

*Handbook of* PTSD

Science and Practice

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## Chapter 8

# Trauma-Induced Dissociation

Anne P. DePrince and Jennifer J. Freyd

A man who had seen his greatest friend killed beside him developed the following symptoms. At first he struck several of his comrades, but later he assumed a semi-stuporose condition, in which he would stare curiously at such objects as shining buttons and play with them as a child. He became depressed, tearful, vacant, speechless and heedless of what was said to him. . . . He took not notice of a pin-prick until it had been repeated several times, whereupon he gazed at the spot without attempting to withdraw from the pricking. . . . Two days later, he suddenly sat up and exclaimed: "Where am I." Then he got out of bed and sat by the fire, speaking quite intelligently to the orderly, but with no memory of his military life. After a few minutes he relapsed into his former state. The next day he became very restless, and on being quieted and assured that he was in hospital, he gradually came to himself, but had completely lost all memory of what had occurred since he left the trenches. He had to be evacuated in this condition to England, where, it was considered, he made a complete recovery. But after his return to duty in England, he began to complain of shakiness, bad dreams, attacks of headache and dizziness, which, when severe, caused "fainting attacks." Finally after a sudden shock he was readmitted to hospital, suffering from complete "functional paraplegia."

—MYERS (1940, pp. 46–48)

Hysteria, soldier's heart, and shell-shock are among the many terms that signify psychiatry's history of grappling with human responses to trauma. The roots of traumatic stress studies began as early as the 19th century, when psychiatrist Pierre Janet drew a connection between traumatic experiences and "hysteria" in adult women (van der Kolk, Weisæth, & van der Hart, 1996). Janet was the first to articulate the basic principles of dissociative phenomena based on observations of alterations in consciousness in

patients with hysteria (Putnam, 1989). Beyond articulating principles of dissociation, Janet was among the first investigators to elucidate the adaptive nature of dissociation for dealing with acute and/or chronic trauma (Putnam, 1989). The foundation for traumatic stress studies established by Janet and his colleagues at the turn of the century was lost to a period of neglect of dissociation and trauma, with limited interest resurfacing after World Wars I and II (see Herman, 1992; Hilgard, 1986; van der Kolk et al., 1996). For example, Myers (1940) described dissociative reactions to combat exposure, as in the quotation opening this chapter, in which a soldier was "vacant" and forgot his combat experience. A sustained interest in dissociation on the part of clinicians and researchers working with trauma began in the 1980s and continues strongly into the present.

## METHODOLOGICAL CONSIDERATIONS

### Defining Dissociation

As clinical and research interest in dissociation has increased over the last two decades, the need to clearly define the term has arisen. During this period, definitions of dissociation have varied along many dimensions, including the degree of specificity of what we mean by the term "dissociation." Among the issues that need to be considered in defining the phenomenon are continuum–taxon views, state–trait distinctions, and outcome–mechanism discussions. Each of these issues is considered in an effort to define the term "dissociation."

#### *Definitions of Dissociation*

Although definitions of "dissociation" have varied, they have generally centered on the assumption that dissociation involves a lack of integration of aspects of information processing that would typically be connected. Beyond an agreement that dissociation involves a lack of integration, theorists vary in estimates of the scope and type of disintegration necessary to characterize experiences meaningfully as trauma-induced dissociation. In a recent commentary, van der Hart, Nihenhuis, Steele, and Brown (2004) argued that many definitions of dissociation are over- and/or underinclusive, and that this definitional issue impedes study of the phenomenon. They argued that dissociation is a "lack of integration among psychobiological systems that constitute personality" (p. 906). Similarly, Putnam (1997) argued that pathological dissociation is "characterized by profound developmental differences in the integration of behavior and in the acquisition of developmental competencies and metacognitive functions" (p. 15).

#### *Continuum–Taxon*

Janet's early conceptualization of dissociation suggested that a subset of individuals experience dissociative states that nondissociative individuals do not experience (see Putnam, 1997). In spite of Janet's view that dissociation involves a distinct category of experience, the prevailing view placed dissociation on a continuum; that is, theorists assumed that everybody dissociates to some degree. Common forms of dissociation were thought to include highway hypnosis or absorption in a movie/book. When the most widely used measure of adult dissociation, the Dissociative Experiences Scale (DES; see the section "Observing Dissociation" for more information on this scale), was

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developed, the prevailing assumption was that dissociation exists on a continuum. Factor analysis of the DES reveals an absorption-imaginative factor (Ross, Ellason, & Anderson, 1995; Sanders & Green, 1994) that seemingly encompasses normative experiences that are more normally distributed in the population than pathological dissociation.

