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Title: Childhood abuse and neglect and loss of self-regulation.

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Source: Bulletin of the Menninger Clinic; Spring94, Vol. 58 Issue 2, p145, 24p,
1 chart

Document Type: Article

Subject Terms: *ABUSED children
*PSYCHOLOGY
*POST-traumatic stress disorder in children
*AFFECTIVE disorders in children

Abstract: Discusses childhood abuse and its contribution to the development of disorganized attachment patterns. Loss of ability to regulate the intensity of feelings and impulses; Inability to modulate emotions; Abused children as unable to develop the capacity to express specific and differentiated emotions; Affective dysregulation; Complex posttraumatic stress disorder.

Full Text Word Count: 9434

ISSN: 00259284

Accession Number: 9410253943

Database: Academic Search Premier

Notes:

**CHILDHOOD ABUSE AND NEGLECT AND LOSS OF
SELF-REGULATION**

Secure attachments with caregivers play a critical role in helping children develop a capacity to modulate physiological arousal. Loss of ability to regulate the intensity of feelings and impulses is possibly the most far-reaching effect of trauma and neglect. It has been shown that most abused and neglected children develop disorganized attachment patterns. The inability to modulate emotions gives rise to a range of behaviors that are best understood as attempts at self-regulation. These include aggression against others, self-destructive behavior, eating disorders, and substance abuse. The capacity to regulate internal states affects both self-definition and one's attitude toward one's surroundings. Abused children often fail to develop the capacity to express specific and differentiated emotions: Their difficulty putting feelings into words interferes with flexible response strategies and promotes acting out. Usually, these behaviors coexist, which further complicates diagnosis and treatment. Affective dysregulation can be mitigated by safe attachments, secure meaning schemes, and pharmacological interventions that enhance the predictability of somatic responses to stress. The ability to create symbolic representations of terrifying experiences promotes taming of terror and desomatization of traumatic memories. (Bulletin of the Menninger Clinic, 58[2], 145-168)

The recognition that childhood trauma plays a significant role in the genesis of a variety of mental disorders has stimulated inquiry into the ways that early attachment disturbances are translated into impairment of self-regulation. Over the past two decades, there have been significant advances in understanding the effects of child

abuse and neglect on biological (e.g., Lewis, 1992) and cognitive development (e.g., Cicchetti & Beeghly, 1987; Fish-Murray, Koby, & van der Kolk, 1987), and on development of self (e.g., Cole & Putnam, 1992; van der Kolk, Roth, & Pelcovitz, in press). Aside from a loss of trust and an impaired sense of being able to positively affect one's environment, one of the central effects of psychological trauma is not learning how to regulate the intensity of feelings and impulses (van der Kolk, Roth, & Pelcovitz, in press). Child abuse and neglect affect the biologically based capacity to regulate the intensity of affective responses. This dysregulation is associated with a wide spectrum of problems, from learning disabilities to aggression against the self and others (Cicchetti & White, 1990; Cohn, Matias, Tronick, Connell, & Lyons-Ruth, 1986; Pynoos & Nader, 1988; van der Kolk, Greenberg, Orr, & Pitman, 1989; Werner, 1989). It is thought that the lack of development of self-regulatory processes in abused children leads to an impaired capacity to develop proper definitions of the self, as reflected by: (1) disturbances in the sense of self, such as a sense of separateness, a loss of autobiographical memories, and disturbances of body image; (2) poorly modulated affect and impulse control, including aggression against self and others; and (3) insecurity in relationships, such as distrust, suspiciousness, lack of intimacy, and isolation (Cole & Putnam, 1986).

Trauma versus neglect

In most studies of child abuse, no clear distinctions have been made between trauma, physical abuse, sexual abuse, and neglect (Widom, 1987, 1989). It has not yet been established whether different forms of abuse have a different impact. Data from the trauma literature indicate that, at least on a biological level, the central nervous system responds quite consistently to any overwhelming experience, but is affected by maturational level and duration and severity of exposure (van der Kolk, 1994). A critical variable that determines the long-term effects of abuse or neglect appears to be the meaning that the victim gives to the experience. In this context, the relationship between the victim and the perceived agent of the traumatic event is of primary importance. Research has clearly established that abuse will have its most devastating impact when the trauma emanates from a person entrusted with the care of the victim (van der Kolk, Roth, & Pelcovitz, in press). Yet in both children and adults, it has been shown that as long as one secure attachment bond remains available, a person is powerfully protected against trauma-induced psychopathology (Finkelhor & Browne, 1984; McFarlane, 1987): The effects of trauma on children can be mitigated by the presence of a supportive caregiver, even if that caregiver is unable to alter the outcome of events (Luthar & Zigler, 1991).

