
7 Adaptive Dissociation: Information Processing and Response to Betrayal

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7.1 ABSTRACT

Betrayal trauma theory (Freyd, 1996) proposes that dissociation is one mechanism by which traumatized individuals can be unaware of information that could threaten an important relationship. This chapter proposes a view of dissociation as a set of characteristics, including information processing tendencies, that can be organized into two separate but connected branches of symptoms. One branch consists of more transient, normative dissociative experiences without a trauma-based etiology, and the other consists of trauma-based dissociation that is less transient and more severe. Dissociative information processing includes differences in dividing and directing attention, as well as deficits in memory and metacognition. Suggestions are discussed for future research regarding dissociation as an adaptive information processing style.

Severe dissociation involves a profound fragmentation of the self. It affects and is affected by physiological responses, cognitions, and social interactions. As part of this fragmentation of self, dissociation can also be seen as a fragmented style of information processing, whether the information to be processed consists of stimuli in a

laboratory or emotions in everyday life. In this chapter we present the viewpoint that the dissociative information processing style is developed as an adaptation to trauma, and is a way to not know about potentially threatening information. A primary type of threatening information is that which threatens a necessary attachment relationship. Using betrayal trauma theory (Freyd, 1996, 2001), we explain in this chapter why it may be advantageous for a trauma victim's survival to dissociate information that threatens the attachment relationship. First we offer a framework for understanding the phenomenology of dissociation based on the idea of two branches.

7.2 A PROPOSED FRAMEWORK: TWO BRANCHES OF DISSOCIATION

How should dissociation be understood? Van der Hart and Dorahy (this volume) discuss “broad” and “narrow” conceptualizations of dissociation. Carlson, Yates, and Sroufe (this volume) also discuss the debate between the “continuum” and “taxon” views of dissociation. In defining the realm of dissociation and in resolving the seeming contradictions among these views, it may be helpful

to view dissociation as a set of characteristics, including information processing, that consists of two separate but connected branches. One branch, called Branch A dissociation for convenience, consists mainly of “normative” types of dissociative activity that are not caused by trauma. Examples include highway hypnosis, absorption, fantasy, and voluntary identity alteration (e.g., in religious rituals). These examples are more transient states of dissociation. The other branch, Branch B, has a trauma-based etiology. Examples of this type of dissociation include less transient occurrences such as depersonalization, identity confusion, and involuntary identity alteration. Branch B dissociation may itself consist of several sub-branches, and empirical research can help clarify the relationships among these concepts. For example, how are depersonalization symptoms related to amnesia symptoms? They have in common that they are more persistent than are Branch A symptoms and are regarded as more pathological. To what degree do they covary? Do they function in parallel or synergistically?

Dividing dissociation into branches in this manner is consistent with factor analyses of the Dissociative Experiences Scale (DES; Bernstein & Putnam, 1986) conducted by Ross and colleagues (Ross, Ellason, & Anderson, 1995; Ross, Joshi, & Currie, 1991). The analyses revealed three factors measured by the DES: absorption-imagination, activities of dissociated states, and depersonalization-derealization (Ross, et al., 1991; Ross, et al., 1995). Three similar factors emerged from a modified version of the DES (Goldberg, 1999). (For a review of factor analysis studies, see Holmes, Brown, Mansell, Fearon, Hunter, Frasquilho, et al., 2005.) In the current chapter’s framework, Branch A dissociation is measured by the first factor, absorption-imagination. The other two factors make up Branch B dissociation, and the existence of these differing factors argues for a possible further division of the Branch B symptoms.

The two classes of symptoms are not unrelated. For example, it is possible that the presence of Branch A symptoms may facilitate the development of Branch B symptoms in the face of sufficient trauma and betrayal. In general, dissociation is high in children and declines with age, in part due to the high percentage of time children spend in fantasy play and imaginary worlds. Macfie, Cicchetti, and Toth (2001) found that, during the preschool years, dissociation increased for maltreated children but did not increase for nonmaltreated children. Becker-Blease, Deater-Deckard, Eley, Freyd, Stevenson, and Plomin (2004) examined genetic and environmental effects on individual differences in dissociation in children and adolescents. This study was unique in that it

allowed analysis of how influences may change over time, because in one of their samples the children were reevaluated every year for four years. Their results showed that amount of dissociation was relatively stable from middle childhood through mid-adolescence. Although there is some support for the assertion that dissociation declines with age, this decline is probably driven largely by the presence or absence of abuse, and by whether hypnotizability is used as a measure of dissociation (see Putnam, 1997, for a review; cf. Macfie, Cicchetti, & Toth, 2001). The authors hypothesized that environmental factors reinforce sibling differentiation rather than sibling similarity, and that the normative dissociation measured in this study may constitute an underlying diathesis that affects how children respond to later trauma (Becker-Blease, Deater-Deckard, et al., 2004). They pointed out, however, that their methods were based on the assumption that all the siblings of the same family (full siblings, adopted siblings, MZ and DZ twins) had the same environment, an assumption that may be faulty in some circumstances. For normative dissociation at least, genetic factors may play a role in the development of dissociation. This theory is bolstered by the findings of Ogawa and colleagues (1997) that temperament measured at the age of three months was one of the best predictors of dissociation in adolescence.

