

In Terror's Grip: Healing the Ravages of Trauma

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None of us will ever forget the events of September 11, 2001. But some who experienced the terrorist attacks directly—who, for example, fled the scene or rushed in to the rescue—will be forced by their brains not only to remember but to relive the nightmare over and over. Bessel A. van der Kolk, M.D., a pioneer in the study and treatment of traumatic stress, explains how overwhelming trauma reshapes our biology as well as our minds and emotions. How can we use this understanding to help heal those who suffer from the aftershocks of traumatic events, private or public?

The September 2001 terrorist assaults on the United States propelled into public awareness many questions, among them those concerning the human capacity to recuperate from psychological trauma. How do human beings deal with overwhelming experiences? What long-term effects will these events have on American society? Some say that our feelings of trust and safety have been changed forever. Whether that turns out to be true will depend in large measure on how successful the American public and government will be at finding ways to re-establish a sense of effective protection. Thus far, the attacks have mobilized us in vital ways. Our response has been creative and forward-looking—exactly the response that, when it occurs in traumatized individuals, bodes well for recovery. Sustaining this active, well-reasoned response is likely to mean eventually that these terrorist attacks will have shaped, but not determined, our social and political discourse. Our essential identity will remain. Most of us will continue to work and love as before, to engage in life with the same degree of zest, and to embrace our fellow human beings with the same degree of openness.

From research on trauma's impact on various victim populations, we have learned that the great majority of people not affected immediately and personally by a terrible tragedy sustain no lasting damage. Most of those who witness devastating events are able, in the long term, to find ways of going on with their lives with little change in their capacity to love, trust, and hope for the future. Those at highest risk for permanent damage are people who have been directly exposed to traumatic events: who were physically immobile and helpless while trying to escape from the disaster; who have firsthand experiences of its sounds, smells, and images; who directly witnessed the death and dismemberment of human beings; and whose lives have been permanently altered by the death or injury of a loved one.

In general, our society does a relatively good job of protecting its citizens. For example, each year earthquakes kill more than 10,000 people throughout the world. Around the time when the 1989 Loma Prieta earthquake in California struck, another earthquake hit Armenia with the same strength on the Richter scale (7.1). There were 40,000 deaths in Armenia and only 67 in California—the result of good building codes, a well-functioning government, and efficient emergency networks. Following the terrorist attacks of September 11, the outpouring of support, the intense rescue operations, and the leadership shown by government officials are likely to be pivotal in containing the long-term effects of the attack.

Public Disasters, Private Traumas

Psychological trauma is a prime public health issue in the United States. Family and social violence, rapes and assaults, natural disasters, wars, accidents, and predatory violence are all too common. The traumas may temporarily or permanently alter not only people's capacity to cope, their perception of threat, and their concept of themselves and the world, but their very biology.

For most Americans, especially women and children, trauma begins at home. About two-thirds of the almost three million annual attacks on women in this country are carried out by someone they know; in contrast, about two-thirds of the almost four million assaults on males are by strangers. Assault by someone you know is often more serious than assault by a stranger. More than a third of the victims of domestic assault experience serious injury, compared with a quarter of victims of stranger assault.

Despite these startling facts, public disasters command more public concern. September 11 has attracted spectacular attention and financial aid. Social support, public acknowledgment, and practical help to restore functioning all have far-reaching effects in helping victims recover. For victims of domestic abuse, by contrast, lack of validation and public acknowledgment tends to lead to shame, helplessness, secrecy, and preoccupation with hanging on to one's emotional attachments and financial security.

Whether a traumatic experience is solitary or shared by a nation, however, there are commonalities. It may be years before we can assess the full aftereffects of the terrorist attacks. But understanding what scientists and clinicians have learned about how people cope with trauma, and how some may go on to develop lasting problems—both biological and psychological—offers clues to how to help those who have suffered any trauma.