Studies are slowly beginning to tease out the differential effects of abuse and neglect. These often are difficult to distinguish. Our own research suggests that distinct, isolated incidents of trauma are likely to produce rather discrete conditioned biological and behavioral responses to reminders of the trauma, without necessarily affecting the totality of a person's identity. Chronic abuse and neglect, on the other hand, are likely to have a more pervasive effect on psychological and biological regulatory processes, without necessarily producing discrete conditioned responses (van der Kolk, 1994). In the long run, lack of secure attachments may produce the most devastating effects because consistent external support appears to be a necessary condition in learning how to regulate internal affective states and how to modulate behavioral responses to external stressors (van der Kolk, Perry & Herman, 1991).

Disorders of extreme stress or complex posttraumatic stress disorder

In preparation for an expanded definition of posttraumatic stress disorder (PTSD) for DSM-IV (American Psychiatric Association [APA], in press), we did a study that involved more than 700 subjects, looking at the relationship between trauma and dysregulation of feelings and behaviors, as well as disorders in relation to self and others. We reviewed the literature on the effects of trauma on both children and adults and identified those trauma-related psychological problems that were consistently mentioned but not captured in the biphasic intrusion/numbing paradigm of the DSM-III definition of PTSD

(van der Kolk, Roth, & Pelcovitz, in press). With the help of Judith Herman (1992), we identified the following variables: (1) alterations in regulating affective arousal; (2) dissociation and amnesia; (3) somatization; (4) chronic characterological changes in the areas of self-perception, perception of others, and relationship with the perpetrator; and (5) alterations in systems of meaning (see Table 1). We found that these five seemingly disparate problems tended to occur together in the same individuals, and that this cluster of symptoms occurs almost exclusively in people with PTSD (i.e., in the presence of intrusive recollections of the trauma, numbing of responsiveness, and chronic hyperarousal). The syndrome occurred mainly after a person had been exposed to interpersonal trauma at an early age. The field trials for DSM-IV thus confirmed the pervasive effects of interpersonal abuse on the totality of personality development; these effects persist many years after the original abuse experience has ceased. The field trials also showed the multiplicity of symptoms resulting from early abuse experiences, which seem to represent long-term somatic, cognitive, affective, and interpersonal effects of the trauma.

Attachment as the regulator of arousal

All primate infants, including humans, depend on their caregivers to help them regulate their emotional states. Human infants have only a small repertoire of actions with which they can modulate affective arousal, such as gaze aversion, self-sucking, and dissociation. These actions allow infants to enter into trance states and to ignore current sensory input (Gardner & Olness, 1981). Dissociation is a method of coping with overwhelming stress that becomes increasingly available as children mature, most likely reaching its peak around age 10 (Nemiah, 1991; Putnam, 1991). The behavioral expressions of dissociation include amnesias, rapid shifts in behavior, visual hallucinations, "spacing out," and "lying" (Putnam, 1991). However, young children seem to resort to dissociation only when caregivers are not available to provide them with stroking, rocking, feeding, verbalizing, and singing to help them change their internal states from agitated and dysphoric to calm and contented.

Field (1985) has shown that attachment figures, particularly mothers, play a critical role in helping children modulate physiological arousal. They do so by providing a balance between soothing and stimulation, which regulates normal play and exploratory activity. Stern (1983) called this phenomenon "affect attunement" between mothers and their infants. In his studies, about 48% of the mother's behaviors were described as attunements or as mirroring-echoing of the infant's behavior in either the same or a different modality. During these interactions, the heart rate curves of mothers and infants paralleled each other. During stressful, disturbed interactions, both mothers and infants had increased heart rates, and parallel decreases occurred during more harmonious interactions.

The capacity of mothers to modulate physiological arousal in their children may be a powerful component of the attachment bond between mother and child. Secure attachments allow children to alternate between activities that increase and reduce arousal as they go back and forth between exploring the environment and returning to their mothers. As children grow older, they are less likely to become overstimulated and they can tolerate higher levels of excitement. The need for physical proximity to the mother gradually decreases and is replaced by increased social play, expressed in attachments toward the father and peers. However, under increased stress, children continue to seek attachment to their primary attachment figure (Field, 1985).

The psychobiology of attachment and separation

When young children are removed from their caregivers, they initially go through a period of behavioral agitation, accompanied by increases in heart rate and body temperature, followed by depression (Field & Reite, 1984). During this time, they suffer from sleep disturbances (characterized by a decrease in REM sleep and an increase in the number of arousals and time spent awake) and from decreased autonomic measures to below baseline (Hollenbeck et al., 1980; Reite, Short, Kaufman, Stynes, & Pauley, 1978).

After separation from their mothers, children may continue to show behavioral and biological dysregulation on reunion, but it is the caregivers' response during this time that is the critical variable in determining the long-term effects of separation (Field & Reite, 1984). Thus a crucial caregiver role is the maintenance of optimal levels of physiological arousal; unresponsive or abusive parents may promote chronic hyperarousal that can have enduring effects on the child's ability to modulate strong emotions.