In recent years, taxometric analyses have been used to justify treating dissociation as a taxon instead of a dimensional variable (e.g., Waller, Putnam, & Carlson, 1996). In this view, dissociation exists as a taxon, in which individuals display behaviors that are or are not consistent with pathological dissociation. This shift is important, because it affects not only theories about the development and maintenance of dissociation but also measurement. For example, existing measures include non-pathological experiences that may not be informative or related to pathological degrees of dissociation. The taxon view influences theory building by assuming that those individuals who pathologically dissociate differ in their basic cognitive organization (Putnam, 1997).

The issue of whether dissociative phenomena fall on a continuum or a taxon necessarily invokes issues of consciousness. Arguably, many experiences (e.g., absorption, daydreaming, trance states) can cause alterations in consciousness; however, the quality of such an experience may be better described as something other than dissociation. For example, van der Hart and colleagues (2004) argued that experiences such as daydreaming or trance can involve alterations in the level of consciousness (the degree to which the individual has awareness of consciousness) and the field of consciousness (the stimuli available to consciousness), and that it is structural dividedness that separates nondissociative experiences (e.g., absorption) from dissociation. "Structural dividedness" involves alterations between an apparently normal part of the personality and an emotional part (van der Hart et al., 2004).

For our purposes of this chapter, we treat trauma-induced dissociation as pathological dissociation; that is, we do not deal with understanding alterations in consciousness that are more typically distributed in the population (e.g., absorption) or that are not trauma-induced (e.g., neurologically based alterations in consciousness).

### *State-Trait*

Inherent in continuum-taxon issues are also temporal issues. From the continuum view of dissociation, it is easy to imagine relatively transient periods of dissociation during a traumatic event. Reports of dissociation at the time of the event—called "peritraumatic dissociation"—have been made across a variety of traumas. Early reports of dissociation were noted by Myers during World War I, who described soldier's dissociative responses as varying "from a slight, momentary, almost imperceptible dizziness or 'clouding' to profound and lasting unconsciousness" (as cited in Brewin, 2003, p. 53). Peritraumatic dissociation has been found to be predictive of later posttraumatic stress disorder (PTSD; e.g., Gershuny, Cloitre, & Otto, 2003; Tichenor, Marmar, Weiss, Metzler, & Ronfeldt, 1996; Weiss, Marmar, Metzler, & Ronfeldt, 1995), leading theorists to question how adaptive dissociation is at the time of the event. In turn, recent work suggests that peritraumatic dissociation may be a common response that is not necessarily associated with later psychopathology (e.g., Bryant & Harvey, 2000). Panasetis and Bryant (2003) argued that persistent rather than peritraumatic dissociation may actually predict later psychopathology, such as PTSD. In a sample of participants who entered the hospital following motor vehicle accidents or nonsexual assaults, Panasetis

and Bryant found that "persistent" dissociation was associated more strongly with acute stress disorder (ASD) severity and intrusion symptoms than with peritraumatic dissociation. The authors defined "persistent dissociation" as dissociation at the time of the assessment rather than at the time of the event. In other work, Gershuny and colleagues (2003) found that the relationship between peritraumatic dissociation and later PTSD was mediated by fears of death and loss of control during the event, which are central cognitive components of panic, raising the possibility that peritraumatic dissociation may be related to panic and not necessarily to pathological dissociation.

### *Outcome-Mechanism*

Dissociation is referred to as both a psychological outcome of trauma and a mechanism of trauma-related problems (e.g., of memory problems) in the literature. For example, dissociative processes have been used to explain trauma-related memory impairment. It becomes difficult to distinguish whether dissociation is a static phenomenon that describes the status of integration of parts of a person's personality, or a process by which information is disintegrated. Van der Hart and colleagues (2004) shed light on this issue, arguing that experiences such as depersonalization and derealization may be alterations in consciousness but are not necessarily dissociative symptoms. The authors argue that to qualify as dissociative symptoms, the experience must involve structural dissociation; for example, the experience must involve dissociation between observing and experiencing ego (van der Hart et al., 2004).

### *Development of Dissociation: Motivation*

The discrete behavioral states (DBS) model of dissociation argues that pathological dissociation is the result of developmental processes whereby children do not learn to integrate across behavioral states (Putnam, 1997). Putnam (1997) links the development of dissociation to early childhood abuse and notes three primary defensive functions of dissociation: automatization of behavior, compartmentalization of information and affect, and alteration of identity and estrangement from self.