Coping

The critical difference between a stressful but normal event and trauma is a feeling of helplessness to change the outcome. This is obvious when people are trapped physically, or their cries for help go unheeded. A nightmarish example is the experience of waking up during anesthesia, which is thought to happen to some 30,000 people a year undergoing surgical procedures in the United States. If this were to happen to you, you would be conscious and aware of where you were and what was happening but, because of muscle relaxants and other drugs, you would be unable to move or speak. Psychological trauma is a frequent result.

As long as people can imagine having some control over what is happening to them, they usually can keep their wits about them. Only when they are faced with inevitable catastrophe do victims experience intense fear and feelings of loss and desertion. Hearing unanswered screams for help or witnessing mutilated human bodies, as happened to some survivors of the September 11 attacks in Manhattan and Washington, DC, are particularly disturbing. In addition, many trauma survivors, including rape and torture victims, have come face to face with human evil, witnessing people taking pleasure in inflicting humiliation and suffering.

Feeling helpless against a dire threat, people may experience numbness, withdrawal, confusion, shock, or speechless terror. Staying focused on problem solving, on doing something, however small, about the situation—rather than concentrating on one's distress—reduces the chances of developing post-traumatic stress disorder (PTSD). In contrast, spacing out (dissociating) during a traumatic event often predicts the development of subsequent PTSD. The longer the traumatic experience lasts, the more likely the victim is to react by dissociating (separating those thoughts away from the rest of the mind). Once a person dissociates, he becomes incapable of goal-directed action.

People's responses to the traumatic event change as time passes. Usually, there is an initial outcry, seeking help and attempting to re-establish social connections. Once victims have regained a sense of physical safety, they can assess the damage and begin to adjust or assimilate—a process that may take months or years. It is primarily their social context that re-establishes the feeling of safety vital for successful recovery. Such support may come from anybody who can help when one's own inner resources fail. This initial social response will shape the way the victim comes to perceive the safety of the world and the benevolence or malevolence of others. If people in the social environment refuse to step in when a person's own resources are exhausted, this may become as great a source of devastation as the original trauma itself and seed further helplessness, rage, and shame. The wave of efforts to aid the victims of the recent terrorist attacks has been a powerful antidote to the dangers of secondary trauma.

Enter PTSD

Many people who feel powerless to change the outcome of events resort to “emotion-focused” coping; they try to alter their emotional state instead of the circumstances giving rise to it. About one-third of traumatized people eventually turn to alcohol or drugs in a (usually ill-fated) search for relief. This coping behavior is often a prelude to developing PTSD.

Failing to reset their equilibrium after a traumatic experience, people are prone to develop the cluster of symptoms that we diagnose as PTSD. At the core of PTSD is the concept that the imprint of the traumatic event comes to dominate how victims organize their lives. People with PTSD perceive most subsequent stressful life events in the light of their prior trauma. This focus on the past gradually robs their lives of meaning and pleasure.

The definition may be new, but descriptions of the symptoms of PTSD go all the way back to the *Myth of Gilgamesh*, the Greek tragedies, William Shakespeare's *Macbeth*, the works of Leo Tolstoy, and many other literary works from around the world. Not until 1980, however, following a political struggle by mental health professionals to define the suffering of Vietnam War veterans who were plagued by the aftereffects of war-related trauma, were the symptoms of PTSD officially incorporated into the *Diagnostic and Statistical Manual (DSM)* of the American Psychiatric Association.

The diagnosis of PTSD usually focuses on three elements:

1. The repeated reliving of memories of the traumatic experience in images, smells, sounds, and physical sensations. These are usually accompanied by extreme physiological states of hyper- and hypoarousal, and by psychological distress, experiencing trembling, crying, fear, rage, confusion, or paralysis—all of which lead to self-blame and alienation.

2. Avoidance of reminders of the trauma, as well as emotional numbing or detachment. This is associated with an inability to experience pleasure and with a general withdrawal from engagement with life.