All primate infants utilize the separation cry to elicit parental responses of care and attention. This cry powerfully summons parental caregiving in all primate species (van der Kolk, 1987). Abuse history in the mother may interfere with a consistent and adequate response to the infant's separation cry. Research has shown that some mothers with a history of being abused may not respond to the separation cry at all, while at other times the cry may trigger abuse. Weston (1968) found that the infants' crying was given as the reason for child abuse by 80% of mothers who abused their children. There seems to be an optimal range of distress cues for eliciting an empathic response in caregivers. Prolonged exposure to crying may exceed the mother's tolerance level, and her primary response then becomes aimed at alleviating her own distress rather than the infant's (Frodi, 1985). In a study by Frodi and Lamb (1980), abusive mothers were significantly more annoyed by and less sympathetic toward the crying infant than were nonabusive mothers. The cry also elicited greater increases in heart rate and skin conductance but somewhat smaller increases in blood pressure in the abusive mothers than in the control mothers. While the smiling baby had a negligible effect on the control mothers, it elicited increased blood pressure and skin conductance from the abusers, who responded to both the cry and the smile with annoyance and an increased heart rate.

Both the emission of cries and their motivational effect on the listener are under the control of the limbic-hypothalamic system (MacLean, 1978), and both emission and response can be powerfully affected by endogenous and exogenous opioids (Panksepp, Meeker, & Bean, 1980). Thus the consumption of opiates and other psychoactive substances by caregivers will interfere with their capacity to respond to the infant's needs, while withdrawal from these substances will increase the caregivers' own physiological arousal. Increased arousal will make people with an abuse history vulnerable to interpreting stressful situations as recurrences of their own past trauma; such arousal also promotes behavior appropriate to that trauma: in the direction of fight or flight (van der Kolk, 1994).

Adequate attunement between caregivers and infants is necessary to help infants change their psychological state from distressed to contented. In abused infants (as well as in other atypical infants, such as premature babies), mothers may become a source of physiological disorganization rather than a source of gratification. These children learn that their mother's responses will not provide them with comfortable physiological states, and they react accordingly. Current research shows that as many as 80% of abused infants and children have disorganized/disoriented attachment patterns, which include unpredictable alterations of approach and avoidance toward their mothers, as well as other conflict behaviors, such as prolonged freezing, stilling, or slowed "underwater" movements (Carlson, Barnett, Braunwald, & Cicchetti, 1991; Lyons-Ruth, 1991). These children are ill-equipped to modulate their arousal, but their mothers are unresponsive to their children's affective cues and do not adjust their stimulation according to the children's needs. The children react by averting their gaze and by terminating the interaction. A child is left to its own devices to find ways of calming itself, and the mother is left frustrated and ungratified, setting the stage for abusive behavior (Field, 1985). Thus lack of attunement promotes dysregulated behavior in both child and caregiver.

Attachment and separation in nonhuman primates: Lessons from Harlow's heirs

The effects of social deprivation. Although the biological underpinnings of maturational disturbances are extremely complex, research on nonhuman primates has allowed us to

delve deeper into the biology of abuse and neglect than observational studies of human infants might allow. Forty years of research on nonhuman primates have firmly established that early disruption of the social attachment bond reduces the long-term capacity to cope with subsequent social disruptions and to modulate physiological arousal (Kraemer, 1985). These studies have demonstrated that disruptions of attachment early in the life cycle (as occurs in child abuse) have long-term effects on the neurochemical response to subsequent stress, including the magnitude of the catecholamine response and the duration and extent of the cortisol response. There are also long-term effects on a number of other biological systems, such as the serotonin and endogenous opioid system (Kraemer, Ebert, Lake, & McKinney, 1984; Munck, Guyre, & Holbrook, 1984; van der Kolk, 1994).

Starting with Harlow's work, a long series of experiments has documented the response of nonhuman primates to separation from mothers and peers, demonstrating its remarkable similarities to the effects of neglect on human beings. In both male and female monkeys, social isolation for various periods during the first year of life produces grossly abnormal social and sexual behavior. Isolated monkeys do not produce offspring, and artificially inseminated females will mutilate or kill their babies. Young monkeys who are separated from their mothers become socially withdrawn and unpredictably aggressive. They also develop self-destructive and self-stimulating behaviors, such as huddling, self-clasping, self-sucking, and biting (Harlow & Harlow, 1971; Sackett, 1965, 1972; Sackett, Griffin, Pratt, Joslyn, & Ruppenthal, 1967). They do not learn to discriminate such social stimuli as facial expressions (Mirsky, 1968) because they seem to lack the early experience of synchrony between mother and child and its associated expressions. Remnants of this deficit persist throughout their lives, even after later exposure to social situations.

The relevance of critical periods. Monkeys separated from their mothers during the first few months of life who otherwise remain socially isolated develop normally later, provided that they are soon reunited with their mothers or with peers (Griffin & Harlow, 1966). Even after having been socially isolated during critical periods of development, monkeys can partially overcome the effects of this isolation if they are rapidly reunited with attachment figures. Although the behavioral effects of separation are nearly universal--protest followed by despair, intrusion followed by numbing--male monkeys are more seriously affected by isolation than are females (Suomi & Ripp, 1983). Individual genetic vulnerability also influences the severity of the damage (Sackett, Ruppenthal, Fahrenbruch, & Holm, 1981). The age at which monkeys are separated from either their mothers or their peers is crucial in accounting for both the immediate intensity of the protest/despair response and its long-term effects. With variations depending on the species, separations at the end of the first year of life (corresponding roughly to the third year in human infants) have devastating short-term as well as permanent consequences (Suomi, 1984).

