Traumatic Stress and Human Behavior

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In this overview of research into the biopsychosocial changes caused by traumatic events, Dr. Novac discusses psychopathology, brain development and the effect a traumatic event can have on the victim's family—even long after the event occurred.

The past 100 years have been characterized by rapid development of technology, major sociopolitical changes and substantial growth in knowledge about human biology, behavior and the brain. These changes have been paralleled by an ever-increasing speed with which information and news are transmitted around the world. For instance, news of natural disasters, catastrophes and genocides are made widely available, instantaneously, via 24-hour cable news networks, creating an enormous pool of spectators to regional negative events.

This is significant, as the study of traumatic stress has determined that not only victims but also those being confronted with and witnessing traumatic events may be vulnerable to posttraumatic stress disorder (PTSD) (American Psychiatric Association, 1994). There is some evidence that man-made and man-induced traumatic stress is more traumatogenic and more likely to cause psychopathology than natural disasters (Breslau et al., 1991). After a century that claimed approximately 200 million lives in military conflicts and genocide, it becomes particularly important to examine the origins and consequences of traumatic stress and preventive modalities.

In the 1980s, the establishment of diagnostic criteria for PTSD caused a more in-depth inquiry into the effects of trauma on the brain's biology. Literature has recently emerged showing that trauma constitutes the pathogen for both trauma-specific and general psychopathology.

Trauma-Specific Pathology. Post-traumatic stress disorder was first described in the DSM-III, but psychophysiological reactions to traumatic stress have been known since ancient times. Current emphasis on descriptive psychiatry has made it important to differentiate between a variety of syndromes that occur after traumatic events. PTSD has been found to be a fairly common psychiatric condition in the general population. Lifetime PTSD prevalence of 7.8% (Kessler et al., 1995) suggests that it is among the most common psychiatric disorders.

PTSD is characterized by the following triad of symptoms: 1) re-experiencing symptoms (i.e., obsessive recollections, flashbacks, nightmares); 2) avoidant symptoms; and 3) symptoms of hyperarousal. Although the DSM-IV requires the presence of a number of such symptoms, traumatized patients more often may present a hybrid of PTSD, depressive disorder and other anxiety disorders.

For example, some patients will present more severe symptoms of hyperarousal with severe depression. The re-experiencing of symptoms is often misdiagnosed as "obsessiveness" within a depressive disorder. Hyperarousal symptoms may be misdiagnosed as insomnia and anxiety to a major depressive episode. Other patients have predominant obsessive rumination and, thus, may be misdiagnosed with obsessive-compulsive disorder. A careful interview is necessary to elicit different, new habits that may indicate the presence of newly developed avoidant symptoms. Patients with such symptoms may have also self-medicated their hyperarousal with alcohol to mute the symptoms; this drinking is most often denied. Still other patients may experience mixed obsessive recollections with flashbacks and, at times, auditory and visual hallucinations. These patients may be misdiagnosed as dissociative or psychotic. Patients with severe insomnia, symptoms of hyperarousal, severe irritability and racing thoughts may be misdiagnosed as manics or hypermanic borderline patients. In all cases, a recent onset of symptoms and a rapid drop in level of functioning should raise the suspicion of PTSD.

Uncovering the traumatic origins of these manifestations is important because traumatic stress seems to have a lifetime cumulative effect. Previously traumatized victims seem more likely to develop PTSD than first-time victims (Resnick et al., 1995). Among two separate populations of trauma patients, those who developed PTSD later presented lower mean levels of blood cortisol in the immediate aftermath of trauma, compared to those who developed depressive or no psychiatric
condition (Resnick et al., 1995; McFarlane et al., 1997). Peri-traumatic dissociations, elevated heart rate, severe intrusive symptoms and exaggerated startle response have been identified at least in some studies as predictors of PTSD (Shalev et al., 1998; Koopman et al., 1994). General Psychopathology. The majority of traumatized individuals do not develop PTSD. According to Tomb (1994), in an exposed population, the frequency varies anywhere from 10% to 30%. Vietnam veterans are known to have a prevalence of 20% to 30% of PTSD, while the prevalence of PTSD in rape victims may exceed 50% during the first month, then drop to 5% after several years (Tomb, 1994). In a study of 124 Holocaust survivors, 46% were found to suffer from PTSD (Kuch and Cox, 1992). The majority of patients who survive traumatic events develop a variety of anxiety disorders (e.g., phobias and panic attacks), major depression and substance abuse disorders. Among patients with major depression, those with an earlier history of trauma are more likely to present with bipolarity and atypicality (reversed functional shifts) (Levitan et al., 1998), which would support a separate classification of "trauma-related depression." Finally, traumatic stress seems to have had an impact on the prevalence of general psychopathology as well. In fact, the stressogenic lifestyle of the 20th century seems to have led to an increase in prevalence of certain psychiatric disorders.

