

THE DISSOCIATION CAPSULE

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In my 30+ years of the practice of Neurology, I spent the last 20 as the medical director of a rehabilitation center, much of that directing a multidisciplinary chronic pain program. We routinely treated the most challenging patients, those whose physicians had basically given up their treatment in despair, and referred them to us. Our team included a full-time psychologist, and their intake data revealed a dramatic incidence of child abuse (~60%) and of Borderline Personality Disorder (~30%) in our pain clientele. Virtually all of them suffered from depression. Our frequent staff meetings often addressed how to avoid "splitting" of the staff by our borderline patients.

Unlike many pain programs, we avoided the use of narcotics in these patients, and routinely involved drug detox in most. Our patients often were admitted on huge doses of narcotics, but however high their dose, the pain was never relieved or even substantially diminished. We found that detox from Oxycontin often was associated with more panic than with any symptoms of narcotic withdrawal.

Mary was just such a patient. She'd had suffered a very traumatic injury, losing much of the skin of her left forearm in a roll-over auto accident. Surgery and skin grafts saved the arm, but she was left with chronic, searing pain associated at the same time with a feeling that the arm felt numb and detached as if it didn't belong to her. She also had a history of physical abuse as a child by her father. Her admission photography showed a sad, distracted looking woman, with a strange, twisted posture. She stood with her left shoulder markedly elevated, with her left arm rotated backward, her hand virtually behind her back, her head turned slightly to the right. During meetings and exercise, her left hand often wandered off into strange, contracted postures of which she was quite unaware. Although she was on over 80 mg. of oxycodone, her pain was unremitting, usually 10 on a 0-10 scale. Therapists documented that she was forgetful, distracted, and often seemed to be in another world, but with dramatic mood swings, anger and irritability. One could say that she was effectively detached from reality much of the time. One could also say that she typified the majority of patients in my pain program.

What do you suppose Mary's diagnosis would be? Most of you would probably respond something like 307.89 *Pain Disorder Associated with Both Psychological Factors and a General Medical Condition*. But the general medical condition was stable, and for all intents, cured, and the psychological condition was complex to say the least. If one had asked Mary what she was feeling during her distracted

periods, she would have told you that at times she felt out of body, spacey and in "another place". Intrusive, usually negative thoughts were running through her mind, some of which were almost delusional. During those times, despite excruciating pain in her left arm, she had to look at it to find out where it was. Moving it was clumsy and uncertain. Mary clearly was *dissociated* much of the time, and that dissociation also selectively affected her left arm.

Dissociation remains the *bête noire* of psychiatric diagnoses. Its features include "...a disruption in the usually integrated functions of consciousness, memory, or perception of the environment" (DSM-IV, p. 477), but a unitary diagnosis continues to evade us. We refer to states of depersonalization, derealization, distorted time and sensory perception, fugue states, amnesia and dissociative identity disorder. Although conversion hysteria is accepted as a dissociative state, it has been relegated to the category of Somatiform Disorders in the DSM-IV (DSM-IV, 1994). (Somatiform Disorders imply that a symptom is unexplainable on the basis of any physical disruption of body function, and is therefore "psychological".) Opinions about dissociation range from its dismissal as a valid condition or diagnosis, to its endorsement as the primary expression of traumatic stress.

But psychotherapy practitioners in the field know full well what dissociation is. It's that confused, distracted state in your patient that prevents you from breaking through the fog into any semblance of meaningful contact. It's the patient "leaving the room", losing contact with you when you've barely touched on the meaningful traumatic material, or when an obtuse reference to some supposedly benign topic causes a short circuit to a traumatic cue in their memory. It's the state of confusion and distraction that the patient describes, as if they've suffered a brain injury. It's the fortunately rare event where the patient "floods" during a session of EMDR or exposure therapy, entering a state of unremitting panic, or becoming virtually regressed and unresponsive. Finally, it's that state of detachment and inaccessibility they seem to live in that ultimately prevents any progress in therapy, regardless of technique or therapist. I propose to take that clinical experience that you all recognize as dissociation and try to organize it into a functional working model that not only will provide a single frame of reference for the diverse and hard-to-relate symptoms that it seems to represent clinically, and to apply that model to an effective therapeutic paradigm. Unless we consider this divergent group of clinical features that we call dissociation as part of a logical wholistic structure, we'll continue to struggle with dissociation as a concept without a real definition.