Monkey infants who are separated from their mothers but who are allowed to remain with peers showed much less protest and despair than those who were housed alone: Monkeys apparently can substitute strong peer attachments for maternal care. Repeated peer separation evokes responses similar to those of repeated maternal separation. According to McKinney (1985), peer-reared monkeys showed a stronger response to peer separation than did mother-reared animals, and although protest abates over time, despair persists.

Reversibility of early deprivation and the persistence of latent effects

The effects of early social deprivation in monkeys used to be considered largely irreversible (Novak & Harlow, 1975). However, Suomi and Harlow (1972) demonstrated that rearing separated monkeys with younger peers can provide a nurturing environment that eliminates most of the bizarre behavior caused by isolation. They coined the term "monkey therapists" for these younger peers. After an initial period in which they were extraordinarily aggressive, the separated monkeys slowly developed appropriate

behavior during prolonged periods of group housing. After 3-4 years, the previously isolated monkeys were nearly indistinguishable from monkeys who were normally reared (Suomi, Harlow, & Novak, 1974). However, this adaptation can be lost under social stress, when complex social discriminations are required (Anderson & Mason, 1978; Sackett, Bowman, & Meyer, 1973). Heightened emotional or physical arousal causes previously separated animals to show inappropriate social behavior; they either become withdrawn or aggressive, and they display an increase in stereotyped activity. Even monkeys who recover in other respects may have persistent deficits in sexual behavior and continue to misperceive social cues; for example, they may fail to withdraw after a threat by a dominant animal (Anderson & Mason, 1978; Mason, 1968; Novak & Harlow, 1975).

Latent effects of separation uncovered by amphetamines and alcohol

Kraemer, Ebert, Lake, and McKinney (1984) have shown that the administration of amphetamines, which increase brain dopamine and norepinephrine, has very different effects on previously separated monkeys than on those who were always properly socialized. Kraemer and his colleagues examined the behavioral and neurobiological effects of d-amphetamine on 3-year-old preadolescent rhesus monkeys who had been separated from their peers during the second month after birth and isolated during the first year of life, and who had for several years been successfully reunited with stable affiliative and peer relationships. When given low doses of amphetamines, these monkeys immediately became very violent and killed several of their peers. None of the monkeys who had been properly socialized behaved this way.

Social separation also alters the response of rhesus monkeys to alcohol (McKinney, 1985). Intermittently separated and social isolated monkeys consumed more alcohol both during separation and after reunion. Alcohol had different effects at different dosages. At low doses (1g/kg), the monkeys showed much less of a separation response, while at high doses (3g/kg) they showed increased despair. Thus alcohol in low doses had an antidepressant effect, while in higher doses it produced behavioral signs of depression. When a mixed group of monkeys was given free access to alcohol, both consumption and degree of behavioral dysregulation were significantly higher in the monkeys who had been isolated many years before.

These results, like the reactions to amphetamines, support the notion that primates who have experienced an early lack of parental responsiveness and who are left to their own devices to regulate physiological states may develop persistent deficits in the capacity to modulate physiological arousal. Being unable to regulate physiological arousal makes them more vulnerable to substance abuse and addiction and to aggressive acting out under the influence of these substances.

Biological dysregulation following trauma

Because of obvious methodological and ethical problems, there have been very few direct studies of the psychobiological effects of child abuse. However, this past decade has spawned an extensive research literature on the psychobiology of adults with PTSD, some of whom were first abused as children, while others were first traumatized as adults. Although the psychobiological effects of child abuse may be both qualitatively and quantitatively more profound than those of adult trauma, these findings are quite relevant to understanding the biological underpinnings of the dysregulation of affects and impulses following childhood abuse and neglect.

Traumatized adults tend to suffer both from generalized hyperarousal and from physiological emergency reactions to specific reminders of the trauma (APA, 1987, in press). At the same time, there is a numbing of responsiveness to the environment, punctuated by intermittent hyperarousal in response to reminders of the trauma. In adults, this hyperarousal is thought to account for the lack of ability to use affect states as signals (Krystal, 1978; van der Kolk, 1994). Instead of using affective arousal as a cue to attend to incoming information, traumatized adults experience arousal as a stimulus

for fight and flight reactions that make them go immediately from stimulus to response without being able to make the necessary psychological assessment of the meaning of what is going on (van der Kolk & Ducey, 1989).