Maldonado, Butler, and Spiegel (1998) stated that dissociative symptoms "should be understood as failures in integration, defects in control systems, rather than the creation of multiple identities . . ." that result in distress and dysfunction (p. 463). This statement captures a common viewpoint: that dissociation is a deficit with negative consequences. An alternative viewpoint is that dissociation is a creative adaptation to external insult and may even be seen as a positive set of skills. For example, dissociative automatization of behavior may allow a child to endure painful abuse without full awareness of what is happening and/or his or her own actions (Putnam, 1997). These two perspectives in their extremes may have profoundly differing implications for those who experience high levels of dissociation that necessitate treatment.

One issue implicit in this distinction between dissociation as a deficit and dissociation as an adaptation is the origin or motivation for developing dissociation. Theorists have long argued that dissociation may serve a protective or defensive function at the time of the trauma, or later, to keep trauma-related information out of awareness. Some authors have observed, though, that dissociation at the time of an event predicts later distress, including PTSD (Ozer, Best, Lipsey, & Weiss, 2003), raising the question of how effectively dissociation protects the individual. The key to evaluating the adaptive-maladaptive nature of dissociation lies in thinking about the function of dissociation

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given the individual's context. Betrayal trauma theory (Freyd, 1996), discussed below in more detail, argues that dissociation enables victims who are dependent on an abusive caregiver to maintain necessary attachments. Under conditions in which survival depends on structural dissociation—that is, lack of awareness of the trauma-related information by the part of the personality that must manage tasks necessary to survival, such as attachment with caregivers—dissociation may very well serve an adaptive function. In the long run, dissociation may play different roles in later distress, perhaps mediating or moderating the relationship between some traumas (e.g., abuse) and later psychological symptoms. There may be contexts, too, in which so-called “pathological” dissociation puts individuals at a distinct disadvantage. For example, the dissociation of emotion information from the personality acting in day-to-day situations may result in individuals missing danger cues or otherwise increasing risk of problems, such as revictimization or HIV risk (DePrince, Freyd, & Malle, 2007; Zurbriggen & Freyd, 2004).

Seeing dissociation as a creative adaptation may have benefits for the dissociative client seeking treatment. Rather than pathologizing the trauma survivor, this viewpoint more likely empowers the client because of the implicit respect it offers. However, there is some danger in ignoring real suffering if dissociation is seen as a “normal” response. Some might conclude that because it is a normal response, there is no need for intervention. However, this may be mistaken. By analogy, if one were to slice off a part of the body, bleeding would be a normal response, yet intervention might be very much needed.

One more interesting aspect of this distinction between dissociation as a deficit or an adaptation is how one models individual differences in the tendency to respond to trauma with dissociation. If individuals do differ, perhaps due to heredity (Becker-Blease et al., 2004), in their tendency to dissociate, then this can be viewed in terms of a diathesis–stress model; that is, the underlying tendency may be a vulnerability that is provoked by trauma. An alternative would be to see the underlying tendency as a resilience factor that is awakened by trauma. In this view, dissociation protects the individual from greater harm. Additional research is needed to provide more evidence on these issues.

A dialectical view may help resolve issues of how adaptive or maladaptive dissociation is viewed. Specifically, dissociation may be both a creative adaptation to an environmental insult that threatens survival (e.g., child abuse by a caregiver) and a deficit that causes problems in other domains of life (e.g., difficulty in school). We have the classic problem of looking at “survivor data” when we examine adults who are high in dissociation and evaluate whether dissociation has been adaptive or maladaptive; that is, we are not able to see what these individuals would be like had they not dissociated. Perhaps consequences for some individuals would have been far worse had they not engaged in dissociation, so although dissociation is linked to negative consequences, we have no way of evaluating whether those consequences are better or worse than if the individuals had not chronically dissociated. Furthermore, a dialectical view of dissociation as both adaptive and maladaptive invokes the importance of examining context. In some contexts, dissociation may be the most helpful thing the person could do (e.g., under some conditions of child abuse); in others, it may increase potential harm (e.g., revictimization risk). By viewing dissociation dialectically, practitioners and researchers are likely to examine both the adaptation in the response (and seek to teach alternative skills given the person's current context) and the negative consequences that cause problems for the individual.

## Observing Dissociation

### Measuring Dissociation

Measuring dissociation requires thought about both the definition of dissociation (e.g., pathological vs. normative) and conditions under which it occurs. We have argued that trauma-induced dissociation should include pathological dissociation (as opposed to alterations in consciousness that are more normally distributed in the population). Several reliable and validated self-report measures of dissociative experiences in children, adolescents and adults are available (see Table 8.1 for a listing of several widely used measures).

