorders, there is evidence of an overlap between proneness to trait
dissociation and schizotypy. Irwin (2001) investigated whether childhood trauma played a factor in the relationship between dissociation and schizotypy. Australian adults (N = 116; 42 men, 74 women) completed the DES, Schizotypal Personality Questionnaire – Brief (SPQ-B), and CTQ. The SPQ-B is broken down into three subscales: cognitive-perceptual, interpersonal, and disorganized. Even when childhood trauma was controlled, high schizotypy scores were significantly associated with dissociation. Specifically, the cognitive-perceptual component of schizotypy was the most predictive of dissociation (pathological and nonpathological), with interpersonal as the second and disorganized as the third most predictive. Additionally, childhood trauma served as a better predictor for absorption than dissociation. A large majority of the participants were young adults (Mage = 22.7 years, s = 7.36) gathered from an undergraduate introductory psychology course and limited to those with childhood trauma, thus affecting generalizability of the results.

Merckelbach and Giesbrecht (2006) examined the potential influence of fantasy proneness and traumatic distress on trait dissociation and schizotypy. Undergraduate students (N = 191; 47 men, 144 women) were administered the DES and separated into either the low-DES (DES < 14) or high-DES (DES > 30) groups. Participants returned one week later to complete the Perceptual Abberation Scale (PerAb), Magical Ideation Scale (MagId), Creative Experiences Questionnaire (CEQ), and Impact of Event Scale (IES). There was a relationship between schizotypy and dissociation, with individuals in the high-DES group scoring significantly higher in schizotypy symptoms than the low-DES group. This significant relationship remained even after fantasy proneness and traumatic distress were covaried in the analyses. These authors addressed the limitations
of utilizing a convenience sample and that relationships between variables are constantly changing, so one factor may be influencing another (e.g., the ability to manage trauma-related intrusions initially after a trauma may be impaired by high levels of schizotypy, resulting in dissociation).

One important issue in the assessment and diagnosis of schizotypy is that it does not appear in the *DSM-5*. Although there are scales which assess schizotypy (see above), there is no conventional standard of assessment of schizotypy, which is likely to make studies of schizotypy vary. Therefore, the results found in studies measuring schizotypy may not be applicable to individuals who meet the *DSM-5* criteria for schizoid or schizotypal personality disorders. Despite these potential limitations, the studies previously referenced have all found support for a positive relationship between dissociation (peritraumatic and trait) and symptoms of schizotypal personality disorder, schizoid personality disorder, and schizotypy. Therefore, evidence of this relationship is expected to exist in the present study as well.

**Antisocial and Narcissistic Personality Disorders**

Similar to schizotypal and schizoid personality disorders, the association among dissociation, antisocial personality, and narcissistic personality disorders have been insufficiently researched. One study found that a sample of 91 adults with Cluster B personality disorders (i.e., BPD, histrionic, narcissistic, and antisocial (psychopathic) personality disorder) tended to use more primitive defense mechanisms (e.g., denial and projection) (Cramer, 1999). These mechanisms share characteristics similar to dissociation, such as with denial, which can involve neglecting to accept reality, and projection, which can be associated with unrealistic, magical thinking.
Perry, Presniak, and Olson (2013) studied various defense mechanisms used by individuals with schizotypal, borderline, antisocial, and narcissistic personality disorders, which included dissociation. A total of 107 participants (48 men, 59 women) recruited from the community were diagnosed by professionals using the Guided Clinical Interview (GCI), BPD Scale, *DSM-III*, and, when available, *DSM III-R* criteria. Participants then were given a videotaped, unstructured interview by experienced clinicians for 50 min where they were asked questions about topics such as their family and romantic relationships. Defenses displayed during the recorded interviews were rated by groups of three raters viewing the recordings and using the Defense Mechanisms Rating Scales, fourth edition (DMRS). Their results showed that dissociation was most commonly used with the BPD sample (19.5%; \( n = 46 \) using BPD Scale criteria), followed by the schizotypal (12.8%; \( n = 44 \)), antisocial (12.1%; \( n = 41 \)), and narcissistic (0%; \( n = 10 \)) groups. While this study did address the prevalence of trait dissociation as a defense mechanism in these disorders, the sample size of each disorder is small, with only 10 people in the narcissistic group, so it may not be representative of people with these disorders in the population.

The results of these studies suggest that there is a potential link between trait dissociation and Cluster B disorders. This relationship was not found in the Perry et al. (2013) study with the narcissistic group, but this may be due to the group’s small sample size (\( n = 10 \)), which may not be representative of others with narcissistic personality disorder. The association between trait dissociation and Cluster B disorders is likely related to a reliance on primitive defense mechanisms in these populations. Hence, the relationship is also anticipated to be present in the current study.
Cluster C Personality Disorders (Avoidant, Dependent, and Obsessive-Compulsive)

There is a lack of readily available research with Cluster C personality disorders and dissociative tendencies. Some support is provided by Shiner (2009) who suggested there was an increased risk for dissociative tendencies in those with Cluster C disorders, as people with personality disorders tend to implement maladaptive coping strategies, along with having higher levels of neuroticism, and high neuroticism was associated with trait dissociation (Irwin, 1998). Additionally, because these disorders are characterized by a hyper-focus on various aspects of an individual’s life, such as internal reactions (e.g., with social situations in avoidant), interpersonal relationships (e.g., fear of abandonment in dependent), or work performance (e.g., perfectionism in obsessive-compulsive), people with Cluster C disorders may be more likely to exhibit dissociative symptoms similar to absorption. This may be reflected in PDEQ scores in the present study as absorption has been shown to be related to peritraumatic dissociation (Giesbrecht, Smeets, & Merkelbach, 2008).