Psychophysiology

Abnormal psychophysiological reactions in PTSD have been demonstrated on two different levels: (1) in response to specific reminders of the trauma, and (2) in response to intense but neutral stimuli, such as acoustic startle. The first paradigm demonstrates that traumatized adults and children have heightened physiological arousal in response to sounds, images, and thoughts associated with specific traumatic incidents. These profound physiological responses that accompany the recall of traumatic experiences illustrate the timelessness and the intensity with which traumatic memories continue to dominate current experience (Pitman, Orr, & Shalev, 1993). In both abused children and traumatized adults, triggers reminiscent of traumatic experiences may precipitate intense emotional and biological reactions, without much conscious awareness of the origins of this disorganization.

Aside from physiological hyperarousal to specific reminders of the trauma, several studies have demonstrated that traumatized children and adults suffer from a generalized lack of capacity to modulate their responses to intense sensory stimulation. Like the deprived monkeys who were incapable of modulating their response to amphetamines, traumatized people cannot modulate their response to sensory stimuli, as shown in studies of habituation to the acoustic startle response (Ornitz & Pynoos, 1989; Shalev, Orr, Peri, Schreiber, & Pitman, 1992). This means that they cannot adequately evaluate sensory stimuli, and that they do not mobilize appropriate levels of physiological arousal to meet those stimuli. Thus the failure to recover psychologically from intrusive memories of a traumatic past is mirrored physiologically in the misinterpretation of innocuous stimuli (e.g., the acoustic startle) as potential threats.

Stress hormones

In addition to experiencing chronic physiological hyperarousal, traumatized adults have both tonic and phasic abnormalities in stress hormone secretion and in the number and sensitivity of receptors in the central nervous system (for a thorough review, see van der Kolk, 1994). For example, veterans with PTSD have chronically low urinary cortisol excretion and increased numbers of lymphocyte glucocorticoid receptors. Yehuda, Lowy, Southwick, Shaffer, and Giller (1991) reported the results of a study by Heidi Resnick, in which the acute cortisol response to trauma was studied using blood samples from 20 acute rape victims. Three months later, a prior trauma history was taken, and the subjects were evaluated for the presence of PTSD. Victims with a childhood history of sexual abuse were significantly more likely to go on to develop PTSD following the rape than were rape victims without such a history. Cortisol levels shortly after the rape were correlated with histories of prior sexual abuse. The mean initial cortisol level of women who had been abused as children was 15 ug/dl, compared to 30 ug/dl in women who had not been abused. These findings indicate that one legacy of child abuse is a failure to mobilize an effective stress hormone response to subsequent stressors, which, in turn, may set the stage for the development of further psychopathology.

Another neurochemical system with relevance to regulatory processes following child abuse, but one that has been studied only in adults, is the endogenous opioid system. In a study of traumatized Vietnam veterans, we found that exposure two decades later to a stimulus resembling the original trauma caused an endogenous opioid response equivalent to the injection of 8 mg of morphine (Pitman, van der Kolk, Orr, & Greenberg, 1990; van der Kolk et al., 1989). The psychological effects of this opioid response consisted of a decrease in psychological distress, which was analogous to how opioids affect physical pain. It is likely that the endogenous opioids are involved in the capacity to gain psychological distance from emotionally overwhelming experiences, as is seen in dissociative reactions (we will return to this theme when discussing the issue of self-mutilation). The magnitude of the conditioned opioid response found in these studies

illustrates the powerful biological responses to stimuli reminiscent of earlier trauma. Those who suffer from these conditioned biological responses are unlikely to be conscious of the historical antecedents of their biological changes, other than being aware of a rather nonspecific, negative alteration in how they feel.

Finally, our studies with the serotonin reuptake inhibitor fluoxetine indicate that lowered serotonin may play a significant role in the dysregulation of affects and impulses in abused children (van der Kolk, Dreyfuss, Michaels, Saxe, & Berkowitz, in press). Inescapably shocked animals develop a relative serotonin depletion in the limbic system. The effect of serotonin depletion in animals has been described as hyperirritability, hyperexcitability, and hypersensitivity, and as an exaggerated emotional arousal and/or aggressive display (though not necessarily attack) to relatively mild stimuli (Depue & Spoont, 1989). This description bears a striking resemblance to the symptoms seen in traumatized children and adults. At least with traumatized adults, medications that increase serotonin levels in the central nervous system can have a marked effect on the capacity to regulate affective and behavioral responses to environmental stimuli (van der Kolk, Dreyfuss, Michaels, Saxe, & Berkowitz, in press).