It is possible that characteristics such as fantasy-proneness and absorption (Branch A symptoms) facilitate the development of dissociation later in life (Pekala, Angelini, & Kumar, 2001). Indeed, some early theorists in the field of dissociation proposed that multiple personalities cannot develop without a higher-than-usual inborn capacity to dissociate (see Braun & Sachs, 1985). However, very little research has assessed different types of dissociative experiences in young children and compared them longitudinally to types of symptoms experienced in adulthood. Future research should address the relationships between Branch A and Branch B symptoms.

It is currently unclear how somatoform dissociation fits into this classification system. Somatoform dissociation (see Nijenhuis, this volume) consists of physical symptoms, such as sensory losses, perceptual alterations, and pain, which are not well measured by the DES or similar instruments. However, somatoform dissociation has been shown to have a strong association with the psychological symptoms measured on the DES (Nijenhuis, Van Dyck, Spinhoven, Van der Hart, Chatrou, Vanderlinden, et al., 1999). The current measure of somatoform dissociation, the Somatoform Dissociation Questionnaire (Nijenhuis, Spinhoven, Van Dyck, Van der Hart, & Vanderlinden, 1996, 1997) was developed specifically on patients with

dissociative disorders, in order to measure the symptoms of those disorders. Therefore, it seems plausible that somatoform dissociation should be considered a branch of the Branch B symptoms, which are less transient and more disruptive than are the Branch A symptoms.

Brown (2002) also divided dissociation into two categories, which he called Type 1 and Type 2 dissociation. Brown's Type 2 dissociation is in some ways related to the Branch A symptoms discussed in this chapter, but Brown included certain kinds of more serious, trauma-based dissociation in this category. According to Brown (2002), Type 2 dissociation involves altered states of consciousness including derealization and out-of-body experiences, similar to the symptoms described as Branch A. However, Brown's Type 2 dissociation also involves peritraumatic dissociation. In keeping with the proposed Branch A definition, these dissociative symptoms are relatively transient. Similar to the framework of this chapter, Brown (2002) also combined somatoform symptoms with dissociative symptoms that are long-lasting and severe, including most of the dissociative disorders. Again, this classification is similar to the current description of Branch B symptoms. One difference is that Brown defined this category of dissociation by the presence of physical symptoms, in essence stating that the defining characteristic of dissociative disorders is physical, rather than psychological, symptoms. Although this focus is somewhat at odds with the conceptualization of dissociation outlined in this chapter, it is nevertheless interesting to note that Brown (2002) related dissociative disorders specifically to information processing.

The current conceptualization of dissociation as two branches of symptoms allows a place for both the broad and narrow views, and combines the continuum and the taxon views of dissociation. It also allows the field to study both severe dissociation, which is caused by trauma, and less severe dissociation, which can be either trauma-based or merely an altered state of consciousness. Further, it allows these two conceptualizations of dissociation to be separated from each other, so that researchers and clinicians can decide more easily where to focus their efforts.

7.3 DISSOCIATION AS AN INFORMATION PROCESSING STYLE

Dissociation has been defined as a jump between behavioral states, or as a special and distinct state of profound disconnection (Putnam, 1997). The American Psychiatric Association (2000) defines it as a separation between processes that are normally integrated, such as events,

emotions, and memories. What these definitions have in common is a separation of information. Whether dissociation is seen as a jump between states, as a special state, or as a functional (rather than physiological) separation, all definitions agree that dissociation allows memories, skills, affects, and other knowledge to be sectioned off and stored in less easily accessible ways. The state-dependent nature of dissociated memories is not disputed, although the motivations assumed to underlie this segmentation can vary by theory. Whereas psychoanalytic theory views dissociation as a primitive defense against being overwhelmed by unacceptable or unmanageable emotions, other theories (such as attachment theories, including betrayal trauma theory, discussed later) emphasize that the most salient danger is not that of being threatened by one's own emotions, but rather the very real danger of losing an essential attachment relationship and with it the physical and emotional care necessary for survival.