Theoretical Rationale for the Exploration of the Relationship of Dissociation, Personality Disorders, and Neurocognitive Disorder

Millon (2011) theorized that each personality disorder was composed of different behavioral, intrapsychic, and biophysical components. The intrapsychic levels described defense mechanisms, which included denying reality through fantasy and reorganization of internal self-image, as well as rejecting any contradictory or uncomfortable information. The ability to internally separate from external stimuli may resemble dissociation. On an intrapsychic level, people with schizoid personality disorder were assumed to implement intellectualization dynamics (i.e., focus on objective elements of
situations) and undifferentiated architecture (i.e., underdeveloped internal structures resulting from rarely needing to develop coping mechanisms to manage internal or external conflicts). The intrapsychic level of schizotypal personality disorder consisted of undoing dynamics (i.e., mental reversal techniques to cope with negative feelings) and fragmented architecture (i.e., disorganized defense mechanisms caused by weak ego boundaries that result in psychotic thinking). The intrapsychic level of avoidant personality disorder included fantasy dynamics (i.e., overreliance on imagination to fulfill needs) and fragile architecture (i.e., the utilization of fantasy to avoid facing overwhelming negative emotions when in new or stressful situations). Dependent personality disorder included introjection dynamics (i.e., denial of any individual thoughts to reinforce a belief in a permanent bond with a partner) and inchoate architecture (i.e., virtually non-existing coping mechanisms due to fully relying on another person to tend to individual needs). Histrionic personality disorder involved dissociation dynamics (i.e., continual manipulation of self-image to fit social situations, as well as denying uncomfortable thoughts or emotions) and disjointed architecture (i.e., unintegrated, generalized coping mechanisms to maintain an unintegrated self-image, yet further reinforces the separation between thoughts and behaviors). Narcissistic personality disorder consisted of rationalization dynamics (i.e., self-deception to support socially unacceptable actions) and spurious architecture (i.e., weak defense mechanisms to minimally manage impulsivity, while ignoring conflicts or failures). Paranoid personality disorder involved projection dynamics (i.e., reassigning of personal flaws onto others) and inelastic architecture (i.e., inflexible coping mechanisms unable to adapt to new situations, which can result in outbursts or disintegration of internal structures).
Antisocial personality disorder included acting-out dynamics (i.e., immediate release of inappropriate thoughts or behaviors without shame) and unruly architecture (i.e., lack of or low impulse control leading to uncensored self-expression). Borderline personality disorder consisted of regression dynamics (i.e., reliance on immature defense mechanisms when under stress) and split architecture (i.e., rapid transitions across internal psychic boundaries leading to psychotic episodes). Finally, obsessive-compulsive personality disorder included reaction formation dynamics (i.e., consistent external, positive behaviors that are contradictory to internal thoughts or feelings) and compartmentalized architecture (i.e., unwavering, segmented internal structures to separate motivation, memory, and thought processes with limited communication between areas).

Theoretical support for neurocognitive deficits in relation to dissociation may come from the dual representation theory of PTSD. Brewin, Dalgleish, and Joseph (1996) proposed that if an individual experiences a traumatic event after early childhood, their traumatic memories will separate into two types of memory. The first type is verbally accessible memory, which describes autobiographical memory that can be articulated and revised; this type of memory includes detailed information of sensory stimuli and physical reactions at the time of trauma. This type of memory can become more generalized over time. Information in verbally accessible memory is continually recalled, which reinforces and potentially exaggerates elements, yet impaired recall may exist for the information less commonly accessed. The second type of memory is situationally accessible memory, which refers to memory that is automatically retrieved in situations with context (internal or external) that resemble the traumatic event; this
type of memory is related to dissociative memories or flashbacks. The details of both verbally and situationally accessible memories are theorized to bias cognitive processes as the information in both types of memory can create attentional and perceptual biases toward potentially threatening information that resembles the traumatic event. People with PTSD who have not yet emotionally processed and integrated their traumatic experience are more likely to experience heightened emotions only when their situational accessible memory is activated. These individuals are also theorized to be more likely to avoid any stimuli that resembles their trauma.

Thus, there are two components for the theoretical rationale for this study. The first is that personality disorders manifest primitive defense mechanisms on an intrapsychic level. The maintenance of personality disorders relies on defense mechanisms that involve fantasy or denial of reality for information that contradicts the established structure of their internal architecture. These techniques may easily translate into derealization, depersonalization, or absorption. Additionally, the dual-representation theory of PTSD suggests that after a traumatic event, two types of memory are created, but if these memories are not integrated and processed, then neurocognitive deficits may occur. Specifically, an attentional and perceptual bias to trauma-related information, as well as an avoidance toward processing trauma-related stimuli. Therefore, it is assumed that personality disorders will be associated with dissociative defense mechanisms. Neurocognitive dysfunction is also expected to be related to dissociation, as dissociation suggests an avoidance toward processing trauma-related information, and individuals with unintegrated traumatic memories are likely to demonstrate attentional and perceptual biases toward trauma-related stimuli. This would likely result in attentional, perceptual,
and memory deficits as these individuals would be biased toward information that they are simultaneously trying to avoid.

**Hypotheses**

As noted previously, there have been relatively few studies that have explored the relationship between dissociation (peritraumatic and trait) and personality disorders. It is theorized that due to the significant correlation between peritraumatic and trait dissociation \( r(19) = .61, p < .001 \), any relationships found for one type of dissociation will also be found with the other (Ebner-Priemer et al., 2005). As there is a high comorbidity between personality disorders (Shiner, 2009), the general hypothesis for the present study is that there will be a moderate to strong positive association between peritraumatic dissociation and all 10 personality disorders \( (H_1) \). It is also hypothesized that there will be a moderate to strong positive association between trait dissociation and all 10 personality disorders \( (H_2) \). It is hypothesized that this relationship will exist for all Cluster A (paranoid, schizoid, and schizotypal), Cluster B (borderline, antisocial, histrionic, and narcissistic), and Cluster C (avoidant, dependent, and obsessive-compulsive) personality disorders.