The miracle of symbolic representation

Henry Krystal (1978) was the first student of psychological trauma to describe how trauma results in "affect dedifferentiation" (p. 96): an inability to identify specific emotions that serve as a guide to appropriate actions. He described how this inability to use symbols is related to the development of psychosomatic reactions and to aggression against self and others. Later studies have documented that verbalization of traumatic experiences decreases psychosomatic symptoms (Pennebaker & Susman, 1988). The trauma-induced inability to use symbols to identify affect states can begin as a child first starts to develop the systems for symbolic representation. Schneider-Rosen and Cicchetti (1984) have shown that maltreated toddlers use fewer words to describe internal states and show less differentiation in attributional focus than do their normally treated peers. In contrast, nonmaltreated children spend more time describing physiological states, such as hunger, thirst, and states of consciousness, and they speak more often about negative emotions, such as hate, disgust, and anger (Cicchetti & Beeghly, 1987; Cicchetti & White, 1990). Maltreated children, like traumatized adults, have difficulty expressing specific and differentiated emotions. These deficits have been held responsible for the impaired impulse control seen in these youngsters (Fish-Murray et al., 1987). They have difficulty putting feelings into words and instead act out their feelings without being able to resort to intervening symbolic representations that would allow for flexible response strategies. In the DSM-IV field trials for PTSD (van der Kolk, Roth, & Pelcovitz, in press), the abused adolescents were so out of touch with their feelings that they denied that the abuse had any impact on their lives. However, they tended to be involved in abusive relationships with peers and to engage in high-risk behaviors and substance abuse (girls tended to become pregnant).

A series of Rorschach studies of traumatized adults (Levin, 1993; van der Kolk & Ducey, 1989; van der Kolk et al., unpublished data, 1994) has shown that the perceptions of adults with PTSD tend to be dominated by traumatic material, and that their responses to their surroundings are largely determined by affective reactions without modification through the use of cognitive strategies. Our projective tests of traumatized children demonstrated similar responses in maltreated children (Fish-Murray et al., 1987). Both verbal treatments and medications that affected the serotonin system decreased the pervasive presence of traumatic concepts and increased the use of cognitive strategies to interpret incoming information. Cicchetti and White (1990) hypothesized that the difficulties abused toddlers have expressing feelings in words may be not simply a reflection of psychological intimidation but rather a manifestation of neuroanatomical and neurophysiological changes secondary to abusive or neglectful treatment. It appears that, once aroused, traumatized children and adults are unable to postpone their behavioral responses to sensory input by appropriate cognitive assessment of the stimulus. Thus the lack of symbolic representation causes them to go immediately from

stimulus to response, and to react to stress with familiar reactions: as catastrophic trauma.

Self-regulation and adult psychopathology

In recent years, there has been a trend in psychiatry to split emotional problems into ever-smaller categories of "disorders," without much attention to how they may be interrelated. At the same time, prospective and retrospective studies of traumatized children and adults have shown that abuse and neglect may result in a spectrum of disorders of self-regulation, in which dissociation seems to be a common element. The behavioral expressions of this lack of capacity for self-regulation range from aggression against self or others, to eating disorders, to substance abuse and other addictive behaviors (van der Kolk, Roth, & Pelcovitz, in press). The relationship between childhood trauma and aggression against others has been extensively discussed elsewhere (Lewis, 1992; Widom, 1987). We will briefly summarize the evidence for the other disorders of self-regulation here.

Dissociation

Recent studies (Saxe et al., 1993) have shown that approximately 15% of adult psychiatric inpatients suffer from dissociative disorders. These patients invariably have a history of severe child abuse, or, occasionally, other major trauma, such as repeated surgery (Loewenstein, 1990; Ross et al., 1991; Ross et al., 1990). Dissociation is one of the principal mechanisms by which people cope with overwhelming experiences (Ross et al., 1991). Dissociation terminates states of extreme physical and emotional arousal (Moleman, van der Hart, & van der Kolk, 1992) during the trauma, but over time dissociative processes may be activated by minor stresses and simple reminders of earlier trauma.

Dissociation, although initially providing protective detachment from overwhelming affects, also results in a subjective sense of deadness, disconnection from others, and internal disintegration. We found that adults with dissociative disorders are likely to also suffer from nightmares and flashbacks, psychosomatic problems, suicide attempts, self-mutilation, and substance abuse (Saxe et al., 1993; van der Kolk, Roth, & Pelcovitz, in press), all of which appear to have been activated at various developmental stages as responses to, or as ways of coping with, the effects of childhood abuse and neglect.

Self-injury

In a 1974 study of self-mutilation in violent male prisoners, Bach-y-Rita concluded:

the constellation of withdrawal, depressive reaction, hyperexcitability, hyperreactivity, stimulus-seeking behavior, impaired pain perception, and violent aggressive behavior directed at self or others may be the consequence of having been reared under conditions of maternal social deprivation. This constellation of symptoms is a common phenomenon among a number of environmentally deprived mammals. (p. 1020)

Since then, research on nonhuman primates has amply demonstrated that self-mutilation is a common reaction to social isolation and fear. Research on people (van der Kolk et al., 1991) and on nonhuman primates (Kraemer, 1985; Suomi, 1984) has shown that self-mutilation is a common reaction to extreme disruptions of parental caretaking. For example, isolated young rhesus monkeys engage in self-biting, head slapping, and head banging (Mineka & Suomi, 1978).