(The DSM-IV defines dissociation as "a disruption in the usually integrated functions of consciousness, memory, identity or perception of the environment". I would expand this definition (which basically says that dissociation is an apparently global disruption in perception) to the concept that dissociation has its roots in the procedural memories for remote traumatic events, and that the *confusion between past and current events is the defining feature of dissociation*. Current thinking would suggest that when a patient is dissociated, they are

experiencing distorted perceptions in a variety of possible areas - reality, time, memory, sense of self, sense of the body, etc. In fact what they are experiencing are perceptions that have been stored in survival-based procedural memory as if they reflect the experience of the present moment. The diagnosis of dissociation isn't even mentioned in the DSM-IV description of Posttraumatic Stress Disorder (PTSD), the syndrome that defines the effects of exposure to a traumatic experience. The primary diagnostic criteria for PTSD reflect that posttraumatic symptoms to a significant degree relate to abnormal memory processes - dreams, flashbacks, intrusive thoughts and images, cue-related anxiety and startle, avoidance of exposure to reminders of the trauma. Although the other important criteria for PTSD include arousal and avoidance criteria, one could make the case that the entire symptom complex of PTSD is based on the premise that an event that occurred in the past is perceived as a lived event that is still in the present. I'd like to make the case that trauma therefore could be defined as a *corruption of perception of time and of memory*.

I need to take a little side trip and clarify what I mean by memory. We don't need to get into the complexities of memory theory to understand its application to trauma. For our purposes, let's look at the differences between conscious (explicit) and unconscious (implicit) memory processes. Explicit, or declarative memory, has many subtypes, but is basically what we use to remember facts and events. It's what we use to memorize things to regurgitate for the test in the course we're taking, or in preparation for a profession. Declarative memory is quite subject to rapid decay, and in fact to inaccuracy. Recall references to the inconsistency of reports by witnesses at the scene of an accident, or how a story changes through multiple repetitions. I probably remember 20% at best of what I memorized in medical school.

Our conscious experience of course is intimately associated with our autobiographical declarative memory of key events in our lives - but in fact those events by definition were associated with significant emotional tone - deaths, births, celebrations, losses. Memories associated with high emotional tone assume qualities of implicit, or unconscious memory - they are much more hard-wired and permanent in nature. For example, think for a moment about your first images of the plane crashing into the Twin Towers on 9/11. I'll bet that you can describe in detail the exact images of the room with the TV, what you had been doing before that moment, and so on in great detail. These memories associated with high emotional tone become part of our personal autobiography, and are retained in memory with the accuracy of implicit recall. Basically emotional memories have important implications for survival.

But the most important of the subsets of implicit memory is *procedural memory*, a term that I will belabor you with throughout this article. The primary function of procedural memory is the acquisition of information and skills that are necessary for survival. And most of these have to do with the unconscious functioning of your body. It's how we learn skills and habits - the intentional repetition of a

sensor motor process until it is automatic and unconscious, such as learning a musical instrument, a sport or an art form. It's also how we learn to adapt to danger and threat - the negative associations that we unconsciously learn to avoid, and the positive associations that we learn to seek. Survival-based procedural memory is based on *classical conditioning* - the pairing of life experiences with threat or reward. Although some survival instincts are genetic - fear of falling, snakes and spiders - most must be learned through experience - the spotted cat on the Kalahari Desert, the smell of gas in a home, the whine of an incoming missile. Such memories are acquired in a flash, and stored for a lifetime. And such procedural memories, acquired and stored as part of a traumatic experience and perceived not as skills, but as warnings of present danger, are also the essential ingredient for all of the symptoms of trauma.