As noted earlier, research has supported that clinically significant dissociation (peritraumatic and trait) has been found in individuals with schizoid, schizotypal, antisocial, and borderline personality disorders; therefore, it is hypothesized that this relationship will occur in the present study as well. Based on research supporting increased usage of primitive defense mechanisms in Cluster B personality disorders (Cramer, 1999), along with a positive relationship between peculiar perceptions and beliefs with dissociative symptoms and absorption (Berenbaum et al., 2008), it is
hypothesized that those with paranoid, histrionic, and narcissistic personality disorders will also demonstrate a higher likelihood of experiencing dissociative symptoms. Therefore, the next seven hypotheses are that peritraumatic dissociation will be moderately ($r \geq .30$) to strongly ($r \geq .50$) positively correlated with paranoid (PPD) ($H_3$), schizoid (SPD) ($H_4$), schizotypal (STPD) ($H_5$), antisocial (ASPD) ($H_6$), borderline (BPD) ($H_7$), histrionic (HPD) ($H_8$), and narcissistic (NPD) ($H_9$) personality disorders.

Similarly, the following seven hypotheses are that trait dissociation will also be moderately ($r \geq .30$) to strongly ($r \geq .50$) positively correlated with paranoid ($H_{10}$), schizoid ($H_{11}$), schizotypal ($H_{12}$), antisocial ($H_{13}$), borderline ($H_{14}$), histrionic ($H_{15}$), and narcissistic ($H_{16}$) personality disorders.

Despite the lack of readily available research with the Cluster C personality disorders, due to the connection between personality disorders, high neuroticism, absorption, and dissociation, along with Millon’s theory (2011) of the intrapsychic defense mechanisms of personality disorders, it is hypothesized that Cluster C personality disorders will also positively correlate with both peritraumatic and trait dissociation. Thus, the next three hypotheses are that peritraumatic dissociation will be moderately to strongly positively correlated with avoidant (AVPD) ($H_{17}$), dependent (DPD) ($H_{18}$), and obsessive-compulsive (OCPD) ($H_{19}$) personality disorders. Trait dissociation is also hypothesized to be moderately to strongly positively correlated with avoidant ($H_{20}$), dependent ($H_{21}$), and obsessive-compulsive ($H_{22}$) personality disorders. Finally, it is hypothesized, based on the literature reviewed previously, that peritraumatic ($H_{23}$) and trait ($H_{24}$) dissociation will be moderately ($r \geq .30$) to strongly ($r \geq .50$) positively correlated with self-reported cognitive dysfunction, more specifically, the five domains of
criteria for neurocognitive disorder in the *DSM-5* (i.e., attention, executive function, learning and memory, language, and perceptual-motor abilities). PTSD will be controlled for in the analyses to provide support for a relationship between dissociation, personality disorders, and neurocognitive disorder over and above PTSD symptoms.
CHAPTER II

METHOD

Participants

A total of 240 trauma-exposed adult participants (18 years and older) were recruited on Amazon’s Mechanical Turk (MTurk) and rewarded $4.00 for completion of the study. Participants who failed attention checks or did not meet Criterion A were excluded from analyses, leaving a total of 93 adult participants (32 men, 60 women, 1 non-binary). Participants identified predominately as White (72%; 11.8% Black, 10.8% Asian, 1.1% American Indian or Alaska Native, 4.3% other), married (47.3%; 38.7% never married, 9.7% divorced, 3.2% separated, 1.1% widowed), employed full-time (65.6%; 17.2% part-time, 5.4% unemployed not seeking work, 4.3% unemployed seeking work, 3.2% retired, 2.2% student, 2.2% disabled), and obtained their bachelor’s degree (40.9%; 29% some college, 11.8% graduate degree, 9.7% high school degree or GED, 7.5% associate degree, 1.1% less than high school degree). Most participants reported their age as between 25- and 34-years-old (43%; 3.2% 18-24, 29% 35-44, 15.1% 45-54, 8.6% 55-64, 1.1% 65 and older). Participants were required to be a United States citizen with a MTurk approval rating of 95% or higher and a minimum of 500 approved studies to participate. MTurk assigns only case numbers to participants to protect anonymity.

Several mechanisms were implemented to eliminate bot responses. Participants were required to have a minimum of 500 studies approved by other researchers. Geolocation detection on Qualtrics noted IP addresses to prevent multiple responses from
the same IP address and immediately redirected anyone with an IP address outside of the U.S. to the end of the study. An open-ended response option eliminated the remainder of bot responses, as bots tended to provide responses unrelated to the question (e.g., the definition of PTSD or motor vehicle accident statistics were provided as responses for a description of their worst personal trauma); these responses were manually deleted. Attentional checks were also integrated throughout the study to assess for random responding and exclude data if an attention check was failed.

**Materials**

**Brief Trauma Questionnaire (BTQ)**

The BTQ (Schnurr et al., 1999) is a 10-item, self-report questionnaire used to assess for *DSM-5* Criterion A for PTSD. Criterion A exposure is determined by answering “yes” to at least one of the items. The BTQ was found to have an interrater reliability higher than .70 for all traumatic events, excluding “other” life-threatening events, meeting both A.1 and A.2 criteria, with a test-retest reliability of .96 for CAPS current PTSD and .99 for CAPS lifetime PTSD severity (Schnurr, Spiro, Vielhauer, Findler, & Hamblen, 2002).

**PTSD Checklist for DSM-5 (PCL-5) – Extended Criterion A**

The PCL-5 - Extended Criterion A (Weathers et al., 2013) includes a 20-item, self-report questionnaire used to measure 20 PTSD symptoms found in the *DSM-5*, along with five additional items used to provide information on details surrounding the responder’s worst traumatic event. The rating scale ranges from 0 (*Not at all*) to 4 (*Extremely*). The PCL-5 can be used to assess severity of PTSD symptom clusters by totaling item scores relevant to a specific cluster (e.g., items 1-5 for cluster B, 6-7 for
cluster C, 8-14 for cluster D, and 15-20 for cluster E). An endorsed PTSD symptom relevant for diagnosis is defined as an item with a rating of two or above, with a cut-point score of 33 on the *PCL-5* suggesting pathology. In two separate studies, the *PCL-5* was found to have an internal consistency of .94 and .95, respectively, with a test-retest reliability of .82 (Blevins, Weathers, Davis, Witte, & Domino, 2015).