The phenomenon of state-dependent memory is well documented and does appear to play a role in memory functioning in dissociative identity disorder (DID). Context exerts a definite influence on what is remembered. For example, people in a depressed state tend to disproportionately report negative memories, while people in a manic episode inflate their recall of personal successes (Putnam, 1997). An intriguing application of this effect is Sahakyan and Kelley's (2002) theory of contextual change and amnesia in directed forgetting tasks. Sahakyan and Kelley proposed that memory performance in directed forgetting tasks can be explained by the participants in the "forget" group changing their internal context in between the lists. For participants in the "forget" group, they are told to forget List 1 but not List 2, so therefore the testing situation is different from the context of List 1, and more closely matches the context in which they saw List 2. For the "remember" group, there is no difference between the two lists and therefore the testing context is similar to the context of both lists, essentially creating one long list with a break in the middle.

Solid cognitive experimental evidence supports this theory, but Sahakyan and Kelley (2002) have not extended their results to the realm of memory for trauma. The conditions of child abuse that lead to dissociation are very similar to a directed forgetting task. It is easy to see how this situation, in conjunction with the contextual hypothesis of forgetting, can explain the dissociation of traumatic memory. In most of everyday life, the context is radically different from the context in which abuse occurs. Abuse usually happens only in private, in secret, often at night. Therefore the context mismatch makes it less likely that the victim will recall the abuse

until placed in a similar situation. The more effectively the encoding context is reinstated, the easier it is to recall the memories (Sahakyan & Kelley, 2002).

As compelling as this account is, however, state-dependent memory is not likely to be the main explanation for the patterns of amnesia seen in DID. Amnesia in DID tends to be more robust under recognition conditions than is forgetting caused by state-dependent memory, which usually only manifests under conditions of free recall (e.g., Bower, 1994). The amnesia seen in DID also tends to be much more severe than is state-dependent forgetting (Bower, 1994; Peters, Uytterlinde, Consemulder, & Van der Hart, 1998; Silberman, Putnam, Weingartner, Braun, & Post, 1985; Szostak, Lister, Eckardt, & Weingartner, 1994).

Studies conducted with nondiagnosed college student participants have shown some interesting results regarding the interactions of attention, memory, and dissociation. While it is debatable how well their results would generalize to actual memories and experiences of abuse, these studies provide an intriguing look at the advantages and cognitive processes of dissociation. Freyd, Martorello, Alvarado, Hayes, and Christman (1998) found that high dissociators showed greater Stroop interference but not overall reaction time slowing in a standard, selective attention Stroop task. The stimuli were all neutral words; the use of kinship terms had no effect on results. DePrince and Freyd (1999) found that performance on the Stroop task was related to the attentional demands of the task, such that high dissociators ($DES > 20$) performed worse in a selective attention task and better in a divided attention task relative to low dissociators ($DES < 10$). The high dissociators also recalled fewer sexual trauma words and more neutral words compared to the low dissociators. These results may indicate that at least nonpathological dissociation is a distinct style of information processing.

The results of DePrince and Freyd (1999) were partially replicated in a sample of four- and five-year-olds (Becker-Blease, Freyd, & Pears, 2004). The sample included 48 children with no reported abuse and 20 children with parent-reported abuse histories. In contrast to the findings of DePrince and Freyd, Becker-Blease and colleagues found that dissociation levels alone did not predict memory scores under either selective or divided attention conditions. However, the combination of abuse history and dissociation scores did predict memory performance. Eight children had both high dissociation scores and reported abuse, while 30 children had low dissociation scores and no reported abuse. Comparing these two groups, the same effect as was shown by DePrince and Freyd (1999) appeared: under divided attention

conditions, the high dissociators with abuse remembered fewer charged pictures than did the low dissociation/no abuse group (Becker-Blease, Freyd, & Pears, 2004). These findings provide further support for the idea that abuse may lead to a distinctive attention style that includes dissociation and memory differences.

Another study of 105 female college students also assessed dissociation and attentional direction (Waller, Quinton, & Watson, 1995). Participants were split at the median DES score into high and low dissociator groups. In a selective attention task with neutral and threatening words, the high dissociation group responded more slowly to the presence of threatening words than did the low dissociation group, although they perceived the words equally well (Waller, et al., 1995). This effect was mostly the result of high levels of absorption in the high dissociators, not of the presence of “pathological” dissociation, which is not surprising because participants with present or past DSM diagnoses of any kind were excluded from analysis.