Returning to concepts of dissociation, disruption of perception of one's own identity is clearly a feature of dissociation, and the noted neurologist, Antonio Damasio would maintain that one's identity, or sense of self, is in part based on one's somatosensory awareness, the often subconscious perception of "feelings" of the body. In his book, *Descartes' Error*, he describes a compelling working model of the self as: 1) "...representations of key events in an individual's autobiography (emotion-linked declarative memory)...", and 2) "...the primordial representation of an individual's body." (*Descartes' Error*, p. 239) Our "autobiography" basically consists of the sum total of our extrinsic and intrinsic memory for key events in our life that by definition are hard-wired and intrinsic because of their emotional content. Memories such as weddings, births, deaths and athletic successes are examples. Each one of these examples of key life events was associated with unique somatic and visceral experiences (the tingling of the face in joy, the clenching of the gut in grief, the heart-pounding adrenaline rush of scoring the winning goal). These sensations also form part of our "autobiography".

The second part of the self, our "body representation" is composed of all of the sensory information provided by the organs of the body at any given *present moment*. For example, the sensations of emotions (*feelings*) at any given moment provide immediate input to the brain regarding the emotional content of the moment, and how that should affect our immediate behavior. That input will shape our behavior, cause that experience to be stored as a key event and continue to shape our evolving sense of self. So the body itself plays an integral part in our evolving sense of self, both in past sensory memories and in those sensory experiences of the present moment. The self may in essence be thought of as the *embodied mind*. Obviously, one's sense of self is an evolving process. One could say that our sense of self evolves continuously with the passage of time though experiences of the present moment superimposed on our past autobiographical memory.

Intense experiences, especially negative ones, will shape our sense of self

dramatically, with the combination of images, sounds, gut and somatic sensations that accompany them. These sensations become part of our body sense, and of our intrinsic autobiography. Most victims of adult trauma complain that they no longer are the same person they were before the traumatic event. They felt that their life was arrested at that point, was fragmented into disconnected pieces that they no longer could put together as a whole. Because perception of the present moment is relegated to past traumatic experience in the trauma victim, the evolving sense of self will also be "stuck" at that past moment in time. This process is in keeping with the well-known tendency for the trauma victim's sense of self and developmental maturity to be relatively frozen at the time and age of the sentinel traumatic experience.

Therapists in the brain injury rehabilitation program that I directed frequently commented that often the victim's sense of self was probably the most damaged function they experienced. I came to realize that symptoms of diffuse cognitive impairment due to what we called Minor Traumatic Brain Injury were often due to the fact that these patients were dissociated much of the time, and that this state of perceptual confusion was the cause of their attention deficits, slow information processing and short term memory impairment. In many of these cases, the velocity of the accident (5-10 MPH) was clearly not sufficient to cause a brain injury severe enough to produce their degree of cognitive impairment. Not surprisingly, most of these patients whose symptoms included an altered sense of self and significant cognitive impairment after an auto accident had a history of childhood trauma or family dysfunction, since dissociation during childhood predicts the tendency to dissociate after trauma as an adult. So our sense of self may be dramatically changed by a traumatic experience and the dissociation associated with it, especially if we arrive at that traumatic event with a fragmentary sense of self based on a relatively dysfunctional childhood.

As we've said, the sense of self in significant part is shaped by perception of the intrinsic body sensations of the moment. Daniel Stern describes the "present moment" as a brief period of time that lasts from 1-10 seconds and probably represents what we call the "here and now", or even how we perhaps define consciousness. During this moment, we process sensory information coming from both the internal sensations of the body, and from the external environment. The present moment is composed of Damasio's "background feelings of the body", which contribute to our evolving sense of self. Perception of the present moment is tempered by concepts of *time* (when is this happening?), *intentionality* (what, and what are we going to do about it) and *vitality affects* (shifting emotions and their bodily feelings). For example, the present moment during a presentation to your boss might well consist of a focused sense of now, a clear intention of facilitating a job promotion down the line, and mixed emotions of anxiety and excitement. It might be associated with bodily feelings of cold, sweaty palms, tightness in the neck and jaws and "butterflies in the stomach", or by the alertness and adrenaline rush of excitement. Working memory - short-term storage for processing the experience- also contributes to our perception of the

present moment. This fleeting period of awareness, constantly moving into the future, in a sense defines what we perceive as consciousness. The present moment is essential for our ability to process information from our internal and external world, and to act appropriately. During the present moment, we continue to develop our constantly evolving sense of self. Impairment of perception of the present moment may be caused by intrusion of old body-based procedural memories, as well as key memories of past events, especially those linked to old trauma. For example, emotion-linked memories of financial or marital conflicts may intrude on our thoughts as we go to the bedroom to get something, and make us forget why we went there. The tightness in our neck triggered by the conflict may contribute to our distraction. The present moment has been corrupted by the concurrent experience of *feelings* of past traumatic events, and the intention is lost.