### Dissociative Experiences Scale (DES)

The DES (Bernstein & Putnam, 1986) is a 28-item, self-report questionnaire used to measure trait dissociation symptoms. Dissociation is rated in increments of 10%, ranging from 0% (*Never*) to 100% (*Always*). A DES score of 45 or greater is considered pathological and indicative of a possible dissociative disorder. The internal consistency of the DES was found to be .95, with a test-retest reliability of .93 (Frischholz et al., 1990).

### Peritraumatic Dissociation Experiences Questionnaire (PDEQ)

The PDEQ (Marmar et al., 1997) is a 10-item, self-report, Likert-type questionnaire that ranges from 0 (*Not at all true*) to 5 (*Extremely true*). This test measures the level of dissociation experienced during and shortly after a traumatic event. Clinically significant dissociation is classified as a total score of 15 or above. Tested with two samples, the PDEQ was found to have an internal consistency of .79 and .78, with a test-retest reliability of .72 (Birmes et al., 2005).

### Coolidge Axis II Inventory (CATI)

The CATI (Coolidge, 1984, 2013; Coolidge & Merwin, 1992) is a 250-item questionnaire in which participants self-report symptoms using a four-point Likert-type scale (1 = *Strongly false* to 4 = *Strongly true*). The CATI assesses symptom criteria of 14
personality disorders found in the last three *DSM* editions, neurocognitive disorder (defined in the *DSM-5*), and other major mood disorders. The CATI also incorporates questions to screen for random responding (three items) and excessive denial or malingering (97 items). The questions testing for random responding should be rated by a majority of the population as *Strongly false* (e.g., “I was a member of the French Foreign Legion”). For the denial-malingering scale, extremely low scores (below 140) suggest denial of obvious pathology and extremely high scores (above 230) suggest malingering. In a recent study by Coolidge (2013), the median internal validity of the 14 personality disorders scales was $\alpha = .76$, which ranged from $\alpha = .68$ (obsessive-compulsive) to $\alpha = .87$ (dependent), and a mean test-retest reliability of $r = .90$. The median concurrent validity between the CATI and the Millon Clinical Multiaxial Inventory-II has been reported at $r = .58$ (Coolidge & Merwin, 1992).

**Procedures**

Participants logged onto MTurk and accepted the HIT for the study. They were asked if they have experienced a stressful or traumatic life event where they believed their life, or the life of a loved one, was in danger, or they were at risk of serious injury. They were instructed that if the answer was yes, to continue in the study by clicking a link to the Qualtrics website. If their answer was no, they were instructed to immediately return the HIT and exit the study. Qualified participants then completed a consent form, demographics information, BTQ, PCL-5 - Extended Criterion A, DES, PDEQ to measure their dissociation levels during the time of their worst traumatic event (identified in the PCL-5 - Extended Criterion A), and CATI. The final page provided participants with their unique completion code to receive credit for their participation.
**Data Analysis**

Two multiple regressions analyzed the relationship between all 10 personality disorders with dissociation (peritraumatic with PDEQ scores and trait with DES scores) to test $H_1$ and $H_2$. For $H_3$ through $H_{24}$, a partial correlation analyzed the relationships between PDEQ scores, DES scores, and overall scores on each of the personality disorder scales and the neurocognitive disorder scale, while controlling for PTSD symptoms (PCL-5 scores) to assess for the contribution of dissociation over and above the contribution of PTSD symptoms. Partial correlations were selected for analyses as there was a possibility that personality disorder subscales would be highly intercorrelated. Nathans, Oswald, and Nimon (2012) advised against interpreting multiple regression results by focusing only on beta weights if the predictor variables are correlated as the variable with the strongest prediction value will be boosted, and any variance shared with the strongest predictor will be removed, therefore lowering the predictive value of the other variables. They suggested that correlations between a dependent variable (DV) and an individual independent variable (IV) be considered, along with the standardized beta coefficients. One-way analysis of variances (ANOVA) were also performed to assess whether gender differences and trauma type significantly affected scores for peritraumatic dissociation, trait dissociation, and PTSD.

**Additional Analyses**

After the initial analyses were conducted, additional analyses were performed to explore potential explanations for insignificant findings. A partial correlation was performed for all 10 personality disorders with the absorption and amnesia/depersonalization subscales of the DES, controlling for PTSD symptoms, to
assess whether the personality disorders that may not have been significant with trait
dissociation (DES total score) were significant with either of the subscales. A Pearson
correlation was performed for SPD, trait dissociation, and PTSD.
CHAPTER III

RESULTS

Descriptive statistics of the personality disorders scales, DES scores, PDEQ scores, and PCL-5 scores were calculated (see Table 1). T-scores were calculated for each of the personality disorder scales. Scores of 60 or greater on the CATI subscales were considered abnormal. Psychopathology for the other subscales were indicated by PCL scores > 33 (for PTSD), PDEQ scores > 15 (for peritraumatic dissociation), and DES scores > 30 (for trait dissociation). This sample obtained abnormally high scores on the AVPD \((M = 61.06, SD = 12.51)\) and SPD \((M = 63.58, SD = 13.86)\) subscales. They also reported abnormally high scores for peritraumatic dissociation \((M = 28.55, SD = 9.60)\), trait dissociation \((M = 48.66, SD = 37.74)\), and PTSD \((M = 51.59, SD = 17.65)\).

Table 1

<table>
<thead>
<tr>
<th>Participant Characteristics</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
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<td>17.65</td>
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*Note.* Highlight indicates the mean score suggests psychopathology.
Two multiple regression analyses were performed. Most personality disorders were moderately to strongly correlated with each other (see Table 2).