Self-mutilation is frequently accompanied by analgesia in both human and nonhuman primates. People who engage in self-mutilation report feeling numb and "dead" prior to harming themselves (Demitrack, Putnam, Brewerton, Brandt, & Gold, 1990; Leibenluft, Gardner, & Cowdry, 1987; Pattison & Kahan, 1983; van der Kolk et al., 1991). They often claim not to experience pain during self-injury, and they report a sense of relief afterward (Gardner & Cowdry, 1985; Leibenluft et al., 1987; Pattison & Kahan, 1983). The experience of dissociation itself may account for the urge to cut: The subjective

sense of deadness and disconnection from others, which originally may have served to cope with extreme trauma, is quite a dysphoric experience. Many people who habitually engage in deliberate self-harm report that self-mutilation allows them to terminate this dysphoric state of mind.

In a recent study on childhood antecedents of self-destructive behavior in psychiatric outpatients (van der Kolk et al., 1991), we found that of the 28 subjects with a history of self-mutilation, 80% gave a history of child physical and/or sexual abuse, and 90% reported a history of severe neglect; only one subject in this study did not give a history of childhood abuse. The age when the abuse had occurred played an important role in both the severity and the form of the self-destruction: The earlier the abuse, the more self-directed the aggression. Abuse during early childhood and latency was strongly correlated with suicide attempts, self-mutilation, and other self-injurious behavior. In contrast, abuse in adolescence was significantly associated only with anorexia and with increased risk taking.

In this prospective study, we followed our subjects an average of 4 years, measuring continued self-destructive behavior. A history of sexual abuse, in particular, predicted continued suicide attempts, self-mutilation, and other self-destructive acts. Severity-of-neglect scores predicted continued suicide attempts, self-mutilation, and other self-destructive behavior. During this period, the subjects with the most severe separation and neglect histories were the most self-destructive. We concluded that child abuse initiates self-destructive behavior, but that lack of secure attachments maintains it. Those subjects who had experienced prolonged separation from their primary caregivers, and those who could not remember feeling special or loved by anyone as children, were least able to use interpersonal resources to control their self-destructive behavior.

Eating disorders

In our study on childhood origins of self-destructive behavior (van der Kolk et al., 1991), we did not find that bulimia was related to childhood abuse and neglect, although there was a weak correlation with adolescent abuse and the development of anorexia nervosa. However, many other studies suggest an association between childhood abuse and eating disorders, particularly with anorexia nervosa. In a large epidemiological study of the high school population of Minnesota, Hernandez and DiClemente (1993) found that sexually abused girls were at greater risk for developing eating disorders. A history of childhood abuse, particularly sexual abuse, keeps showing up in studies of clinical populations with eating disorders, with rates ranging from 7% (Lacey, 1990) to 69% (Folsom, Krahn, Canum, Gold, & Silk, 1989).

In a recent study of women with anorexia nervosa, bulimia nervosa, or both anorexia and bulimia nervosa, Herzog, Staley, Carmody, Robbins, and van der Kolk (1993) found that severity of childhood sexual abuse was correlated with the duration and severity of eating disorders. The high frequency of dissociation, self-mutilation, and inconsistent family rules reported by the eating disorder subjects with childhood sexual abuse parallels the dissociative phenomena, self-destructive behavior, and patterns of parental care commonly reported among other clinical populations with a history of child abuse (Herman, Perry, & van der Kolk, 1989; Sanders & Giolas, 1991). However, the question remains as to whether sexual abuse and eating disorders are causally related, or whether the same disrupted environment in which children's needs are left unattended, and in which the potential sources of protection also become the sources of terror, gives rise both to sexual abuse and to eating disorders.

Substance abuse

Studies of populations with substance abuse consistently report a childhood history of abuse and neglect in much higher proportions than the general population (e.g., Abueg & Fairbank, 1992; Hernandez & DiClemente, 1993). In traumatized adults, high rates of alcohol and drug abuse have been reported as well (Keane & Wolfe, 1990; Kulka et al.,

1990). Thus people with a history of trauma, both as children and as adults, seem to resort to psychoactive substances to remove the impact of these experiences from their conscious awareness. Khantzian (1985) has proposed a self-medication theory of substance abuse, hypothesizing that drugs of abuse are selected according to their specific psychotropic effects. For example, heroin quite powerfully mutes feelings of rage and aggression, while cocaine has significant antidepressant action.

Alcohol probably is the oldest self-medication for the treatment of trauma-related psychological problems; it is an effective short-term medication for sleep disturbances, nightmares, and other intrusive PTSD symptoms (Jellinek & Williams, 1987; Keane, Gerardi, Lyons, & Wolfe, 1988). Although alcohol may effectively dampen memories of, and somatic experiences related to, the trauma, cessation of drinking causes rebound effects, in which people experience sleep loss, nightmares, and flashbacks (Abueg & Fairbank, 1992). Prolonged alcohol use also decreases serotonin levels in the central nervous system, which in the long term aggravates affective and behavioral dysregulation. Alcohol and drug abuse treatment of people with a history of child abuse and neglect is likely to be ineffective if the issue of the effects of trauma on self-regulation is not recognized. Self-help groups such as Alcoholics Anonymous intuitively seem to have grasped this issue and, with extraordinary insight, seem to have incorporated effective posttraumatic treatment into their twelve-step recovery program.