We've noted that the uncorrupted present moment is associated with an appropriate concept of time (*when?*) based on input from our prefrontal cortex. This is the dilemma of posttraumatic symptoms: internal and external cues of old traumatic memories continue to trigger emotions and body sensations that don't represent the present moment, but rather past implicit memories when the trauma was experienced. The present moment may be corrupted by these past traumatic autobiographical memories, and the actual experience may be an illusion of time and perception. The somatosensory messages of the present moment that contribute to our evolving sense of self are subordinated to old trauma-related body messages. For example, as we drive by the scene of a recent MVA, our neck stiffens, we feel a little dizzy and for a moment forget where we're going. For a brief instant, we would experience the emotion-linked memory of the accident itself. *I would suggest that this unique narrowing, interruption and corruption of perception of the present moment by past memory in traumatic stress is in fact what we define as dissociation.*

Dissociation, almost by definition, is characterized by a unique and rather sharply defined state of altered perception that is different from reality. As a *state*, we can assign it quite specific features, based on its unique alteration in various types of perception, all of which are memories for past experiences. As a specific state, it will be defined by the boundaries of its content, and I would therefore like to present the metaphorical, but quite functional definition of the *dissociative capsule*. The content of a specific capsule will consist of procedural memories for the autonomic, *somatosensory* and *emotional feelings* of the trauma. All of these states of course are associated with body sensations. Autonomic states (fight/flight/freeze) are associated with cardiac and visceral feelings - pounding heart, cold hands, tremor, chest pressure, gut tightness and cramps. Emotions also are associated with feelings such as the tingling rush of joy, the heavy sinking feeling of depression, the face-burning, constricting feeling of shame. And somatosensory sensations (from the muscles, skin and skeleton) contribute to all of these feelings - tightening of neck and back muscles, tingling of the skin, pressure in the head, even severe pain. Of course, this capsule would also

contain the very specific emotion-linked conscious memories of the event as well. And finally, since endorphins were released in large amounts at the time of the threat and the freeze response that initiated the traumatic event, perceptions of the dissociative capsule will often be distorted and bizarre.

The dissociative capsule would be quite specific to the traumatic event that defined it, and would consist of the sum total of all of those procedural memories reflecting the experiences of the event that were stored, in their finest detail in a diverse grouped cluster of perceptions. These diverse procedural memories, hard-wired and permanent, would be susceptible to recall in the face of both internal and external environmental cues that reflect elements of the traumatic event. (Recall the MVA example noted above.) That recall by definition would occur in the course of some present moment, and would be perceived as *being present*, even though it reflected a past moment. It would interrupt the present moment for a variable period of time depending on the intensity and specificity of the cues. It could last a few seconds, or in the case of numerous large capsules, could occupy one's present moment most or all of the time. Emergence of the dissociative capsule into the present moment would destroy its function (intentionality, acquisition of new memory and evolution of the sense of self). The present moment would consist of old emotionally-based declarative memories and feelings from the body reflecting the autonomic, emotional and somatic input from traumatic procedural memory. During this obliteration of the present moment, the person would exist in the past traumatic experience, would respond to its messages as if confronted with the old trauma, and would be unable to form plans of action or store new memories based on current experience. For that brief or prolonged period of time, consciousness and the mind would be rendered inert. The victim would be frozen in a past traumatic moment, and their perception would reflect that moment. Finally, the inevitable release of endorphins with emergence of the dissociative capsule would cloud cognition and perception, creating the surreal state of dissociative perception.