Table 2

Correlation Matrix of Personality Disorders

<table>
<thead>
<tr>
<th></th>
<th>BPD</th>
<th>DPD</th>
<th>HPD</th>
<th>NPD</th>
<th>OCPD</th>
<th>PPD</th>
<th>STPD</th>
<th>SPD</th>
<th>ASPD</th>
<th>AVPD</th>
<th>ND</th>
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<td>BPD</td>
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<td>.67</td>
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<td>.42</td>
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<td>.34</td>
<td>.09</td>
<td>.69</td>
<td>.73</td>
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<td>.01</td>
<td>.07</td>
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<td>.27</td>
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<td>.76</td>
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<td>.35</td>
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<td>.53</td>
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<tr>
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<td>1.00</td>
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<td>.71</td>
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<tr>
<td>SPD</td>
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<td>.34</td>
<td>-.32</td>
<td>.06</td>
<td>.66</td>
<td>.68</td>
<td>.71</td>
<td>1.00</td>
<td>.23</td>
<td>.66</td>
<td>.46</td>
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<tr>
<td>ASPD</td>
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<td>.09</td>
<td>.27</td>
<td>.38</td>
<td>.18</td>
<td>.35</td>
<td>.33</td>
<td>.23</td>
<td>.100</td>
<td>.04</td>
<td>.37</td>
</tr>
<tr>
<td>AVPD</td>
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<td>.69</td>
<td>-.14</td>
<td>.16</td>
<td>.68</td>
<td>.65</td>
<td>.65</td>
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<td>.04</td>
<td>1.00</td>
<td>.54</td>
</tr>
<tr>
<td>ND</td>
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<td>.71</td>
<td>.46</td>
<td>.37</td>
<td>.54</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Note. Values in matrix indicate correlation between personality disorders. Values strengths are moderate if ≥ .30, strong if ≥ .50, and perfect if ≥ 1.00.

For the first multiple regression, peritraumatic dissociation (PDEQ) served as the DV and the 10 CATI personality disorder scales served as the predictor variables (IVs). The multiple regression was significant, $F(10, 82) = 2.79$, $R = .50$, $R^2 = .25$, adj. $R^2 = .16$, $p = .005$. There was only one standardized beta coefficient that approached significance: STPD ($\beta = .34$, $t(82) = 1.80$, $p = .076$) (see Table 3).

For the second multiple regression, trait dissociation (DES) served as the DV and the 10 CATI personality disorder scales served as the IVs. This multiple regression was also significant, $F(10, 82) = 6.01$, $R = .65$, $R^2 = .42$, adj. $R^2 = .35$, $p < .001$. Two standard beta coefficients were significant: BPD ($\beta = .50$, $t(82) = 2.80$, $p = .006$) and STPD ($\beta = .39$, $t(82) = 2.37$, $p = .02$) (see Table 4).
### Table 3

**Multiple Regression of Peritraumatic Dissociation and Personality Disorders**

<table>
<thead>
<tr>
<th></th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
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<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
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<td>(Constant)</td>
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<td>ASPD</td>
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<tr>
<td>AVPD</td>
<td>.08</td>
<td>.17</td>
</tr>
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<td>BPD</td>
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<td>.17</td>
</tr>
<tr>
<td>DPD</td>
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<td>.15</td>
</tr>
<tr>
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<td>.17</td>
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<tr>
<td>NPD</td>
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<td>.15</td>
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<tr>
<td>OCPD</td>
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<td>.14</td>
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<td>PPD</td>
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<td>.15</td>
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<tr>
<td>STPD</td>
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<td>.14</td>
</tr>
<tr>
<td>SPD</td>
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<td>.14</td>
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</table>

*Note. Significance set at p < .05.*

### Table 4

**Multiple Regression of Trait Dissociation and Personality Disorders**

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<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
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</thead>
<tbody>
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<td></td>
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<td>.60</td>
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<td>.58</td>
</tr>
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<tr>
<td>HPD</td>
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<td>NPD</td>
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<tr>
<td>OCPD</td>
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<td>.50</td>
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<tr>
<td>PPD</td>
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<tr>
<td>STPD</td>
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<td>.47</td>
</tr>
<tr>
<td>SPD</td>
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</table>

*Note. Yellow highlight indicates significance at p < .05.*
Partial correlations were also performed between dissociation (trait and state), all 10 personality disorders, and neurocognitive disorder, controlling for PTSD.

Peritraumatic dissociation was significantly positively correlated with BPD \( r(90) = .27, p = .009 \), DPD \( r(90) = .24, p = .022 \), HPD \( r(90) = .21, p = .048 \), STPD \( r(90) = .30, p = .004 \), and ND \( r(90) = .28, p = .008 \) (see Table 5).

Table 5

**Partial Correlation between Peritraumatic Dissociation, Personality Disorders, and ND**

<table>
<thead>
<tr>
<th></th>
<th>BPD</th>
<th>DPD</th>
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<th>NPD</th>
<th>OCPD</th>
<th>PPD</th>
<th>STPD</th>
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<th>ASPD</th>
<th>AVPD</th>
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<td>.09</td>
<td>.15</td>
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<td>.28</td>
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<tr>
<td>Sig. 2-tailed</td>
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<td>.048</td>
<td>.144</td>
<td>.244</td>
<td>.236</td>
<td>.004</td>
<td>.406</td>
<td>.148</td>
<td>.104</td>
<td>.008</td>
</tr>
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<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
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<td>90</td>
<td>90</td>
<td>90</td>
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</tr>
</tbody>
</table>

*Note.* Yellow highlight indicates significance at \( p < .05 \). Orange highlight indicates moderate strength \( r \geq .30 \) with significance at \( p < .05 \).

Trait dissociation was significantly positively correlated with BPD \( r(90) = .43, p < .001 \), DPD \( r(90) = .29, p = .005 \), HPD \( r(90) = .27, p = .008 \), NPD \( r(90) = .24, p = .02 \), PPD \( r(90) = .22, p = .035 \), STPD \( r(90) = .40, p < .001 \), ASPD \( r(90) = .25, p = .015 \), and ND \( r(90) = .45, p < .001 \) (see Table 6).