**Brain Development**

The environment has a significant impact on postnatal cortical development. The orbitofrontal cortex, which is in command of alternating emotional processes, may require both variety and balance between different external stimulations (both negative and positive) for adequate structural and biochemical development (Schore, 1994). The prefrontal neurotransmitter system has been found to be sensitive to environmental stress. Exposure to extreme circumstances may lead to subtle structural abnormalities in the frontal lobe, which is closely related to the limbic system. These abnormalities may further result in deep-seated personality deficits (i.e., an inability to be empathetic, pathological narcissism) that are not readily diagnosable as psychiatric disorders. This may explain why early exposure to traumatic stress or disruptive changes in environment may result in more fundamental behavioral changes that are ego-syntonic and are more often diagnosed as personality disorders. These may vary from subtle interpersonal problems to major personality disturbances, as described in the *DSM-IV*.

Some of these individuals may be prone to aggression and dehumanization of others in the service of a cause that they find noble. Such manifestations, described in a number of political leaders known to have been victims of child abuse, may not fit into a classifiable psychiatric diagnosis. The elusiveness of such dysfunctional behavior is further supported by the fact that systematic analysis of Rorschach ink blot tests obtained from Nazi war criminals did not reveal the presence of any specific mental illness (Zillmer et al., 1995). In summary, the increase in prevalence of traumatic stress over the past century may explain, in part, the increase in behavioral syndromes with less well-defined boundaries. This is consistent with earlier reports (Sass, 1982) linking personality pathology to less structured family environments. Individuals with "deficits of the self" may become new sources of trauma in society. **Impact on the Family**

A body of literature on the behavioral changes exhibited by victims of trauma has emerged over the past decade. Behavioral changes that occur in the absence of classifiable psychopathology have been examined in survivors of domestic violence, natural disasters and the Holocaust; results of such can be found elsewhere (Novac et al., 1999). The study of intergenerational transmission of trauma began with descriptions of trauma-induced behavior transmitted from Holocaust survivors to their children (Felsen, 1998). Early accounts were mainly anecdotal, reported by clinicians and interpreted mainly as psychodynamic processes occurring during early development. However, a 1998 systematic study by Yehuda et al. confirmed that offspring of Holocaust survivor parents with PTSD have a higher lifetime risk for PTSD and report more distress after traumatic events. Thus, besides the exposure to their parents' traumatic stories and their trauma-related acquired behavioral patterns, these offspring may have a biological vulnerability to traumatic stress and PTSD transmitted to them from their parents (Novac and Hubert-Schneider, 1998). In 1998, Suomi and Levine reported intergenerational transmission of trauma in primates. As a result, Novac and Hubert-Schneider (1998) hypothesized that there is a phylogenetically determined survival mechanism by which primates and humans pre-sensitize and prepare their offspring for dangers.

**Conclusions**

Numerous contributions on PTSD have not clarified whether traumatic stress is a normal reaction to unusual circumstances or a pathological response to stressors routinely encountered (Yehuda and McFarlane, 1995). Surviving traumatic stress most likely results in an entire spectrum of behaviors, some of which may be attributable to psychopathology, while others may be adaptational styles. Traumatized individuals may transmit a certain vulnerability to stress to their offspring. Amazing
accomplishments in modern societies may have overextended, at times, the boundaries of compensatory biological systems, creating an environment that is suboptimal for time appropriate maturation of certain brain areas. These same environmental factors, however, may have also resulted in behavioral diversity, social plurality and a quest for tolerance.

References: References


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