The contents of a given capsule would be infinitely variable, as one can imagine. Let's use the analogy of experiencing an MVA to illustrate the process. For example, a patient of mine was stopped at a light, when she heard the screech of brakes behind her. She looked up into her rear view mirror, and saw a large truck as it slid into and impacted the rear of her car. She instinctively reached back for her young child in a car seat in the rear, and then was thrown about within the restraints of her lap and shoulder belt but essentially was uninjured. She subsequently experienced the typical symptoms of whiplash - neck and back pain, dizziness with head movement, blurring of vision, ringing in her ears and problems with concentration and memory. She especially note pain in her right shoulder and arm. These symptoms came and went, but particularly were brought on by any activities involving being in a car.

When simply getting into her car, she noted pounding of her heart, tremulousness, neck tightness and pain, right shoulder pain, lightheadedness and a sense of numbness and mild confusion. When stopped at a stoplight, driving by the scene of the accident, hearing the screech of tires in the distance or hearing the crash of trashcans being loaded into a dump truck, all of these symptoms returned proportionate to the intensity of the stimulus, occasionally associated with actual images of the truck in her rearview mirror. They were also experienced with a surreal, detached quality. One would be tempted to attribute these symptoms to the reexperiencing, arousal and numbing criteria for PTSD in the form of flashbacks. But the pain that she felt, the physical sensation in her chest, the ringing in her ears and the dizziness were not imagined - they were actually felt as a physical experience, and were exactly like the sensations she had experienced in the accident. During those experiences, she in effect was living in the past, a time warp of the accident defined by its procedural memories.

The *conscious* emotionally-based memories of the images, sounds, smells and emotions associated with the accident also tend to be distorted, exaggerated and intricately interwoven with their somatosensory components. The image of the grill of an oncoming truck in posttraumatic memory may be bizarrely distorted, and huge, the sound of the crash like an exploding bomb, the smell of the twisted metal choking in its intensity, the movements of the body like an epileptic seizure. Procedural memories of the body would form a large component of the contents of the capsule, such as the reflex patterns of unconscious self-protective muscle contractions throughout the body and the pain and movement-based sensory messages that accompanied them. The stimulation of the balance centers of the brain and inner ears, the outward movements of the eyes in the face of threat, the defensive clenching of the jaw muscles - all of these behaviors and sensory experiences would form a large component of the cluster. The perceptions arising from these memories could include muscle bracing and spasm, jaw clenching, local pain, numbness and tingling, violent movement, dizziness, deafening noise, disturbing images and blurred vision. Visceral sensations linked to emotions and autonomic reflexes might include chest sensations of the pounding heart, and nausea and tightness in the gut.

Autonomic phenomena invariably accompany trauma as part of the fight/flight/freeze response, and would play a prominent part of the experiences of the MVA. These autonomic events and the physical sensations associated with them would actually be stored in procedural memories, and triggered with related cues. Rapid heart-beat, soaring blood pressure, constriction of blood vessels of the skin, dilatation of blood vessels of the heart and brain would form part of the precise procedural memory for traumatic autonomic events. In the face of an associated freeze response, profound drop in blood pressure and pulse, with collapse and weakness of muscles might form a separate memory cluster. One must recognize that in trauma, procedural memory even for the most primitive of body processes occurs. These autonomic states would be replicated within the specific cluster when triggered by cues from the traumatic

event, just as in the clinical example above. One wouldn't just experience the sensations of the heart pounding, the body would actually go through these autonomic changes when the cluster impinged on the present moment triggered by a cue from the trauma such as another close call on the highway. One problem with trauma, of course, is that traumatic cues may generalize (Pavlov called it *irradiation*) to less specific cues with the passage of time. Under these circumstances, the cluster may be triggered by events that don't make much sense - the cues may become almost subliminal, such as the color red if the other car was that color, or even nonspecific ambient life stress.

The emotional components of the traumatic event from the limbic brain will also be stored within the dissociative capsule. Fear, terror, rage and emotional freeze may all be experienced in the MVA, and will be reflected in the exact form and specificity as in the accident, such a rage or terror triggered by another close call. If the victim was also the cause of the MVA, shame may be especially prominent.

