



The effects of dissociation on information processing for analogue trauma and neutral stimuli: A laboratory study

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ABSTRACT

This study investigated the effects of high and low levels of dissociation on information processing for analogue trauma and neutral stimuli. Fifty-four undergraduate females who reported high and low levels of trait dissociation were presented with two films, one depicting traumatic events, the other containing neutral material. Participants completed a divided attention task (yielding a proxy measure of attention), as well as explicit memory (free-recall) and implicit memory (word-stem completion) tasks for both films. Results indicated that the high DES group showed less attention and had poorer recall for the analogue trauma stimuli, relative to the neutral stimuli and the low DES group. These findings suggest that high levels of trait dissociation are associated with reductions in attention and memory for analogue trauma stimuli, relative to neutral stimuli and relative to low trait dissociation. Implications for the role of cognitive factors in the etiology of negative post-trauma responses are discussed.

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Historically, dissociation has featured prominently in writings about emotional adaptation following traumatic events. Pierre Janet was the first to highlight the importance of dissociation and to discuss how dissociation could be both adaptive and maladaptive as a means of coping with traumatic events. In particular, dissociation has been linked with fundamental alterations in attention and memory, which can be psychologically protective as well as damaging (Putnam, 1989). Recently, interest in dissociation has increased, as investigators have recognized that dissociation during a traumatic event (termed *peritraumatic dissociation*) possibly is associated with increased likelihood and severity of posttraumatic stress disorder symptoms, presumably owing to disturbances in cognitive processing during the traumatic event (e.g., Gershuny & Thayer, 1999; Ozer, Best, Lipsey, & Weiss, 2003). Although considerable attention has been paid to dissociation in general (Giesbrecht, Lynn, Lilienfeld, & Merckelback, 2008), there have been relatively few empirical tests of dissociation in the context of processing trauma cues.

Conceptually, there are many definitions of dissociation. Most of these definitions agree that dissociation is a type of cognitive processing that interferes with successful integration of material which normally is encoded under deliberate, conscious awareness (DePrince & Freyd, 2007). Beyond this basic tenant, theorists differ widely with respect to the amount of interference or integration that is necessary to meaningfully conceptualize trauma-related

dissociation. Although the wide range of definitions may be one reason that the literature on dissociation has reached widely disparate conclusions (Giesbrecht et al., 2008; Van der Hart, Nijenhuis, Steele, & Brown, 2004), it also is notable that dissociation has been conceptualized as a state, as a taxon, and as a trait (DePrince & Freyd, 2007). Peritraumatic dissociation is one example of state dissociation, which authors have suggested may reflect transient emotional processes such as fear of dying or panic (DePrince & Freyd, 2007). In contrast, taxon conceptualizations view dissociation as a pathological response to trauma, thus excluding non-pathological forms of dissociation such as day-dreaming (Waller, Putnam, & Carlson, 1996; Waller & Ross, 1997). The taxon view of dissociation assumes that trauma-induced forms of dissociation are distinct from more typical alterations in consciousness. Conceptualizations of dissociation as a trait suggest that dissociation is an individual difference factor, which exists on a continuum, shows stability across situations, and can be assessed using measures such as the Dissociative Experiences Scale (DES; Bernstein & Putnam, 1986). Despite considerable conceptual discussion of dissociation, there have been only a handful of empirical studies designed to examine whether dissociation as a trait influences how traumatic material is processed.

To date, most studies that have focused on information processing associated with dissociation have selected individuals based on high and low scores on the DES. Although some authors have suggested that the study of extreme groups is not an optimal research strategy (e.g., MacCallum, Zhang, Preacher, & Rucker, 2002), this approach has been used extensively to study the impact of dissociation on cognitive processes and represents an initial starting point in this literature. Freyd, Martorello, Alvarado, Hayes, and Christman

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(1998) selected participants who scored high and low in trait dissociation using the DES and administered a standard Stroop task to examine the effects of dissociation on attentional processing. High DES participants showed greater Stroop interference than low DES participants, indicating disruption in consciously controlled attention. DePrince and Freyd (1999) extended this study, adding emotional Stroop words reflecting a sexual assault (in order to utilize trauma-relevant stimuli) and examined selective versus divided attention, as well as memory recall. The results replicated Freyd et al. (1998) with respect to standard Stroop administration. Under selective attention instructions, high DES participants' reaction times were slower, relative to divided attention instructions, suggesting that individuals with higher levels of trait dissociation have greater experience with divided attention. As well, high DES participants recalled fewer assault-related words and more neutral words than the low DES group on a free-recall task, suggesting that the cognitive processes underlying dissociation may disrupt memory retrieval processes for trauma-related information. de Ruiter, Phaf, Veltman, Kok, and Van Dyck (2003) extended these findings, using an event-related potential paradigm. In this study, participants completed a letter detection task using both threatening and neutral words. As an additional stimulus feature, words were selected based on their affective valence, which was intended to divide participants' attention and facilitate dissociative processes. Their results suggest that individuals with high dissociation outperformed individuals with low dissociation on the letter detection task, despite the affective stimuli. These results provide evidence of enhanced attentional processing under conditions of both selected and divided attention for individuals high in dissociation. Noting that there may be a bidirectional association between attention and working memory (e.g., Downing, 2000), de Ruiter, Phaf, Elzinga, & Van Dyck (2004) examined verbal working memory span among college students scoring in the low, medium, and high ranges of trait dissociation. Their results indicated that individuals with high dissociation showed a significantly larger verbal working memory span relative to individuals scoring in the medium to low range of this trait. These authors suggest that high levels of dissociation may be associated with superior explicit memory retrieval processes, as a result of enhanced attentional processing.