3. A pattern of increased arousal, as expressed by hypervigilance, irritability, memory and concentration problems, sleep disturbances, and an exaggerated startle response. Hyperarousal causes traumatized people to become easily distressed by minor irritations. Their perceptions confuse the present and the traumatic past. As a consequence, traumatized people react to many ordinary frustrations as if they were traumatic events.

For people with PTSD, the recurrent reliving of elements of the trauma and their emotional outbursts affect the quality of their lives and relationships. In contrast to the traumatic event, which had a beginning, middle, and end, the long-term imprints of the trauma, transformed into the symptoms of PTSD, are timeless. The problem is

compounded when the sufferer avoids people, places, or actions that are reminders of the trauma; self-medicates with drugs or alcohol; or withdraws emotionally from friends or activities that used to provide solace. Difficulties with attention and concentration prevent victims from engaging with their surroundings with zest and energy. Even uncomplicated activities like reading, conversing, and watching television require extra effort; life is sapped of joy or significance.

Reliving, Not Remembering

In order to understand PTSD, we have to distinguish the persistent reliving of a trauma from ordinary memory, however intense or distorted. Consider the longitudinal study of the psychological and physical health of 200 Harvard College undergraduates who went to World War II after they were students. When these men were re-interviewed about their war experiences 45 years later, those who did not have PTSD had considerably altered their original accounts. The most intense horror of the events had become diluted. In contrast, those who developed the disorder that we call PTSD recalled their wartime memories precisely, having kept them essentially intact in the form of nightmares and recurrent intrusive images for all those decades.

People who are merely remembering a specific event usually do not also relive the images, smells, physical sensations, or sounds associated with that event. Instead, the remembered aspects of the experience coalesce into a story that captures the essence of what happened. As people tell others the story, the narrative gradually changes, and the event is understood as something belonging to their past.

But we have known since the final decades of the 19th century that extreme fear, terror, and helplessness during a traumatic event can overwhelm people's biological and psychological adaptive mechanisms. They are unable to assimilate and integrate their experience. Their "implicit" (sensory and emotional) memories of the trauma are "dissociated" and return not as ordinary memories of what happened, but as intense emotional reactions, nightmares, horrifying images, aggressive behavior, physical pain, and bodily states. The mental imprints of the trauma return.

Thus the core pathology of PTSD is that certain sensations or emotions related to traumatic experiences are dissociated, keep returning in unbidden ways, and do not fade with time. It is normal to distort one's memories over the years, but people with PTSD seem unable to put an event behind them or to minimize its impact. Studies by Edna Foa and ourselves show, however, that as people recover from PTSD, their traumatic memories start to change.

Traumatized people rarely realize that their intense feelings and reactions are based on past experience. They blame their present surroundings for the way they feel and thereby rationalize their feelings. The almost infinite capacity to rationalize in this way keeps them from having to confront the helplessness and horror of their past; they are protected from becoming aware of the true meaning of the messages they receive from the brain areas that specialize in self-preservation and detection of danger.

Indeed, the mind has many tricks for hiding its truths from its owner. In 1914, Sigmund Freud wrote in *Inhibitions, Symptoms and Anxiety* that "If a person does not remember, he is likely to act out: he reproduces it not as a memory but as an action; he repeats it, without knowing, of course, that he is repeating, and in the end, we understand that this is his way of remembering." Most psychiatrists still accept that interpretation and therefore emphasize the need for traumatized people to verbalize and "own" their experiences. This rests on the widespread

agreement that, without the ability to put what happened into words, traumatized individuals tend to react to subsequent stress as if the traumatic event never ended.

If the problem with PTSD is dissociation, treatment should consist of association. Freud wrote in *Remembering, Repeating and Working Through* that “while the patient lives it through as something real and actual, we have to accomplish the therapeutic task, which consists chiefly of translating it back again in terms of the past.” Thus psychotherapy has emphasized helping patients give a full account of their trauma in words, pictures, or some other symbolic form, such as theater or poetry. For traditional therapy this has meant focusing on the construction of a narrative that explains why a person feels a particular way, the expectation being that, by understanding the context of the feelings, the symptoms (sensations, perceptions, and emotional and physical reactions) will disappear. Unfortunately, there is little evidence that simply creating a narrative, without the added process of association, succeeds.