At this point, you might object that what I've defined here is simply the component parts of what we call PTSD. In this model, we define PTSD as a compilation of the varied procedural memories that define the dissociative capsule. In PTSD, reexperiencing describes the emotionally linked (and therefore implicit) declarative memories of the capsule in the form of dreams, intrusive thoughts, flashbacks and emotional distress. Avoidance describes the conditioned responses developed as a means of limiting exposure to the environmental stimuli that might trigger the emergence of the capsule. Cognitive impairment, emotional constriction, numbing and detachment probably in part reflect endorphinergic effects of the capsule. The sense of foreshortened future uncannily reflects corruption of the present moment, a state of conscious perception necessary for moving into a conscious future. The future is basically inconceivable in the absence of perception of the present moment. Finally, arousal in PTSD simply reflects the emotional and autonomic content of the capsule, and their associated body sensations (feelings). Dissociation therefore becomes the defining clinical state of trauma, with the symptoms of PTSD representing simple subsets of the capsule contents.

Layered over these procedural memories is the pervasive effect on consciousness of *endorphins*, neurotransmitters that are released in large amounts throughout the fight/flight/freeze experience and that cause analgesia, a state of blunted pain perception, or numbing. Endorphins are released in any threat-based experience to diminish the need for ministrations to an injury that might inhibit successful attempts at flight or self-defense. They also mediate the freeze response so that analgesia can inhibit movement patterns that might trigger further injury, since predators often attack only based on movement cues of the prey. And as we've said, dissociation does have definite links to the freeze. Endorphins also contribute to the surreal perceptions of the dissociative experience, such as feelings of detachment, unreality, out-of-body perceptions, confusion and distortion of body parts. Procedural memory for these distorted

dissociative perceptions is also just as precise as are somatic procedural, and emotion-linked declarative memories. If perception was distorted as a result of endorphins at the time of the trauma, memories within the capsule will be similarly distorted. But what about such limited and diverse traumatic experiences as the loss of a loved one, financial destitution as a result of bankruptcy or an experience of profound shame? Such purely emotional events assume the role of traumatic stress because they are associated with the loss of systems of social support structure that pose an intrinsic threat to our existence. They are more than sufficient to trigger both fight/flight behavior, as well as the freeze. These experiences consist of high levels of limbic and autonomic tone, and visceral body memories associated with those states - the chest and gut clenching sensations of grief and hopelessness, the burning face and lightheaded feeling of shame and the chest tightening and racing heart with the loss of one's livelihood. Being a captive or hostage would leave a capsule with similar autonomic and limbic content, but with predominantly fear and terror and their typical autonomic visceral feelings. In other words, the dissociative capsule may consist of any combination of its basic ingredients - procedural somatic, emotional and autonomic memories, emotionally-based declarative memories and alterations of perception by endorphins. If a common life event such as those noted above is sufficient to create a threat to one's means of coping, and helplessness is present based on the absence of options to solve the problem, that event may assume the mantle of trauma, and its own dissociative capsule may be formed. The "size" or intensity of the capsule would be dependent on the relative intensity of the experience itself, as in surviving a plane crash vs. just seeing the plane fly into the towers vs. childhood incest. It may also be based on the repetitive nature of similar traumatic experiences, as in child and spousal abuse. So repetitive sexual or physical child abuse as a child would be associated with a capsule of great size, and highly intense and generalized cues based on the similar physical and emotional experiences within each traumatic event, the number of exposures over time and its meaning within the child's social structure. The capsule associated with shame, if repeated, could be sizeable, but might contain only autonomic, emotional and emotion-linked declarative memories. The capsule related to a traumatic event that involved physical injury would contain all of the elements but a predominance of procedural body-based memories, such as chronic pain. The reinforcement of common autonomic/limbic/somatosensory traumatic events would create a capsule that occupies a large portion of one's autobiography of key life events, and would therefore be more likely to interrupt the present moment frequently. The earlier in life that these traumatic experiences have occurred, the more intense the effects and the greater the relative size of the capsule will be, with the same harmful perceptual effects.