The vast majority of the literature has focused on negative symptoms of dissociation, such as amnesia, loss of skills, and loss of awareness (van der Hart et al., 2004). In recent years, theorists have argued that dissociation also includes positive symptoms, such as flashbacks and intrusions (e.g., van der Hart et al., 2004). Only recently have dissociative symptoms related to movement, sensation, and perception been noted. Using the Somatoform Dissociation Questionnaire (SDQ), researchers were able to discriminate between individuals diagnosed with dissociative disorders and those diagnosed with other psychiatric disorders (Nijenhuis, Spinhoven, van Dyck, van der Hart, & Vanderlinden, 1998).

**TABLE 8.1. Self-Report Measures of Dissociative Experiences**

Measure name	Relevant references	Respondent	Comments
Adolescent Dissociative Experiences Scale (A-DES)	Armstrong, Putnam, Carlson, Libero, & Smith (1997); Putnam (1997)	Adolescent	Emphasis on dissociation of mental functions (vs. movement, sensation, and perception).
Child Dissociative Checklist (CDS)	Putnam, Helmers, & Trickett (1993); Putnam (1997)	Parent	Emphasis on dissociation of mental functions.
Dissociative Experiences Scale (DES)	Bernstein & Putnam (1986); Putnam (1997)	Adult	Emphasis on dissociation of mental functions.
Peritraumatic Dissociative Experiences Questionnaire (PDEQ)	Marmar, Weiss, & Metzler (1997); Marshall, Orlando, Jaycox, Foy, & Belzberg (2002)	Adult	Assesses retrospective reports of dissociative experiences at the time of the event.
Somatoform Dissociation Questionnaire (SDQ)	Nijenhuis, Spinhoven, van Dyck, van der Hart, & Vanderlinden (1998)	Adult	Emphasis on somatoform dissociation symptoms. Five- and 20-item measures available.
Multidimensional Inventory of Dissociation (MID)	Dell (2006)	Adult	Assesses 14 facets of dissociation and includes validity items.

## Observing Dissoc

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### *Observing Dissociation Posttrauma*

Numerous researchers have documented a correlation between dissociative symptoms and self-reported trauma (e.g., Francia-Martinez, de Torres, Alvarado, Martinez-Taboas, & Sayers, 2003; Irwin, 1999; Putnam, 1997). Generally this correlation is interpreted as an indication that trauma is a causal factor in the development of dissociative symptoms. Some researchers, however, have questioned the assumption of causality. Merckelbach, Horselenberg, and Schmidt (2002), for instance, argue that structural equation modeling analyses applied to self-report data from a sample of undergraduate students show equally good fit for both a model assuming that dissociation causes self-reports of trauma and one that assumes trauma causes dissociation. It is important, given this inherent difficulty in interpreting correlational data, to look at samples in which trauma history is documented independent of self-reports. Studies using samples of documented trauma survivors have revealed that, indeed, dissociation is present as a function of trauma experience. For example, Putnam and Trickett (1997) compared 77 sexually abused girls to 72 control girls in a longitudinal study of the biological and psychological effects of sexual abuse. The sexually abused girls were referred by child protective service agencies. The control girls were matched on age, race, socioeconomic status, and family constellation. Putnam and Trickett found that, compared with the controls, the sexually abused girls had significantly elevated dissociation scores at three different testing times during the study. Similarly, using a longitudinal design with children at risk due to poverty, Ogawa, Sroufe, Weinfeld, Carlson, and Egeland (1997) reported that age of onset, chronicity, and severity of trauma predicted level of dissociation, as measured at four time points across 19 years.

Several studies have examined dissociation in populations in which trauma is more easily documented or verified than in cases of child abuse or assault (e.g., Bremner, Southwick, & Brett, 1992; Carlson & Rosser-Hogan, 1991; Koopman, Classen, & Spiegel, 1996; Marmar, Weiss, & Metzler, 1997; Yehuda et al., 1996). In Carlson and Rosser-Hogan's (1991) study, for example, 50 Cambodian refugees who had settled in the United States participated in a study involving the administration of a series of questionnaires. DES scores in the sample were strikingly high (mean = 37.1); notably, only two of the 50 participants scored under 10 on the scale, which is considered to be within the range of normal adults.