The Traumatized Brain

Confronted with an experience that includes elements of their original trauma, people with PTSD may react as if they were going through it again. Specifically, when enough of their sensations (such as being touched in a particular way, being exposed to certain smells, or seeing images that remind them of the earlier event) match imprints from the original trauma, these people activate biological systems that make them react as if they were being traumatized anew. In short, they have conditioned psychophysiological and neuroendocrine responses to reminders of the trauma.

Studies over two decades have shown that people with PTSD develop abnormalities in the brain chemicals (neurotransmitters) that regulate arousal and attention. One revelation has been that, while acute stress normally activates the stress hormone cortisol, people with PTSD have relatively low levels of cortisol. Because cortisol is an anti-stress hormone, shutting off other biological reactions turned on by stress, people with PTSD are unable to modulate their biological stress response. The overall effect of the decreased cortisol, coupled with chronic increased secretion of neurotransmitters such as norepinephrine, is to make such people more reactive to arousing stimuli. By contrast, in nontraumatized people stress activates all the principal stress hormones, catecholamines and cortisol, which in turn enable active coping behaviors. In people with PTSD, increased arousal accompanied by low cortisol levels provoke indiscriminate fight or flight reactions.

This cascade of biological events in response to stress after the original trauma activates neuroendocrine and behavioral responses that would have been natural on the original occasion, but that fail to resolve the hurt or helplessness the person currently experiences. The vulnerability of people with PTSD to overreact to emotional and sensory stimuli shows up in their behavior as increased impulsivity and anxiety. In addition, because of a phenomenon called “state dependent memory retrieval,” people in a state of high physiological arousal tend to remember emotionally charged experiences related to their memories of the original trauma—memories that were stored in the brain at a time of high arousal. This is what precipitates flashbacks and nightmares.

Under ordinary conditions, the brain structures involved in interpreting what is going on around us function in harmony. The subcortical areas of the brain (evolutionarily more primitive, not under our conscious control and possessing no language) have a different way of representing past experience than the more recently evolved parts of the brain, which are located in the prefrontal cortex. These higher cortical structures create language and symbols

that enable us to communicate about our personal past. When people are frightened or aroused, the frontal areas of the brain, which analyze an experience and associate it with other knowledge, are deactivated.

In people with PTSD, specific deactivation of the dorsolateral prefrontal cortex (which is responsible for executive function) interferes with the ability to formulate a measured response to a threat. At the same time, high levels of arousal interfere with the adequate functioning of the brain region necessary to put one's feelings into words: Broca's area. Traumatized people suffer speechless terror.

Under conditions of intense arousal, the more primitive areas of the brain—the limbic system and brain stem—may generate sensations and emotions that contradict one's conscious attitudes and beliefs. Sensations of fear and anxiety coming from the subcortex can cause traumatized people to behave irrationally in response to stimuli that are objectively neutral, or merely stressful.

One part of the brain identified as central in traumatic reexperiencing belongs to a section of the limbic system that interprets the emotional significance of experience: the amygdala. The amygdala acts like a smoke detector to ascertain whether incoming sensory information spells a threat, and creates emotional memories in response to particular sensations, sounds, and images that it associated with threats to life and limb. When someone is exposed to stimuli that represent danger, signals calling for protection pass from the amygdala to the rest of the body. These emotionally labeled sensations are believed to be indelible, or at least extraordinarily difficult to extinguish. Once the amygdala is programmed to remember particular sounds, smells, and bodily sensations as dangerous, a person is likely always to respond to those stimuli as a trigger for fight or flight reactions.