Together, the above studies document that changes in attention and memory are associated with high levels of trait dissociation. More importantly, these findings suggest that attentional context may play a critical role in the conditions under which trauma-related information is encoded and recalled. The results from these studies however are mixed. With respect to attention, DePrince and Freyd (1999) found that high DES participants showed disruptions in processing under selective attention conditions, but enhanced processing under divided attention conditions when presented with trauma-relevant stimuli. In contrast, de Ruiter et al. (2003) found that high levels of dissociation facilitated both selective and divided attention for threatening stimuli, relative to low levels of dissociation. With respect to memory, one study suggests that individuals with high DES scores showed greater disruptions in retrieval processes for trauma-relevant words, relative to individuals with low DES scores (DePrince & Freyd, 1999), while a second study suggested that individuals with high DES scores have larger working memories in general, relative to individuals with low DES scores (de Ruiter et al., 2004). When considering these findings, it is possible that variation in these results reflects differences in methodology, suggesting that continued study of this issue is warranted.

From a theoretical standpoint, dual representation theory (Brewin, Dalgleish, & Joseph, 1996) provides a clear discussion of dissociation and its hypothesized effects on attention and memory for trauma stimuli. According to this theory, individuals who are prone to dissociation will prematurely inhibit the processing

of conceptual information (e.g., meaning) of a traumatic event. Incomplete processing is likely to lead to an increase in attentional biases and impaired conceptual memory for trauma material, which is reflective of efforts to avoid verbally accessible memories and images of the traumatic event. Furthermore, when conceptual information fails to be processed, information processing is limited to perceptual information such as sensory stimuli of the event. Dual representation theory postulates that dissociation should not interfere with the recall of perceptual trauma material (e.g., color, smell) because this information is implicitly encoded and automatically retrieved from situationally accessible memories. Thus, given that dissociation tends to be focused on deliberate efforts to avoid threatening material, it should not influence incidental learning, as is typically assessed via implicit memory.

As recognized previously, there is mixed empirical support for disturbances in attention and memory for emotion-based stimuli among individuals scoring high in trait dissociation (Giesbrecht et al., 2008). Unfortunately, most of this work has not used stimuli that evoke high levels of distress, as is relevant for understanding trauma exposure. This leaves unanswered questions about whether the observed changes in attention and memory that have been noted among individuals high in trait dissociation could be relevant when processing trauma material. When trauma-related stimuli are used, single-words have served as stimuli, which may be processed differently from multi-dimensional video or audio stimuli that unfold as a participant experiences them. Some authors further suggest that to effectively assess memory recall, information processing should be activated with stimuli that closely resemble real-life circumstances, as opposed to single-words (Radomsky & Rachman, 1999). Moreover, much of this literature has not considered the role of potential confounds, including prior trauma exposure and current negative mood states, as these variables may influence laboratory responding (Giesbrecht et al., 2008). In the present study, individuals who reported high and low levels of trait dissociation, based on their DES scores, were selected for participation. An extreme group design permitted comparability of the results with previously published studies. To examine the association between trait dissociation and information processing, participants were presented with analogue trauma and neutral film stimuli in a controlled laboratory environment. Previous studies have documented that film stimuli can successfully produce a large array of emotions and elicit responses that are typical to those seen in more naturalistic environments (Carleton, Sikorski, & Asmundson, 2010; Davies & Clark, 1998; Horowitz, 1975; Philippot, 1993). Within the trauma literature, several authors have relied on film stimuli as trauma analogs, noting that this manipulation can create intrusive and repetitive thoughts about the film and thus, mirror actual trauma exposure (e.g., Carleton et al., 2010; Davies & Clark, 1998; Horowitz, 1975). Previous work has illustrated that although this methodology creates distress, its effects are not long-lasting (Palyo, 2008), which makes it well suited for this type of study. In an effort to disentangle trauma exposure and current negative mood states from dissociative style, these variables served as covariates.

In accordance with related work in the anxiety disorders arena (Coles & Heimberg, 2002), both explicit and implicit memory were assessed. Explicit memory represents deliberate, effortful retrieval of information and often is assessed using free-recall or recognition tasks. Implicit memory represents retrieval of information that is learned incidentally as an indirect effect of experience and is assessed without directions for participants to try to retrieve information (Coles & Heimberg, 2002). The current study used a paradigm in which a priming stimuli that shared no physical features with the testing cue was used to assess implicit memory. This type of priming facilitates processing of conceptual features of the stimulus, as opposed to processing perceptual stimuli

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