Even if the converging evidence provided by these documented trauma studies makes us confident that trauma can be a causal factor in the development of dissociation, how much societal and cultural expectations play a role in this relationship is still an open question. For instance, a trauma survivor may learn from others or from the culture at large to evidence dissociative symptoms as a socially accepted response to trauma. Might the correlation between dissociation and trauma be at least partially a result of suggestion by therapist or media exposure? If so, we should see lower correlations between trauma and dissociation in societal contexts in which individuals would be less likely to be exposed to suggestive influences regarding this relationship. Dalenburg and Palesh (2004) evaluated the relationship between dissociative symptoms and trauma in a Russian population that was relatively unexposed to these suggestive sources: 301 Russian university students, who completed measures of dissociative symptoms, and history of violent trauma and child abuse. The relationship between trauma and dissociation was discovered in this sample and, if anything, rates of dissociation were higher than in comparable American samples, suggesting that suggestive influences do not explain the correlation.



### *Observing Dissociation in Other Psychiatric Contexts*

Dissociative symptoms have been observed in conjunction with a range of diagnostic categories, including ASD (e.g., Bryant & Harvey, 2000), PTSD (e.g., Brewin, 2003), complex PTSD (Herman, 1992), eating disorders (see Putnam, 1997), and the dissociative disorders (Putnam, 1997). For our purposes in this chapter, we focus on the co-occurrence of PTSD and trauma-induced dissociation.

The co-occurrence of dissociation and PTSD has received attention in terms of both describing the phenomenon of co-occurrence and what that co-occurrence may mean conceptually for understanding posttraumatic responses. Several studies have observed relations between PTSD and dissociation; for example, people who meet criteria for PTSD score higher on the DES than those who do not (e.g., Carlier, Lamberts, Fouwels, & Gersons, 1996; Maldonado & Spiegel, 1998; Putnam, 1997; Yehuda et al., 1996).

Some researchers have suggested that, conceptually, dissociation may play a central role in the onset and/or maintenance of PTSD. For example, van der Kolk and Fisler (1995) suggested that dissociation is at the core of the development of PTSD. In addition, Braun (1988) and van der Hart (2000) suggested that intrusive symptoms may in fact be dissociative phenomena. Van der Hart likened intrusive PTSD symptoms to positive dissociation symptoms (e.g., presence of intrusive memories), whereas avoidance symptoms reflect negative dissociation symptoms (e.g., feeling detached from others). Indeed, the experience of a flashback fits many definitions of dissociation, in which normally integrated aspects of consciousness are not integrated (one's mental experience may not be integrated with conscious awareness of current surroundings, passage of time, etc.).

With interest in dissociation, some speculation about PTSD as a dissociative disorder can be found in the literature. Support for such a move is drawn from the observation that both PTSD and dissociative disorders are reactions to extreme stress and therefore have similar etiologies (Brett, 1993). Furthermore, both PTSD and dissociative disorders include alterations in memory among their criteria. In spite of this support, researchers have argued that PTSD includes anxiety that is more consistent with other anxiety disorders than with the dissociative disorders; in addition, some people with PTSD do not experience amnesia or dissociative episodes (Brett, 1993). Taken together, these observations raise the question of whether there may be subtypes of PTSD that vary in their involvement of dissociative processes.

## DISSOCIATION AND INFORMATION PROCESSING

As research has progressed to the point that factors associated with dissociation have been observed repeatedly (e.g., history of child abuse), the literature has moved in exciting directions that focus on identifying both the motivation for and mechanisms underlying the relationship between trauma, dissociation, and associated outcomes (e.g., autobiographical memory impairment). Such basic research that identifies and tests mechanisms—emotional, cognitive, and social—that may underlie dissociation and related outcomes is necessary to advancing treatment approaches. To the extent that the mechanisms underlying dissociative problems are better understood, interventions can be fine-tuned to target particular mechanisms. We now review various information-processing approaches to dissociation.

### **Dissociation, Forgiveness**

One aspect of dissociation in the context of abuse will be great. Closeness, trust, and the need to stay in the relationship. We should see the results in reanalyses of a number of studies likely to be forgotten. A representative sample assessed by Cameron (1993) and others from a sample of women found that physical and emotional abuse were related to levels of self-reported dissociation. Research by Stoler (2001) revealed that women in the lowest leagues (2003, p. 6) showed significantly higher levels of dissociation in closer relationships. "Disturbances." Sheiman (1998) reported memory impairment in women with abuse by people who were not family. Similarly Stoler (2001) found that women with dissociation were more closely related to their abusers. Nordenberg (2001) found in a large epidemiological study that women with PTSD who had been sexually abused by their partners were more likely to be dissociated.