This, and the altered functioning of other brain regions involved in the appraisal of incoming stimuli (such as the hippocampus, thalamus, and cingulate), seems to cause trauma imprints to be stored as fragmented sensory and emotional traces, rather than being organized into a narrative by the higher brain's autobiographical self. As far as we know, trauma is the only thing that we know gets stored in this way, except for perhaps mental imprints in very small infants.

Memories and Mental Control

An infant's world is defined by bodily sensations. Infants learn to interpret these sensations in the context of physical interactions with their parents. In fact, at this early stage, a mother or father's only tool for their baby's emotional state is to change the child's physical sensations by rocking, feeding, stroking, making soothing noises, and engaging in other comforting physical interactions. The infant is a "subcortical creature...[who] lacks the means for modulation of behavior," which will come with later developments. The infant's experience is strikingly similar to that of the traumatized person, who also appears to be at the mercy of sensations, physical reactions, and emotions—the subcortical brain.

As they mature, human beings continue to rely on feedback from their bodies to signal whether a particular stimulus is dangerous or agreeable. Even as we vastly expand our repertoire of soothing activities, we rely on being able to establish physical (sensate) homeostasis to give us our sense of flow or of being grounded. For traumatized people who develop PTSD, however, this capacity to sooth oneself is compromised. Instead, they tend to rely on actions such as fight or flight, or pathological self-soothing (for example, mutilation, bingeing, starving, or turning to alcohol and drugs) to regulate their internal balance.

Can these primitive responses be inhibited? That depends, in part, on one's relative level of emotional arousal, which, in turn, depends on the activation of regions of the brain stem. Under ordinary conditions, people

can, for example, suppress anger or irritation, or ignore the sensation of hunger, even in the presence of the normal physiological processes associated with these states, such as increased blood pressure, the secretion of saliva, the contraction of stomach muscles. This inhibition is called top-down processing; higher (neocortical) levels of brain processing can—and often do—override, steer, or interrupt the lower levels and thereby elaborate on or interfere with emotional and sensorimotor processing.

As Antonio Damasio puts it:

We use our minds not to discover facts but to hide them. One of the things the screen hides most effectively is the body, our own body, by which I mean, the ins and outs of it, its interiors. Like a veil thrown over the skin to secure its modesty, the screen partially removes from the mind the inner states of the body, those that constitute the flow of life as it wanders in the journey of each day.

The...elusiveness of emotions and feelings is probably a symptom, an indication of how we cover the presentation of our bodies, how much mental imagery masks the reality of the body. Sometimes we use our minds to hide a part of our beings from another part of our beings rather than concentrating resources on the internal states. It is perhaps more advantageous to concentrate one's resources on the images to describe problems out in the world, on the options for their solution and their possible outcomes. But this has a cost. It tends to prevent us from sensing the possible origin and nature of what we call self.

The usual regulatory system of adults is a kind of top-down processing that is based on cognition and operated by the brain's neocortex. This allows for high-level executive functioning: observing, monitoring, integrating, and planning. The system can function effectively, however, only if it succeeds in inhibiting the input from lower brain levels. Traditional psychotherapy, for example, relies on top-down techniques to manage disruptive emotions and sensations, which are viewed as unwanted interferences with normal functioning that need to be harnessed by reason, rather than as reactivated unintegrated fragments of traumatic states. Top-down processing, in fact, inhibits rather than processes (integrates) unpleasant sensations and emotions. A prime characteristic of both children and adults with PTSD is that in the face of a threat, they cannot inhibit emotional states that originate in physical sensations.

The Tyranny of Language

In traditional insight-oriented psychotherapy, people can grasp that certain emotional or somatic reactions belong to the past and are irrelevant to their lives today. This may help them override automatic physiological responses to traumatic reminders, although it will not abolish them. It provides a deeper understanding of why they feel the way they do, but insight of this nature is unlikely to be capable of reconfiguring the overactive alarm systems of the brain.