Affect regulation and somatization

The results of the DSM-IV field trials show that affect dysregulation does not usually occur in isolation in trauma victims, but that it instead has a high comorbidity with other psychiatric disorders, especially dissociation and somatization (Herman, 1992; van der Kolk, Roth, & Pelcovitz, in press). A close association between trauma and somatization has been suggested since the dawn of contemporary psychiatry. In the latter part of the 19th century, Pierre Janet (1889) suggested that memories of traumatic experiences may be stored outside conscious awareness and expressed in somatic symptoms. In both the field trials for DSM-IV (van der Kolk, Roth, & Pelcovitz, in press) and in our study of patients with dissociative disorders (Saxe et al., 1993), we came to the surprising conclusion that somatization rarely occurred in the absence of a history of child abuse. We found that 64% of patients with dissociative disorders meet criteria for somatization disorder. These findings support Krystal's (1978) notion that trauma leads to dedifferentiation of affects and that the speechless terror that is part of being traumatized interferes with the capacity to put feelings into words, leaving them to be mutely expressed by bodily dysfunction.

Conclusion

Child abuse and neglect often result in a chronic inability to modulate emotional and behavioral responses. In reaction to this inability, traumatized children learn to mobilize a range of age-appropriate behaviors in an attempt to help control intense affective states. These include self-destructive behaviors, eating disorders, and substance abuse, which often coexist. Clinicians working with children or adults who have eating disorders, who repetitively attempt suicide, or who engage in chronic self-destructive behavior need to deal with issues of abuse, neglect, and abandonment, both in the past and as reexperienced in current relationships. When treating these patients, clinicians must anticipate that painful affects related to interpersonal safety, anger, and emotional needs will often be accompanied by dissociative episodes and by increased aggression against self and others.

Fear must be tamed for people to be able to think and articulate their needs. The somatic fear response can be mitigated by safe attachments, secure meaning schemes, and by a body whose reactions to environmental stress can be predicted and controlled. One of the great mysteries of the processing of traumatic experience is that, as long as the trauma is experienced as speechless terror, the body continues to keep score and reacts to conditional stimuli as a return of the trauma. However, when the mind is able to create symbolic representations of these past experiences, there often seems to be a

taming of terror: a desomatization of experience. This includes the development of a capacity to endure pain in order to attend to recuperation. Much of the treatment of these patients consists of clarifying how current stresses are experienced as a return of past traumas, and how small disruptions in present relationships are a repetition of prior abandonment. The availability of words will help these patients start making the necessary connections between their current affective dysregulation and their past history of abuse and neglect. Words may allow them to make a distinction between past helplessness and current access to ways of coping that were not available when their lives were controlled by people who were unable to respond to their needs.

In our work with children and with adults with a history of child abuse, we have found that patients remain unresponsive to outside influences (good or bad) as long as they remain in a state of psychic numbing. When pain returns and intrusions are reexperienced in the emotional life of these patients, they tend to feel easily overwhelmed, but at the same time they become available to think about various ways of taking care of themselves. The task of clinicians and researchers alike is to understand how particular memories are related to particular affects, and to explore when it is helpful to focus on holding and containment, as well as when it is preferable to explore memories and affects so as to promote a distinction between past helplessness and current mastery.

Table 1. Categories of complex posttraumatic stress disorder

1. Alteration in regulation of affect and impulses
 - a. affect regulation
 - b. modulation of anger
 - c. self-destructive
 - d. suicidal preoccupation
 - e. difficulty modulating sexual involvement
 - f. excessive risk taking
2. Alterations in attention or consciousness
 - a. amnesia
 - b. depersonalization
 - c. transient dissociative episodes
3. Somatization
 - a. digestive system
 - b. chronic pain
 - c. cardiopulmonary symptoms
 - d. conversion symptoms
 - e. sexual symptoms
4. Alterations in self-perception
 - a. ineffectiveness
 - b. permanent damage
 - c. guilt and responsibility
 - d. shame
 - e. nobody can understand
 - f. minimizing
5. Alterations in perception of the perpetrator
 - a. adopting distorted beliefs
 - b. preoccupation with hurting the perpetrator
 - c. idealization of the perpetrator
6. Alterations in relationships with others
 - a. inability to trust
 - b. victimizing others
 - c. revictimization
7. Alterations in systems of meaning
 - a. despair and hopelessness
 - b. loss of previously sustaining beliefs

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This article is based on a presentation at the 15th annual Menninger Winter Psychiatry Conference, held March 7-12, 1993, at Park City, Utah. Dr. van der Kolk is director of the Trauma Clinic at Massachusetts General Hospital in Boston. Ms. Fisler is research coordinator at the Trauma Clinic. Reprint requests may be sent to Dr. van der Kolk at the Trauma Clinic, Erich Lindemann Mental Health Center, 25 Staniford Street, Boston, MA 02114. (Copyright * 1994 The Menninger Foundation)

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