Dissociation has been found to be related to betrayal trauma that is mediated by the attachment system. Childhood abuse has been found to be related to increased DES scores. Similar to the findings of Cameron (1993), significant correlations were found between childhood abuse and dissociation (but not extrafamilial abuse). Cameron found that the prevalence of pathological dissociation was higher in individuals who reported a history of personal assault in childhood. These individuals perform worse on tests of memory and safety information processing.

DePrince (2000) found that multiple self-reported histories of trauma survivors, the prevalence of emotional abuse. This finding was strongly associated with dissociation.

## Dissociation, Forgetting, and Betrayal Trauma Theory

One aspect of dissociation is amnesia. Betrayal trauma theory predicts that forgetting abuse will be greater when the relationship between perpetrator and victim involves closeness, trust, and/or caregiving. In these cases the potential for a conflict between need to stay in the relationship and awareness of betrayal is greatest; thus, this is where we should see the greatest amount of forgetting or memory impairment. Freyd (1996), in reanalyses of a number of relevant data sets, reported that incestuous abuse is more likely to be forgotten than nonincestuous abuse. These data sets included the prospective sample assessed by Williams (1994, 1995), and retrospective samples assessed by Cameron (1993) and Feldman-Summers and Pope (1994). Using new data collected from a sample of undergraduate students, Freyd, DePrince, and Zurbriggen (2001) found that physical and sexual abuse perpetrated by a caregiver is related to higher levels of self-reported memory impairment for the events compared to noncaregiver abuse. Research by Schultz, Passmore, and Yoder (2003) and a doctoral dissertation by Stoler (2001) revealed similar results. For instance, in their abstract, Schultz and colleagues (2003, p. 67) state: "Participants reporting memory disturbances also reported significantly higher numbers of perpetrators, chemical abuse in their families, and closer relationships with the perpetrator(s) than participants reporting no memory disturbances." Sheiman (1999) reported that, in a sample of 174 students, participants who reported memory loss for child sexual abuse were more likely to have experienced abuse by people well known to them, compared to those who did not have memory loss. Similarly Stoler noted in her dissertation abstract: "Quantitative comparisons revealed that women with delayed memories were younger at the time of their abuse and more closely related to their abusers" (p. 5582). Interestingly, Edwards, Fivush, Anda, Felitti, and Nordenberg (2001) reported that general autobiographical memory loss measured in a large epidemiological study was strongly associated with a history of childhood abuse, and that one of the specific factors associated with this increased memory loss was sexual abuse by a relative.

Dissociation has long been implicated in trauma-related memory disruption. Betrayal trauma theory predicts that dissociating information from awareness is mediated by the threat that the information poses to the individual's system of attachment (Freyd, 1996). Consistent with this, Chu and Dill (1990) reported that childhood abuse by family members (both physical and sexual) is significantly related to increased DES scores in psychiatric inpatients, whereas abuse by nonfamily members is not. Similarly, Plattner and colleagues (2003) reported that they found significant correlations between symptoms of pathological dissociation and intrafamilial (but not extrafamilial) trauma in a sample of delinquent juveniles. DePrince (2005) found that the presence of betrayal trauma before the age of 18 is associated with pathological dissociation and with revictimization after age 18. She also found that individuals who report being revictimized in young adulthood following an interpersonal assault in childhood, compared to individuals who have not been revictimized, perform worse on reasoning problems that involve interpersonal relationships and safety information.

DePrince (2001) found that self-reported betrayal predicted dissociation (across multiple self-report measures) above and beyond self-reported fear in a sample of trauma survivors, the vast majority of whom reported childhood physical, sexual, and/or emotional abuse. Freyd, Klest, and Allard (2005) found that a history of betrayal trauma was strongly associated with physical and mental health symptoms, including dissocia-

tive symptoms, in a sample of ill individuals. Goldsmith, Freyd, and DePrince (2004) reported similar results in a sample of college students.

Some researchers have presumably failed to find a statistically significant relationship between betrayal trauma and memory impairment. For instance, Goodman and colleagues (2003) reported that that "relationship betrayal" was not a statistically significant predictor for forgetting in their unusual sample of adults who had been involved in child abuse prosecution cases during childhood. It is not clear whether the relationship truly does not exist in this sample (which is possible given how unusual a sample it is) or whether there was simply insufficient statistical power to detect the relationship (see Zurbriggen & Becker-Blease, 2003). Future research will need to clarify these issues. At this point we know that betrayal effects on memorability of abuse have been found in at least seven data sets (see the previous paragraph).