In a 1996 neuroimaging study using PET scans, we learned that when people relive their traumatic experiences, there is decreased activation of Broca's area in the brain (related to language) and increased activation of the limbic system in the right hemisphere of the brain. This suggests that when people with PTSD are reliving their trauma, they have great difficulty putting that experience into words. That the right hemisphere is activated more than the left implies, in addition, that reliving the trauma totally immerses them in the experience and robs them of the ability to analyze what is currently happening. This is comparable to what Martin Teicher found in the

brains of abused children (Cerebrum, Fall 2000). What this means in practice is that traumatized people are prone to avoid becoming restimulated by memories of the trauma and then losing control; they will tend to talk around the trauma instead of facing it squarely.

The Therapeutic Challenge

When asked to put their trauma into words, many people respond physically—as if they were traumatized all over again—and so do not gain any relief. In fact, reliving the trauma without being firmly anchored in the present often leaves people with PTSD more traumatized. Because recalling the trauma can be so painful, many people with PTSD choose not to expose themselves to situations, including psychotherapy, in which they are asked to do so. A challenge in treating PTSD is to help people process and integrate their traumatic experiences without feeling retraumatized—to process trauma so that it is quenched, not kindled.

Above all, treatment should seek to decondition people from their trauma-based physical responses. Medications such as the selective serotonin reuptake inhibitors can alleviate the distress of PTSD, but even then survivors need to find ways to put the traumatic event into perspective—as an element of their personal history that happened at a particular time, in a particular place.

Until the advent of modern psychological treatments and psychopharmaceuticals, many societies made use of theater and ritual to deal with communal traumas. The Greek tragedies, as well as vivid movie portrayals of the tragedy of Vietnam, are good examples. I am astonished by the similarities among communal healing rituals in various non-Western societies, from Kwa Zulu Natal to Laos. Since September 11, we have seen many spontaneous community rituals, and artists—particularly visual artists—are beginning to reflect the terrorist attacks in their work.

For some years, our Trauma Center in Boston has collaborated with theater groups that work with traumatized inner-city children. Theater is used as a way of dealing with, narrating, and transforming their traumatic experiences—both by sharing their personal experiences and by finding ways of coming to an alternative resolution to the once-inevitable outcome of the original traumatic event. This work is predicated on the notion that to overcome a traumatic experience, one must have a physical experience that directly contradicts the helplessness and sense of inevitable defeat associated with the trauma.

Alleviating Symptoms, Finding Words

In summary, there are three critical steps in treating PTSD: safety, management of anxiety, and emotional processing.

When people's own resources prove inadequate to deal with a threat, they need to rely on others for safety and care. It is critical that trauma victims re-establish contact with their natural social support system. If that system is inadequate to ensure one's safety, institutional resources will be needed to help. Traumatized people need to be helped with shelter, food, and other means to get back on their feet.

After safety is assured, psychological intervention may be needed. People have to learn to put words to the problems they face, to name them, and to formulate appropriate solutions. Victims of assault must learn to distinguish between real threats and the haunting, irrational fears that are part of the disorder. If anxiety dominates, victims need to be helped to strengthen their coping skills. Practical anxiety-management skills may include training in deep muscle relaxation, control of breathing, role playing, and yoga.

Trauma victims must gain enough distance from their sensory imprints and trauma-related emotions to observe and analyze them without becoming hyperaroused or engaging in avoidance maneuvers. One tool for this is the serotonin reuptake blockers, which we have seen in our lab can help PTSD patients gain the necessary emotional distance from traumatic stimuli to make sense of what is happening to them.

After alleviating the most distressing symptoms, it is important to help people with PTSD find a language for understanding and communicating their experiences. To put the traumatic event in perspective, the victim needs to relive it without feeling helpless. Traditionally, following Freud's notion that words can substitute for action to resolve a trauma, this has been done by helping people talk about the entire traumatic experience. Victims are asked to articulate what happened and what led up to it; their own contributions to what happened; their thoughts and fantasies during the event; what was the worst part of it; and their reactions to the event in detail, including how it has affected their perceptions of themselves and others. This exposure therapy is thought to reduce symptoms by allowing patients to realize both that remembering the trauma is not equivalent to experiencing it again and that the experience had a beginning, middle, and end. It belongs to their personal history—to the past, not the present.