Supporting the findings of DePrince and Freyd (1999), De Ruiter and colleagues (2003) found that high dissociators in a college population had an advantage in both selecting *and* dividing attention relative to low dissociators. In this study, nonspecific threat words, but not neutral words, helped only the high dissociators reduce reaction time in detecting a relevant characteristic of the words. Low dissociators did not show a reaction time benefit with negative emotional valence and overall performed worse than the high dissociators (De Ruiter, Phaf, Veltman, Kok, & Van Dyck, 2003). Like DePrince and Freyd, this study supports the assertion that divided attention is a situation in which high levels of dissociation are differentially adaptive.

High dissociators also showed slightly longer verbal working memory than low dissociators in another college sample (De Ruiter, Phaf, Elzinga, & Van Dyck, 2004). A difference of about half a word may be attributable to the effects of having a few very high or “pathological” dissociators in the high dissociation group; this advantage was more associated with identity confusion/amnesia than it was with absorption. In a smaller follow-up study, Veltman, De Ruiter, Rombouts, Lazeron, Barkhof, Van Dyck, and colleagues (2005) found that high dissociators performed better than low dissociators on two different working memory tasks. In addition, the high dissociators recruited relevant brain networks more highly during the tasks than did the low dissociators.

Further evidence of a distinct information processing style in clinical samples of DID participants comes from the work of Dorahy and colleagues, who assessed

cognitive inhibition. Cognitive inhibition is the extent to which distracting or irrelevant stimuli can be inhibited or ignored in order to free up attentional resources to focus on relevant stimuli. In an initial study assessing inhibitory functioning in DID with the use of neutral words as distracters, the participants with DID had slower reaction times compared to general population and psychiatric samples. The DID participants also showed weakened inhibitory functioning compared to the general population (Dorahy, Irwin, & Middleton, 2002). In contrast, two subsequent studies found that, when single numbers rather than words were used as distracters, the DID participants did *not* have lower inhibitory functioning than other groups. All the DID participants in these studies completed the experiments while in their host alters, which were disconnected from the emotions of traumatic memories. Unfortunately, neither of these two studies could determine whether the findings were affected by gender differences among the groups (Dorahy, Irwin, & Middleton, 2004; Dorahy, Middleton, & Irwin, 2004).

A final study did use comparison groups matched for gender, and attempted to explain the discrepancy in these three studies with regard to the presence or absence of deficits in cognitive inhibition in DID (Dorahy, Middleton, & Irwin, 2005). The authors hypothesized that the initial study using words as stimuli was a more anxiety-producing context for the DID participants than for the other groups, because some participants had reported that they were constantly on alert for triggering associations from the seemingly neutral words. This anxiety therefore reduced the DID participants' abilities to effectively filter distracting stimuli, but the single digits used in the other two studies did not present this problem. Therefore, the final study used a manipulation of numbers and words in order to vary the experimental context from neutral to negative. DID participants reported more anxiety in the negative context than did the depressed and general population control groups. DID participants showed reduced cognitive inhibition in the negative but not the neutral context, while for the other two groups the neutral and negative contexts did not affect performance. Furthermore, the DID participants also displayed an attentional bias that slowed their reactions to negative but not neutral words, and this result did not occur in the other two groups (Dorahy, et al., 2005). This experiment provided support for the theory that anxiety differentially affects high dissociators' abilities to process information.

A related line of research using different methodology also examined information processing in dissociation. In a directed forgetting paradigm, again using a college student sample, DePrince and Freyd (2001) found the same

pattern of memory results that they had found before, namely, high dissociators recalled fewer trauma and more neutral words when divided attention was required, compared with low dissociators. This pattern was true of the to-be-remembered (TBR) words that had been presented using the item method; there was no difference between high and low dissociators on memory for to-be-forgotten (TBF) words. The authors concluded that high levels of dissociation were helpful in blocking out traumatic information only in situations where participants could not ignore it. The same pattern of results regarding divided attention and dissociation was later replicated using the list method of directed forgetting (DePrince & Freyd, 2004). This interaction effect has also been analyzed elsewhere (see DePrince, Freyd, & Malle, 2007).

Results that seem to contradict this pattern came from two other directed forgetting experiments using the item method (Elzinga, De Beurs, Sergeant, Van Dyck, & Phaf, 2000). In the first experiment, 35 college students were split at the median DIS-Q score into two groups, labeled high and low dissociative groups. When presented with neutral words, the two groups had no significant difference in directed forgetting performance. In fact, using only the performance of the 15 lowest and highest dissociators, the high dissociators appeared to have a decrease in directed forgetting ability, being less able to forget the TBF words. A follow-up experiment included 43 college students, again split into high and low dissociators, as well as 14 patients with dissociative disorders. In this experiment, sexual words and anxiety words were added to the neutral words. Again, the patient group showed a decreased ability to forget the TBF words, especially words related to sex. The overall results showed that the high-dissociating students and the diagnosed patients outperformed the low-dissociating students on memory tests (Elzinga, et al., 2000). These experiments were performed under selective attention demands. Therefore the lack of benefit in high levels of dissociation from the first experiment is not surprising, as DePrince and Freyd only find these benefits under divided attention conditions. The other results are slightly more puzzling, however, and more careful control over and analysis of experimental conditions is needed in future research.