### Dissociation and Cognitive Mechanisms

Phenomenologically, dissociation involves alterations in attention and memory. Thus, it seems that basic cognitive processes involved in attention and memory most likely play an important role in dissociating explicit awareness of betrayal traumas. Across several studies, empirical support for the relationship between dissociation and knowledge isolation in laboratory tasks has been found. Using the classic Stroop task, Freyd, Martorello, Alvarado, Hayes, and Christman (1998) found that participants who scored high on the DES showed greater Stroop interference than individuals with low DES scores, suggesting that they had more difficulty with the selective attention task than low dissociators. Freyd and colleagues' results suggest a basic relationship between selective attention and dissociative tendencies. A follow-up study tested high- and low-scoring DES groups using a Stroop paradigm, with both selective and divided attention conditions; participants saw stimuli that included color terms (e.g., *red* in red ink), baseline strings of *x*'s, neutral words, and trauma-related words, such as *incest* and *rape* (DePrince & Freyd, 1999). A significant DES  $\times$  attention task interaction revealed that high-scoring DES participants' reaction time was worse (slower) in the selective attention task than in the divided attention task compared to low-scoring dissociators' performance (replication and extension of Freyd et al.). A significant interaction of dissociation by word category revealed that high-scoring DES participants recalled more neutral and fewer trauma-related words than did low-scoring DES participants, who showed the opposite pattern. Consistent with betrayal trauma theory, the free recall finding supports the argument that dissociation may help to keep threatening information from awareness. DeRuiter, Phaf, Elzinga, and van Dyck (2004) extended observations of attention-dissociation relationships to examine working memory in an undergraduate sample; working memory has been observed to be closely related to attention. As predicted, they found the verbal span of the high-scoring dissociative group was larger than the medium- or low-scoring dissociative groups.

In two follow-up studies that used a directed forgetting paradigm (a laboratory task in which participants are presented with items and told after each item, or a list of items, whether to remember or forget the material), high-scoring DES participants recalled fewer charged and more neutral words relative to low-scoring DES participants, who showed the opposite pattern for items they were instructed to remember when divided attention was required (item method: DePrince & Freyd, 2001; list method: DePrince & Freyd, 2004). The high-scoring participants report significantly more trauma

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ma history (Freyd & DePrince, 2001) and betrayal trauma (DePrince & Freyd, 2004). Two additional studies have replicated this pattern in undergraduate samples, revealing an average effect size for the interaction across studies of  $d = 0.67$  (DePrince et al., 2007). Similar findings have been found in children by researchers using pictures instead of words as stimuli. Children who had trauma histories and who were highly dissociative recognized fewer charged pictures relative to nontraumatized children under divided attention conditions; no group differences were found under selective attention conditions (Becker-Blease, Freyd, & Pears, 2004).

Other research using the standard (selective attention) directed forgetting paradigm converges on these findings. Moulds and Bryant (2002) compared participants diagnosed with ASD and nontraumatized controls on a directed forgetting task. ASD includes dissociation among the diagnostic criteria. All participants with ASD had been exposed to some form of physical threat. The ASD group showed poorer recall of to-be-forgotten trauma-related words than the nontraumatized group. Elzinga, de Beurs, Sergeant, van Dyck, and Phaf (2000) examined directed forgetting performance for neutral and sex words among undergraduate volunteers and patients with dissociative disorder. Under the standard selective attention instructions, directed forgetting of sex words decreased with higher levels of dissociation. Furthermore, dissociative patients and highly dissociative students remembered more overall compared to the low-scoring dissociative group. Elzinga and colleagues argued that the highly dissociative participants may demonstrate special learning abilities. In particular, drawing on activation/elaboration theory, the authors argued that highly dissociative participants may be skilled at elaboration and construction of conscious experiences. Furthermore, elaboration can be used to detect discrepancies; in the case of the directed forgetting paradigm, it may actually be discrepant to try to forget threatening information, such as sex words. Thus, the dissociative participants showed better recall of sex words relative to the low dissociative group. Elzinga and colleagues argued that highly dissociative individuals may use their capacity to construct separate conscious experiences to keep threatening or painful memories from current awareness. Thus, the same skill that results in increased recall in the directed forgetting paradigm may also underlie memory impairment.

As exemplified by this research, dissociation is one theoretically viable route to memory impairment, though many routes exist. For example, memories may be impaired due to incomplete or fragmented encoding; such routes would be consistent with the concept of dissociative amnesia. Alternatively, forgetting can occur due to retrieval blockage. This sort of forgetting (Anderson et al., 2004) may not involve dissociative processes, as currently conceptualized. In future research, it will be important to examine dissociative-related and -unrelated routes to memory disruption for trauma.