Studies have shown that those who can stick with this treatment, reliving their trauma in words and feelings in a safe therapeutic context, have a good chance of overcoming their PTSD. The drawback is that there are high dropout rates, probably because patients are initially overstimulated by re-experiencing the trauma, without the reward of immediate relief.

Incorporating Bodily Experience

Traditional psychotherapy has stressed the interplay of emotions and thought. When a person is upset, traditional therapy promotes understanding and insight into what is happening in the patient's life to stir up powerful emotions. Most such therapy has paid scant attention to post-traumatic changes in bodily experience—the sensate dimension of life. Now brain science is showing that our emotional states originate in the conditions of our bodies: for example, our body's chemical profile, the state of our internal organs, and the contraction of muscles in our face, throat, trunk, and limbs.

Applying these lessons, we realize that effective treatment of PTSD must involve promoting awareness, rather than avoidance, of internal somatic states. This allows feelings to be known, not just sensed as harbingers of threat that must be avoided. Mindfulness, awareness of one's inner experience, is necessary for a person to respond according to what is happening and is needed in the present, rather than reacting to certain somatic sensations as a return of the traumatic past. Such awareness will free people to introduce new options to solve problems and not merely to react reflexively. As Damasio states:

Consciousness establishes a link between the world of automatic regulation and the world of imagination—the world in which images of different modalities (thoughts, feelings, and sensations) can be combined to produce novel images of situations that have not yet happened.

Imagining new possibilities, not merely repetitively retelling the tragic past, is the essence of post-traumatic therapy. New techniques have the potential to desensitize patients with PTSD without fully engaging them in a verbal reliving of the traumatic experience. Although still controversial, one treatment with great promise is eye-movement desensitization and reprocessing (EMDR). In EMDR, people are guided through recollections of the feelings, thoughts, and physical sensations related to a traumatic event, while following with their eyes a moving visual

stimulus—usually the therapist’s hand passing from side to side in front of their face. In the vast majority of traumatized patients, EMDR produces rapid mental associations with seemingly unrelated prior life events and a gradual easing of the emotional intensity of the memories of the trauma itself.

We can only speculate about how EMDR achieves its dramatic effects. We think it may function similarly to dream-sleep, helping to integrate fragmented elements in the past into an inaccurate, but tolerable, “owned” experience. Aside from its apparent remarkable efficacy, this novel treatment challenges our most fundamental explanations of how therapy changes our psychology. Providing bilateral stimulation obviously does not directly affect consciousness; it is likely to work by means of its actions on subcortical processes that have little or nothing to do with conscious insight and understanding (which are the product of higher brain regions). With scientific explorations of treating PTSD being so new, it is likely that other effective methods will also be found.

Life Transforms Biology

It has been only 20 years since scientists and clinicians defined and understood PTSD as the way the human mind responds to overwhelming trauma. Since then, our knowledge of how experience shapes our central nervous system and formation of the self has exploded. Developments in neuroscience have started to contribute significantly to our understanding of how the brain is shaped by experience, and how life itself continues to transform our own biology.

The study of trauma has been perhaps the most fertile area within psychiatry and psychology in promoting deeper understanding of how emotional, cognitive, social, and biological forces interact in human development. Trauma study has yielded entirely new insights into the way extreme experiences may profoundly affect our memory, how our bodies as well as our minds respond to stress, our ability to regulate our emotions, and our relationships to other people. Now, it promises to shed light on the fundamental question of how the mind integrates experience to prepare itself for future threats, even as it distinguishes between what belongs to the present and what belongs to the past. These discoveries, together with a range of new therapy approaches, are opening entirely new perspectives on how people who have been traumatized—whether by an individual in a private act of violence or by a disaster affecting an entire society—can be helped to overcome the tyranny of the past.