Table 6

**Partial Correlation between Trait Dissociation, Personality Disorders, and ND**

<table>
<thead>
<tr>
<th></th>
<th>BPD</th>
<th>DPD</th>
<th>HPD</th>
<th>NPD</th>
<th>OCPD</th>
<th>PPD</th>
<th>STPD</th>
<th>SPD</th>
<th>ASPD</th>
<th>AVPD</th>
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<td>.008</td>
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</table>

*Note.* Yellow highlight indicates significance at \( p < .05 \). Orange highlight indicates moderate \( r \geq .30 \) to strong \( r \geq .50 \) strength with significance at \( p < .05 \).
A one-way ANOVA was performed between gender (DV), peritraumatic dissociation (IV1), trait dissociation (IV2), and PTSD (IV3). The non-binary participant was excluded from analyses as the non-binary sample size was too small ($N = 1$). There were no significant differences between gender and peritraumatic dissociation, $F(1, 90) = 1.17, p = .281$, trait dissociation, $F(1, 90) = 0.01, p = .935$, or PTSD symptomatology, $F(1, 90) = 0.23, p = .630$, ns (see Table 7). Effect sizes were also small for gender with peritraumatic dissociation ($\eta^2 = 0.01$), trait dissociation ($\eta^2 = 0.00$), and PTSD ($\eta^2 = 0.00$).

Table 7

One-way ANOVA for Gender with Peritraumatic Dissociation, Trait Dissociation, and PTSD

<table>
<thead>
<tr>
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<th>Std. Deviation</th>
<th>Std. Error</th>
</tr>
</thead>
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<td>1.30</td>
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<tr>
<td>Trait Dissociation</td>
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<td>Total</td>
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</table>

A one-way ANOVA was also performed between trauma type (DV), peritraumatic dissociation (IV1), trait dissociation (IV2), and PTSD (IV3). Trauma type was grouped into SA (sexual assault in adulthood), PA (physical assault in adulthood),
CA (childhood abuse), MVA (motor vehicle accident), medical, natural disaster, suicide, combat, and terrorist attack. Suicide ($N = 7$), combat ($N = 1$), and terrorist attack ($N = 3$) traumas were excluded from analyses as their sample sizes were too small. There were no significant differences between trauma type with peritraumatic dissociation, $F(5, 76) = 0.48, p = .792$, trait dissociation, $F(5, 76) = 1.71, p = .142$, and PTSD symptoms, $F(5, 76) = 1.61, p = .168$, ns (see Tables 8, 9, and 10). Effect sizes were small for trauma type with peritraumatic dissociation ($\eta^2 = 0.03$), medium for trait dissociation ($\eta^2 = 0.10$), and medium for PTSD ($\eta^2 = 0.10$).

Table 8

One-way ANOVA for Trauma Type and Peritraumatic Dissociation

<table>
<thead>
<tr>
<th>Peritraumatic Dissociation</th>
<th>Trauma Type</th>
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<th>Std. Error</th>
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<td>1.88</td>
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<tr>
<td></td>
<td>CA</td>
<td>10</td>
<td>27.20</td>
<td>12.17</td>
<td>3.85</td>
</tr>
<tr>
<td></td>
<td>MVA</td>
<td>19</td>
<td>26.89</td>
<td>9.33</td>
<td>2.14</td>
</tr>
<tr>
<td></td>
<td>Medical</td>
<td>10</td>
<td>28.70</td>
<td>10.06</td>
<td>3.18</td>
</tr>
<tr>
<td></td>
<td>Natural Disaster</td>
<td>10</td>
<td>25.50</td>
<td>9.32</td>
<td>2.95</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>82</td>
<td>28.18</td>
<td>9.37</td>
<td>1.03</td>
</tr>
</tbody>
</table>

Table 9

One-way ANOVA for Trauma Type and Trait Dissociation

<table>
<thead>
<tr>
<th>Trait Dissociation</th>
<th>Trauma Type</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SA</td>
<td>10</td>
<td>70.20</td>
<td>36.25</td>
<td>11.46</td>
</tr>
<tr>
<td></td>
<td>PA</td>
<td>23</td>
<td>46.65</td>
<td>36.85</td>
<td>7.68</td>
</tr>
<tr>
<td></td>
<td>CA</td>
<td>10</td>
<td>61.90</td>
<td>46.81</td>
<td>14.80</td>
</tr>
<tr>
<td></td>
<td>MVA</td>
<td>19</td>
<td>42.42</td>
<td>28.89</td>
<td>6.63</td>
</tr>
<tr>
<td></td>
<td>Medical</td>
<td>10</td>
<td>28.40</td>
<td>18.67</td>
<td>5.91</td>
</tr>
<tr>
<td></td>
<td>Natural Disaster</td>
<td>10</td>
<td>43.70</td>
<td>50.10</td>
<td>15.84</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>82</td>
<td>47.82</td>
<td>37.46</td>
<td>4.14</td>
</tr>
</tbody>
</table>
Table 10

One-way ANOVA for Trauma Type and PTSD

<table>
<thead>
<tr>
<th>PTSD Type</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA</td>
<td>10</td>
<td>57.40</td>
<td>13.64</td>
<td>4.31</td>
</tr>
<tr>
<td>PA</td>
<td>23</td>
<td>47.13</td>
<td>19.62</td>
<td>4.09</td>
</tr>
<tr>
<td>CA</td>
<td>10</td>
<td>61.30</td>
<td>20.30</td>
<td>6.42</td>
</tr>
<tr>
<td>MVA</td>
<td>19</td>
<td>48.00</td>
<td>17.19</td>
<td>3.94</td>
</tr>
<tr>
<td>Medical</td>
<td>10</td>
<td>55.60</td>
<td>20.23</td>
<td>6.40</td>
</tr>
<tr>
<td>Natural Disaster</td>
<td>10</td>
<td>44.80</td>
<td>13.01</td>
<td>4.11</td>
</tr>
<tr>
<td>Total</td>
<td>82</td>
<td>51.06</td>
<td>18.24</td>
<td>2.01</td>
</tr>
</tbody>
</table>

A partial correlation, controlling for PTSD, was performed on the absorption subscale, amnesia/depersonalization subscale, and all 10 personality disorders (see Table 11). BPD \( (r(90) = .31, p = .002) \), HPD \( (r(90) = .24, p = .02) \), NPD \( (r(90) = .23, p = .025) \), and STPD \( (r(90) = .28, p = .006) \) were all significantly positively correlated with the derealization subscale. ASPD \( (r(90) = .23, p = .03) \), AVPD \( (r(90) = .24, p = .022) \), BPD \( (r(90) = .47, p < .001) \), DPD \( (r(90) = .34, p = .001) \), HPD \( (r(90) = .23, p = .027) \), NPD \( (r(90) = .21, p = .043) \), OCPD \( (r(90) = .23, p = .027) \), PPD \( (r(90) = .25, p = .017) \), and STPD \( (r(90) = .42, p < .001) \) were all significantly positively correlated with the absorption subscale.