In a further examination of these effects, Elzinga and colleagues conducted a directed forgetting experiment within and across the alters of 12 patients with DID who could switch on demand (Elzinga, Phaf, Ardon, & Van Dyck, 2003). Stimuli were neutral and sexual trauma words. Consistent with participants' reports of inter-identity amnesia, they recalled more words when tested in the same alter who had read the words than

when tested across alters. Overall, the participants recalled more trauma words than neutral words, which is the normal finding under selective attention conditions. Also consistent with their previous research, the authors found that, when tested within an alter, there was a lack of forgetting for the TBF words. However, when tested across alters, directed forgetting functioned so that TBF words were recalled less frequently than TBR words. The authors suggested that switching alters is a major strategy that DID patients can use to block out unwanted information (Elzinga, et al., 2003).

Additional investigation into dissociation and memory processing has revealed that there may be fundamental differences in the way memory is organized in participants with DID. In one study (Barlow, under review), DID participants showed a decreased ability to answer detailed questions about a story containing fear, compared with a neutral story. This decrease did not appear in a student comparison group. The DID participants' ability to answer questions about the gist of the stories was unaffected by emotional valence. This pattern of results is consistent with the DID participants' verbal reports. They reported being more distracted during the fearful story and giving less attention to the details because they were either "spaced out," trying not to switch, actively switching, or having internal dialogue (Barlow, under review). Putnam (1994) suggested that during the switch process, participants' abilities to observe stimuli, to learn, and to form new memories are impaired.

Differences between implicit and explicit access systems have also been hypothesized to play a role in dissociation (Siegel, 1996; Van der Kolk & Fislser, 1995). Van der Kolk has proposed that a narrowing of awareness and the disabling of Broca's area are partially responsible for the difficulty of retrieving memories of trauma. As a result, traumatic memories are encoded without words and are difficult to access.

In a study with 30 DID participants, one-third of the participants reported some amnesia for childhood events that were nontraumatic but emotionally significant (Van der Hart, Bolt, & Van der Kolk, 2005). The DID participants not only reported the common finding of fragmented and sensory recall of traumatic memories, but, unexpectedly, they also reported having the same kind of fragmented and somatosensory memories for nontraumatic significant events. The authors suggested that a key feature of dissociation is a reduced integration of sensory information with autobiographical memory, possibly due to impaired hippocampal functioning (Van der Hart, et al., 2005).

7.4 THE DOMAIN OF DISSOCIATION: METACOGNITION

Dissociation includes many kinds of disruptions of the self (see Dell, this volume). Even common, voluntary forms of dissociation, such as fantasy, absorption, or meditation, involve a temporary removal of or change in the self. In the case of DID, the self is most highly fragmented. People with DID often exhibit a wide variety of confusing and seemingly bizarre physical, mental, and emotional symptoms (Putnam, 1989, provides an excellent overview of DID phenomenology). The five most prominent symptoms of DID are amnesia, depersonalization, derealization, alterations in identity, and identity confusion (APA, 2000; ISSD, 1997; Gleaves, May, & Cardeña, 2001; Steinberg, 2001). Patients with DID are highly polysymptomatic, presenting with almost every other disorder in the DSM. Because of this factor, they are often misdiagnosed and can spend years in unproductive treatment before receiving the correct diagnosis (e.g., Maldonado, Butler, & Spiegel, 1998; Ross, Norton, & Wozney, 1989).

Severe dissociation also involves deficits in metacognition, and these deficits complicate the assessment of amnesia. In addition to having absolute memory loss, people with DID also have a reduced ability to access or utilize the information they do have. Therefore, they honestly report amnesia for information that can be recalled by other parts of themselves than the one being tested, or information that is accessible by other testing methods than the one being used. One of the most frequently cited studies was conducted by Nissen, Ross, Willingham, MacKenzie, and Schacter (1988). In one participant with DID, mutually amnesic alters reported no transfer of information on explicit memory tests, although some of the implicit tests showed some "leakage" of information. The authors hypothesized that this pattern of results was due to differences in the stimuli. Material most likely to leak was stimuli that were interpretable without knowledge-based processing; material that did not leak required interpretation and gist for understanding.