In addition to the research reviewed here, several other studies have focused on memory in individuals diagnosed with dissociative identity disorder (DID) and other dissociative disorders. This work has included examinations of working memory (e.g., Dorahy, Irwin, & Middleton, 2003; Dorahy, Middleton, & Irwin, 2004), as well as interidentity memory in DID (e.g., Elzinga, Phaf, Ardon, & Dyck, 2003; Huntjens, Postma, Peters, Woertman, & van der Hart, 2003). Taken together, the advancement of the use of cognitive methods to examine dissociation, memory, and attention points to exciting discoveries that we hope will add to the growing literature on intervention for trauma-induced dissociation.

## CURRENT STATE OF THE ART

Research to date has examined dissociative responses across a broad range of traumas (e.g., Bremner et al., 1992; Bryant & Harvey, 2000; Carlson & Rosser-Hogan, 1991; Freyd, 1996), developmental stages (e.g., Putnam, 1997), and cultures (e.g., Carlson & Rosser-Hogan, 1991; Dorahy & Paterson, 2005). Although culture-specific dissociative reactions exist, the core components of pathological dissociation appear similar across cultures (see Putnam, 1997). The generalizability of findings at any given time is tied to the field's ongoing struggle to better define the construct of dissociation. Findings based on a continuum view of dissociation, for example, may or may not fully generalize to our knowledge of pathological dissociation. We are hopeful that as we more precisely define dissociative symptoms, we reduce the risk of pathologizing experiences that include alterations in consciousness that do not involve structural dissociation. For example, trance experiences, or certain religious experiences, in other cultures are not viewed as pathological dissociation with our advances in defining dissociative symptoms. Furthermore, normally distributed attributes, such as absorption, are at less risk of being defined as pathological. For example, imaginary play has, at times, been suspected of correlating with problematic outcomes in children. Play involves absorption. Recently, however, Taylor, Carlson, Maring, Gerow, and Charley (2004) found that imaginary friends are very common in children (65% of children up to 7 years of age had an imaginary companion at one point in their lives) and the lack of impersonation of imaginary characters was associated with poorer emotion understanding.

## CHALLENGES FOR THE FUTURE

### Types of Dissociation

We applaud recent work that has involved stepping back from the past two decades of observation to reevaluate the definition of dissociation. Continued work is needed to fine-tune what experiences we include in the category of trauma-induced dissociation. With conceptual clarity about the operationalization of dissociation comes the promise of increased capacity to identify dissociative developmental pathways and mechanisms.

### The Evolving Definition of Dissociation

Several challenges remain in the quest to specify further the operationalization of dissociation, including continued work to examine differences in pathological versus nonpathological views of dissociation. At the same time that we work to exclude normative phenomena (e.g., absorption), we must work to ensure that we do not exclude relevant phenomena. For example, much of the contemporary literature on dissociation has focused on dissociation of mental functions (e.g., memory and attention). Work by Nijenhuis and colleagues (1998) points to the importance of including dissociation of perceptual, movement, and sensory information. In addition, constructs that may be dissociative in nature, such as alexithymia, have not yet been included routinely in analyses. Alexithymia is the inability to label emotions, a phenomenon that may be consistent with the lack of integration observed in dissociation.

As researchers and clinicians improve on the scope of definitions of dissociation, we will be in a better position to evaluate the relationship between dissociation and other psychiatric phenomena. With more precise definitions and measurement of dis-

sociation, researchers between dissociation and dissociation have. There are several rea- bidity could be due. Recent work in the P- toms may actually com- a review, see Asmund- which dissociation ar-

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sociation, researchers can begin to untangle the complicated picture of comorbidity between dissociation and other forms of trauma-related distress. For example, PTSD and dissociation have long been observed as frequently co-occurring phenomena. There are several reasons that this overlap might be observed; for example, the comorbidity could be due to symptom overlap and/or common underlying mechanisms. Recent work in the PTSD literature suggests that the PTSD cluster of avoidance symptoms may actually comprise two distinct symptom clusters: avoidance and numbing (for a review, see Asmundson, Stapleton, & Taylor, 2004). If this is the case, the extent to which dissociation and numbing overlap must be evaluated.

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The past decade has been a period of rapid advancement in the understanding of the neurobiological basis of fear and anxiety. This research has demonstrated to produce powerful and often aversive stimuli. The development of these neurochemicals in the distinct cortical and subcortical systems associated with the regulation of the vulnerability to anxiety. This research is pertinent to the understanding of the pathophysiology of anxiety and fear.

## Functional Neuro

Evidence from a functional neurocircuit of anxiety or fear shows that the amygdala is a key component of the circuitry and neurochemistry of the pathophysiology of anxiety and fear.