A Pearson correlation was performed for SPD, trait dissociation, and PTSD scores. SPD was significantly positively correlated with trait dissociation \( (r(90) = .22, p = .032) \), but was more significantly positively correlated with PTSD symptoms \( (r(90) = .29, p = .005) \) (see Table 12).
Table 11

Partial Correlations of Absorption and Derealization Subscales with Personality Disorders

<table>
<thead>
<tr>
<th>Derealization</th>
<th>ASPD</th>
<th>AVPD</th>
<th>BPD</th>
<th>DPD</th>
<th>HPD</th>
<th>NPD</th>
<th>OCPD</th>
<th>PPD</th>
<th>STPD</th>
<th>SPD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correlation</td>
<td>.20</td>
<td>.07</td>
<td>.31</td>
<td>.20</td>
<td>.24</td>
<td>.23</td>
<td>.10</td>
<td>.16</td>
<td>.28</td>
<td>.03</td>
</tr>
<tr>
<td>Sig. 2-tailed</td>
<td>.055</td>
<td>.508</td>
<td>.002</td>
<td>.060</td>
<td>.020</td>
<td>.025</td>
<td>.329</td>
<td>.135</td>
<td>.006</td>
<td>.768</td>
</tr>
<tr>
<td>df</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Absorption</th>
<th>ASPD</th>
<th>AVPD</th>
<th>BPD</th>
<th>DPD</th>
<th>HPD</th>
<th>NPD</th>
<th>OCPD</th>
<th>PPD</th>
<th>STPD</th>
<th>SPD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correlation</td>
<td>.23</td>
<td>.24</td>
<td>.47</td>
<td>.34</td>
<td>.23</td>
<td>.21</td>
<td>.23</td>
<td>.25</td>
<td>.42</td>
<td>.14</td>
</tr>
<tr>
<td>Sig. 2-tailed</td>
<td>.030</td>
<td>.022</td>
<td>.000</td>
<td>.001</td>
<td>.027</td>
<td>.043</td>
<td>.027</td>
<td>.017</td>
<td>.000</td>
<td>.197</td>
</tr>
<tr>
<td>df</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
</tr>
</tbody>
</table>

*Note.* Yellow highlight indicates significance at $p < .05$.

Table 12

Pearson Correlation between SPD, Trait Dissociation, and PTSD

<table>
<thead>
<tr>
<th>SPD</th>
<th>Trait Dissociation</th>
<th>PTSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson</td>
<td>.22</td>
<td>.29</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.032</td>
<td>.005</td>
</tr>
</tbody>
</table>

| N | 93 | 93 |

*Note.* Yellow highlight indicates significance at $p < .05$. 


CHAPTER IV

DISCUSSION

The aim of this study was to test whether there was a relationship between dissociation (peritraumatic and trait), personality disorders, and neurocognitive disorder in a sample of trauma-exposed adults. Previous studies have failed to assess dissociation in all 10 DSM-5 personality disorders. The multiple regression analyses revealed that both types of dissociation were significantly associated with the 10 personality disorders, thus supporting the first two hypotheses. However, at the individual level, only BPD and STPD significantly predicted trait dissociation. All 10 personality disorders and ND were positively correlated with both peritraumatic and trait dissociation when controlling for PTSD, but many did not reach significance. However, only STPD was moderately positively correlated with peritraumatic dissociation. Additionally, only BPD, STPD, and ND were moderately correlated with trait dissociation. Therefore, only six of the original 24 hypotheses were supported (see Table 13).

Table 13

Summary of Hypotheses

<table>
<thead>
<tr>
<th>PD</th>
<th>PPD</th>
<th>SPD</th>
<th>STPD</th>
<th>ASPD</th>
<th>BPD</th>
<th>HPD</th>
<th>NPD</th>
<th>AVPD</th>
<th>DPD</th>
<th>OCPD</th>
<th>ND</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peri. Diss.</td>
<td>H1</td>
<td>H3</td>
<td>H4</td>
<td>H5</td>
<td>H6</td>
<td>H7</td>
<td>H8</td>
<td>H9</td>
<td>H17</td>
<td>H18</td>
<td>H19</td>
</tr>
<tr>
<td>Trait Diss.</td>
<td>H2</td>
<td>H10</td>
<td>H11</td>
<td>H12</td>
<td>H13</td>
<td>H14</td>
<td>H15</td>
<td>H16</td>
<td>H20</td>
<td>H21</td>
<td>H22</td>
</tr>
</tbody>
</table>

Note. Orange highlight indicates the hypothesis was supported.
Although both multiple regressions assessing personality disorders and dissociation were significant overall, only a few personality disorders were significant as individual predictors. This lack of significance may be due to the high comorbidity found among personality disorders (Shiner, 2009). Therefore, it was necessary to assess the correlations for dissociation with each personality disorder, as suggested by Nathans, Oswald, and Nimon (2012).

Of the 10 personality disorders analyzed, only SPD, OCPD, and AVPD were not significantly correlated with trait dissociation. This may be due to the DES measuring two types of trait dissociation. Olsen, Clapp, Parra, and Beck (2013) noted that the DES can be separated into two factors: absorption and amnesia/depersonalization. It is possible that these personality disorders may only be strongly correlated with one of the two DES factors, thus preventing detection of significance for trait dissociation. When a partial correlation, controlling for PTSD, was performed on the absorption subscale, amnesia/depersonalization subscale, and these personality disorders, OCPD and AVPD were both significantly positively correlated with the absorption subscale, but not the amnesia/depersonalization subscale. Therefore, while OCPD and AVPD were not significantly correlated with trait dissociation, they were significantly correlated with the absorption subscale. On the other hand, SPD was not significantly correlated with the absorption or amnesia/depersonalization subscales. This may be due to SPD symptoms being more closely related to PTSD symptoms than trait dissociation. When a Pearson correlation was performed on SPD, trait dissociation, and PTSD scores, SPD was significantly positively correlated with trait dissociation, but was more significantly positively correlated with PTSD symptoms. SPD is characterized by restricted affect and
detachment from interpersonal relationships, which are also found in Criterion D of PTSD (D.6: detachment from others; D.7: inability to feel positive feelings) (American Psychiatric Association, 2013).