In two studies, Eich, Macaulay, Loewenstein, and Dihle (1997a, 1997b) again found that, while there was no explicit transfer of knowledge between amnesic alters, there was some leakage of information when measured on tests that used priming, such as picture-fragment completion. Peters and colleagues (1998) examined the transfer of neutral information between amnesic alters in four participants with DID. Word list memory was assessed both explicitly, using free recall and recognition, and implicitly, using word stem completion. Contrary to

the authors' hypothesis, but in line with the findings of Nissen and colleagues (1988), there was no leakage of information between alters on the word stem completion task. On the explicit memory tests, evidence supported participants' reports of one-way amnesia, though one participant showed mixed results (Peters, et al., 1998).

A more recent study of information transfer in DID used a one-week delay to test memory for word lists in 21 DID participants that reported the presence of one-way amnesia between two of their alters (Huntjens, Postma, Peters, Woertman, & Van der Hart, 2003). The stimuli used in this experiment were all emotionally neutral. Overall, the performance of the DID participants was equivalent to that of control participants. When exposed to lists of words that shared categories and therefore caused interference, the DID participants were no better than other participants at resisting the memory interference or at discriminating lists. On explicit memory tests of recall and recognition, however, the DID participants did not perform as well as the controls (Huntjens, et al., 2003).

A similar pattern of results was found in a study of 40 nondiagnosed college students (Kindt & Van den Hout, 2003). The more participants dissociated while watching an aversive film, the more fragmented were their reported memories of the film. However, on cued recall and recognition tests, the high-dissociating participants performed no worse than those participants who did not dissociate while watching the film. The authors suggested that amnesia related to dissociation is largely a phenomenon of meta-memory, rather than of "objective" memory performance (Kindt & Van den Hout, 2003).

7.5 WHAT LEADS TO HIGH TRAIT DISSOCIATION?

Models of dissociation continue to be revised as researchers become increasingly aware of the prevalence of trauma and of its effects. This section discusses the pathway to high dissociation according to betrayal trauma theory: trauma and the importance of human attachment. Though there is some evidence that other factors, such as genetics, may play a role in the development of dissociation (e.g., Becker-Blease, Deater-Deckard, et al., 2004), this section will focus on interpersonal betrayal.

7.6 TRAUMA

Severe dissociative disorders are almost always the result of childhood trauma (e.g., Maldonado, et al., 1998; Putnam, 1995, 1996). Numerous correlational studies

have confirmed a high incidence of childhood trauma—sexual, physical, and probably emotional abuse—in adults and children with dissociative disorders or very high levels of dissociation (e.g., Bowman, Blix, & Coons, 1985; Chu & Dill, 1990; Draijer & Langeland, 1999; Kisiel & Lyons, 2001; Loewenstein, 1994; Nijenhuis, Spinhoven, Van Dyck, Van der Hart, & Vanderlinden, 1998; Ross, et al., 1989; Zlotnick, Begin, Shea, Pearlstein, Simpson, & Costello, 1994; Zlotnick, Shea, Pearlstein, Begin, Simpson, & Costello, 1996). Many of these studies further find that an earlier age of trauma, more severe trauma, and more perpetrators also increase the risk of developing a dissociative disorder. It is difficult to know which aspect of trauma leads most specifically to dissociation, because many of the risk factors are confounded—for example, more severe and frequent trauma may begin at a younger age, involve more perpetrators and more force, and occur in a general atmosphere of family dysfunction (e.g., Putnam, 1996). It is probably the combination of several of these factors, rather than trauma alone, that causes impaired information processing and high levels of state dissociation (Briere, 2006).

7.7 DEVELOPMENT OF TRAUMATIC DISSOCIATION

7.7.1 MECHANISMS

The mechanisms by which trauma disrupts information processing and leads to dissociation are still under debate. High levels of trauma may result in an increased facility with divided attention (e.g., DePrince & Freyd, 1999). Intense psychological trauma may also constrain the functioning of neural networks by "cementing" just a few connections into a schema, which is a rigid pattern of connection strengths. This process leads to an inability to respond flexibly to situations, even when the trauma is no longer present (Li & Spiegel, 1992). Disorganized attachment also increases vulnerability to dissociative disorders, but is not in itself sufficient without additional trauma (Hesse & Main, 2000). Dissociative disorders emerge when defense mechanisms break down and attachment to a caregiver is massively activated, causing rapid switching of internal working models (IWMs) to occur. These incoherent and multiple IWMs only increase the feelings of fear and anxiety in the face of a new trauma, and ensure that further dissociation will occur (Liotti, 1999).

In a thorough examination of the effects of trauma on infants' brain development, Schore (2001) explained that abusive caregivers not only do not help infants learn to regulate their arousal, but they actively induce

dysregulation without repair capabilities. This situation results in wild alterations of the infant's biochemistry, with resulting damage to the developing brain. The orbitalfrontal cortex (OFC) develops substantially during the same years that attachment to a caregiver is being formed and emphasized, approximately age 10 to 12 months, with another period of rapid maturation between the ages of 6 and 9 years. This development aids in regulating emotions and their related states so that the individual experiences inner continuity across contexts, which is critical for the development of a coherent sense of self. Interactions with the caregiver are the primary input used to shape the development and abilities of the OFC. Relational trauma during this early period results in drastic pruning in the OFC and subsequent information processing that relies on the amygdala instead, leading to fearful states without cortical input. Infants therefore cannot learn to regulate their states effectively and soothe themselves. Because of damaged connections from the right orbitofrontal area to the left language areas, affective information is not effectively transferred into language for processing, leading to difficulty expressing emotions (Schore, 2001). In this case, the OFC prohibits the integration of different representations of the self into one coherent self. When different contexts arise, the OFC responds on the basis of the immediate environment, which triggers different conceptions of the self to be active, without taking into account all the other senses of self from other contexts (Forrest, 2001). Therefore, the child grows up practicing dissociation.

7.7.2 ATTACHMENT AND BETRAYAL TRAUMA THEORY

Freyd's (1996) betrayal trauma theory is based largely on attachment models. It starts from two basic premises: infants need attachment, and the social human species needs to avoid cheaters. As infants, humans are dependent on their caregivers not only for basic physical needs of food, warmth, and so on, but also for emotional needs of love and care. In most circumstances, this attachment is what enables infants to survive. In situations of distress, such as hunger or loneliness, infants will seek the parents to whom they are attached, for example by crying or motioning to be picked up. Parents become attached to their offspring and take care of them; in return, babies give back love and affection.

Like other social primates, humans also have a strong motivation to avoid being cheated or betrayed (see Freyd, 1996, for further discussion of "cheater detectors"). The most adaptive responses to being cheated are either to

confront the cheater or withdraw from further contact. Empowered individuals may do both.

When a young child is abused by a parent or caregiver, these two needs come into direct conflict. Withdrawing from or confronting the betrayer threatens survival in direct and indirect ways. Losing basic care may result in physical starvation, while losing or damaging the emotional care of the attachment relationship may result in emotional starvation. In this situation, it is more adaptive to not know about the trauma that is occurring. Therefore, the theory proposes, people become blind to betrayal to the extent that being aware of it would threaten a relationship in which they are dependent (Freyd, 1996).

Under this theory, the purpose of dissociation is not escape from pain, but the maintenance of the attachment relationship by not-knowing about information that would threaten it (Goldsmith, Barlow, & Freyd, 2004). The more important the relationship, the stronger the motivation to preserve it. Thus, abuse by a parent or other trusted caregiver is more likely to lead to amnesia and/or dissociation than is abuse by a stranger. Dissociation is therefore conceptualized as an adaptive survival response to a bad situation. Simultaneously, it may also be a maladaptive deficit in information processing that can make future revictimization more likely (DePrince & Freyd, in press).

Betrayal trauma theory is supported by empirical evidence that relationship to the perpetrator is related to rates of forgetting (e.g., Freyd, DePrince, & Zurbriggen, 2001), as well as by reports from people with DID that the betrayal by trusted family and caregivers was the part of the trauma that most disrupted their internal organization of self (Steele, 2002). This basis of dissociation is consistent with Liotti's (1999) conceptualization of how disorganized attachment leads to dissociative disorders. Further support for this theory can be found in Freyd's (1996) reanalysis of previous data, as well as in many recent studies of sexual abuse that assess closeness and betrayal (e.g., Chu & Dill, 1990; Schultz, Passmore, & Yoder, 2003). Sheiman (1999) reported that sexually abused participants who had memory loss for the abuse were more likely to dissociate and to have been abused by someone close to them, compared to sexually abused participants without memory loss.

7.8 ALTERNATE CONCEPTUALIZATIONS OF DISSOCIATION

Nijenhuis's theory of structural dissociation has gained prominence in recent years, partly because it provides testable hypotheses about dissociative responses to various situations. Nijenhuis and colleagues distinguish

between two possible kinds of states: the emotional personality, or EP, and the apparently normal personality, or ANP. EPs hold traumatic memory, often being stuck in the sensory experience of the memory and unaware of the passage of time (Nijenhuis, Van der Hart, & Steele, 2002). ANPs, in contrast, manage the tasks of daily life, such as working, and the functions of attachment and caretaking. They may be emotionally unconnected to, or amnesic for, past traumatic events (Nijenhuis & Van der Hart, 1999).