NPD, OCPD, PPD, SPD, ASPD, and AVPD were all not significantly correlated with peritraumatic dissociation. Overall, the personality disorders were more strongly correlated with trait dissociation than peritraumatic dissociation. A majority of the participant reported traumatic events occurred during adulthood, whereas personality disorders develop early on in life. It is possible that by the time the traumatic event occurred, participants were more capable of implementing a fight-or-flight response as opposed to a dissociative response.

There were no significant differences found between groups for gender or trauma type. The lack of significant differences between groups is contradictory to previous research (McDonald et al., 2013; Pacella et al., 2011). This may be due to a large discrepancy between genders in the present study (32 men compared to 60 women). Additionally, the groups may have been too small for both gender and trauma type to detect differences.

This study involves several limitations. First, the study was conducted on MTurk. All responses were self-reported, so they could not be verified. Although measures were established to prevent data collection from bots, there is always a possibility that bot data was included in analyses, as participants could not be physically identified. The study also only consisted of questionnaires, with a total of 358 questions, increasing the risk of fatigue. This was evidenced by over half of the sample being excluded from analyses due to failing attention checks. Participant fatigue may have also decreased quality of
responses. Although there was no evidence of an effect of gender on dissociation scores, women greatly outnumbered men in the present study. Additionally, participants reached only one standard deviation above the mean (of the average population) for two personality disorders (SPD and AVPD), so most of the participants did not report severe enough symptoms to meet the criteria for a personality disorder. Participants on average tended to score similarly to the general population on the personality disorder scales, but also scored extremely high on measures of dissociation and PTSD, which suggests a potential overreporting bias for trauma-related information. A final limitation that could be raised is the concern with multiple statistical comparisons and an increase in the family-wise error rate. However, the Bonferroni correction has been shown to dramatically increase the probability of the Type II error (i.e., retaining the null hypothesis when it is false) (Perneger, 1998).

This study also exhibited several strengths. The results from this study can provide information to fill in gaps in the literature, as other studies on dissociation and personality disorders often focus solely on BPD and fail to address the other DSM-5 personality disorders. PTSD as a potential confound was addressed and statistically controlled for, thus providing support of a correlation between dissociation, personality disorders, and neurocognitive disorder above and beyond the contribution of PTSD.

Suggestions for further research include utilizing a larger sample size, recruiting people who meet diagnostic criteria for these personality disorders, comparing trauma types, and conducting the study in person rather than over the Internet. Although the personality disorders were positively correlated with both types of dissociation, the sample size may have not been large enough to reach significance for certain disorders.
People who meet the diagnostic criteria for a personality disorder would likely have greater functional impairment than those who only exhibited traits of that personality disorder, so these individuals may exhibit different dissociative responses than a nonclinical population. The majority of participants in the present study reported traumatic events in adulthood, so it would be worthwhile to assess with a larger sample of childhood abuse survivors whether the age of exposure to a trauma (childhood versus adulthood) would make a difference with peritraumatic or trait dissociative tendencies.

Finally, administering the materials in person would assure that bots were not included in the study and allow the opportunity to conduct more extensive neurocognitive testing or a clinical interview to more confidently verify reported symptoms.

In conclusion, the present results suggest that dissociation is significantly positively correlated with personality disorders and neurocognitive disorder. This relationship was found in both trait and peritraumatic dissociation with several personality disorders, even when PTSD was considered. Further research is required to assess the full extent of the relationship between dissociation, personality disorders, and neurocognitive disorder.
REFERENCES


APPENDIX

IRB APPROVAL

University of Colorado
Colorado Springs

Institutional Review Board (IRB) for the Protection of Human Subjects

Date: 11/7/2018

IRB Review

IRB PROTOCOL NO.: 19-061
Protocol Title: The Relationship among Dissociation, Personality, and Neurocognitive Disorders
Principal Investigator: Megan Brausam
Faculty Advisor if Applicable: Frederick Coolidge
Application: New Application
Type of Review: Expedited
Risk Level: No more than Minimal Risk
Renewal Review Level (If changed from original approval) if Applicable: N/A No Change
This Protocol involves a Vulnerable Population: N/A (No Vulnerable Population)
Expires: 6 November 2019

*Note, if exempt: If there are no major changes in the research, protocol does not require review on a continuing basis by the IRB. In addition, the protocol may match more than one review category not listed.

Externally funded: ☐ No ☐ Yes

Thank you for submitting your Request for IRB Review. The protocol identified above has been reviewed according to the policies of this institution and the provisions of applicable federal regulations. The review category is noted above, along with the expiration date, if applicable.

Once human participant research has been approved, it is the Principal Investigator’s (PI) responsibility to report any changes in research activity related to the project:

- The PI must submit all protocol, recruitment, advertising, and consent form amendments/revisions to the IRB for approval.
- The PI must approve these changes prior to implementation.
- If you are a student, please note that it is required to include the IRB approval letter to the library when you submit the dissertation/thesis.
- The PI must promptly inform the IRB of all unanticipated serious adverse (within 24 hours). All unanticipated adverse events must be reported to the IRB within 1 week (see 45CFR46.103(b)(5)). Failure to comply with these federally mandated responsibilities may result in suspension or termination of the project.
- Renew study with the IRB at least 10 business days prior to expiration.
- Notify the IRB when the study is complete

If you have any questions, please contact Research Compliance Program Director in the Office of Sponsored Programs and Research Integrity at 719-255-3903 or irb@uccs.edu

Thank you for your concern about human subject protection issues, and good luck with your research.

Sincerely yours,

Zek Valkyrie
Zek Valkyrie, PhD
IRB Reviewer

www.uccs.edu/ospp
Version 1.18.2018