One benefit of this theory is that it can explain what appear to be opposite responses to threatening stimuli, depending on whether the personality being tested is an EP or an ANP. For example, ANPs seem to deal with threatening stimuli by averting their gaze, while EPs pay close attention to any potential threat; simulators cannot reproduce this pattern of results (cited in Nijenhuis, et al., 2002). The two types of systems evaluate memories and stimuli differently and may even become afraid of each other. Because these two systems are so different, it is difficult for integration to occur across them, particularly under conditions of neuroendocrine instability that are produced by chronic childhood stress and arousal. In fact, the activation of traumatic memories in an EP state can actually inhibit access to other kinds of memories (Nijenhuis & Van der Hart, 1999).

This theory explains the perpetuation and increase of dissociation, as the ANP is not equipped to deal with the emotional trauma held by the EP, and must therefore redissociate the traumatic memories and avoid anything that will trigger the emergence of the EP (Nijenhuis, et al., 2002). Further dissociation leads to even more deficits in integration. Nijenhuis and colleagues have also argued that structural dissociation is the key element that distinguishes true dissociation from related variations in consciousness that should not be considered in the taxonomy of dissociation (Van der Hart, Nijenhuis, Steele, & Brown, 2004).

Putnam's (1997) theory of discrete behavioral states is another theory that has been very influential. In brief, humans are born with the capacity for a few basic states (resting, dreaming, awake and alert, fussing, crying). These discrete states can be distinguished by patterns of affect, motor activity, spontaneous verbalization, heart rate, respiratory patterns, and attention. Later, development and experience contribute to the formation of more numerous and complex states. The infant's main task in the first few years of life is to acquire the ability to control his or her own behavioral state transitions. Parents play a crucial role in this process, teaching children to recognize and control their own emotional states, and

how to reestablish them if they are disrupted. Parents also help children to know which state is appropriate for various situations, and to integrate these various states across contexts so that a unified sense of self develops (Putnam, 1997).

Abuse disrupts these processes. It leads to the necessity of children having different senses of self for different situations, which they use in an attempt to control the state of their caregivers and not get hurt. The vital importance of attachment prevents children from disconnecting entirely from abusive caregivers, but at the same time children are left reliant on parents who are actively undermining their growth. When the caregiver does not help regulate transitions between states, metacognition is impaired and the child does not develop a unitary self (Forrest, 2001; Putnam, 1997); in fact, abusive, dissociative, or inconsistent parents force the child to alternate rapidly between various behavioral states. Under these circumstances, the child's development takes a serious departure from the usual route. Dissociative states arise in response to social and environmental cues, and the child's knowledge and skills are isolated into mutually inaccessible states that are not always available (Putnam, 1997).

7.9 STRENGTHS AND WEAKNESSES OF THE CURRENT TWO-BRANCH THEORY

This chapter's conceptualization of dissociation as two branches of symptoms allows a place for both the broad and narrow views, and combines the continuum and the taxon views of dissociation. It also allows the field to study both severe dissociation, which is caused by trauma, and less severe dissociation, which can be either trauma-based or merely an altered state of consciousness. Furthermore, it is consistent with existing factor analyses and with other theorists who have viewed dissociation as an alteration in information processing abilities. A potential weakness of this theory is that it may be overinclusive and may rest (implicitly or explicitly) on perceived etiology in order to separate symptoms. Much of the experimental evidence that supports dissociation as an adaptive style of information processing is based on measurements of dissociation that are one-dimensional. Most laboratory research has measured as a unitary construct, which may have affected the specificity, applicability, and generalizability of the results.

7.10 DIRECTIONS FOR FUTURE RESEARCH

Further research is necessary in order to determine how the various Branch A and Branch B symptoms fit together

as branches of a tree, much like the cladograms used in biology to represent how closely organisms are related to each other. Researchers should not only analyze results based on different dimensions of dissociation, but should include a dimensional approach in experimental design. Tasks should be designed to access and differentiate among various components of dissociation. For example, can laboratory tasks be constructed that induce depersonalization in participants, independent of derealization? Do results differ within participants depending on whether depersonalization or absorption is induced? Other studies should take a longitudinal approach in order to examine possible developmental relationships between Branch A and Branch B symptoms. Additional trauma symptoms, such as alexithymia and impaired social decision-making, may turn out to have strong connections to dissociative information processing styles, but these areas have typically not been studied in relation to dissociation (see DePrince & Freyd, in press). Factor analysis and meta-analysis are useful techniques that have been infrequently applied in this domain. Such methods could help researchers create a clearer understanding of the multifaceted construct of dissociation.

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