The quantitative impact of many life traumas, especially occurring in childhood, determines the amount of interference with perception of the present moment that will occur in the trauma victim. When childhood trauma is severe, repetitive and varied, posttraumatic dissociative perception would dominate most of their

present moment, or consciousness. This condition could well define such pervasive states of dissociation as Dissociative Identity Disorder (DID). It's generally recognized that DID is probably based on complex traumatic childhood experiences, often associated with a mix of physical and sexual abuse. In this condition, one would expect a variety of large, complex capsules, each with its own peculiar mix of procedural memory components. Because each capsule would have its own unique autonomic procedural memory state, the various "alters" in DID would manifest their own unique autonomic tone and physiology and even might manifest unique disease states. The autonomic nervous system has a linear connection with the endocrine and immune systems, which are influenced by the pituitary gland through the Hypothalamic/Pituitary/Adrenal axis (the HPA). Hypertension, diabetes, even immune disorders would be based on the specific nature of the autonomic and endocrine abnormalities created by the specific autonomic procedural memory content of the particular capsule.

Poorly understood complex medical syndromes, such as whiplash, could be viewed as dissociative capsules, the myofascial neck and back pain, vertigo, labile blood pressure, temporomandibular joint syndrome, cognitive impairment and emotional lability representing procedural memory for the myriad somatosensory, emotional, autonomic and cognitive experiences of the event. In fact, many of the poorly understood medical syndromes such as chronic pain (especially headaches and low back pain), migraine, fibromyalgia, chronic fatigue, irritable bowel syndrome and gastroesophageal reflux syndrome (GERDs) would represent the procedural memory for somatic and autonomic states within capsules created by specific or cumulative traumatic events. It is well known that these are syndromes that fluctuate markedly, especially in the face of life stress that may contain cues to the capsules. If one accepts this premise, then many of the most common causes for visits to physician's offices in fact represent the somatic symptoms generated by the autonomic and somatic procedural memories within cumulative dissociative capsules.

The concept of trauma as a sharply defined capsule of procedural memories for the events of the traumatic experience provides a useful structure for building a comprehensive treatment rationale. Many accepted and validated therapeutic techniques in trauma therapy are based on concepts of procedural memory, classical conditioning and extinction in trauma. Cognitive behavioral, exposure techniques, and many therapies that employ imagery basically involve, at least in part, principles of extinction or desensitization. There is plenty of evidence that these techniques are effective in diminishing the reexperiencing and arousal symptoms of PTSD, but less so in reducing numbing and avoidance, symptoms that in part reflect the dissociative experiences in trauma. I think this problem reflects the fact that the body-based procedural memories in trauma, those sensations that accompany various autonomic, emotional and somatosensory states, form a large part of the trauma structure. If one accepts that the somatic symptoms of so-called Somatization Disorder actually represent real and tangible experiences generated within the dissociation capsule, then standard

psychotherapy based primarily on verbal context addresses only a small part of the picture. Words do not extinguish the posttraumatic messages of the body that we tend to ignore as part of the trauma structure. The good news is that the incorporation of therapeutic techniques that access somatic procedural memories of trauma, and selectively extinguishing these often neglected experiences and their symptoms adds a whole new dimension to the therapeutic mix.

The so-called somatically-based therapies for trauma introduce the incorporation of somatic procedural memory into the therapeutic process. At this point, I think it's obvious that unless we specifically extinguish somatic cues within the dissociative capsule, they will continue to emerge, trigger the dissociative state and interfere with perception of the present moment. The persistence of somatization, dissociative symptoms, affect regulation and depression as late symptoms of trauma suggests that the definition of PTSD is only the tip of the trauma iceberg. Unless one effectively extinguishes these somatic cues from procedural memory, they will continue to intrude on consciousness and promote further sensitization, growth of dissociative capsules and vulnerability to ambient minor trauma.

If one accepts the premise that extinction of somatic forms of traumatic procedural memory is an absolute prerequisite to healing - (admitting that many do not) - then we need to address therapy from the standpoint of the unconscious, a state that defines implicit forms of memory. We know that the limbic nucleus, the amygdala, evaluates the emotional content of incoming sensory stimuli and triggers arousal if those stimuli imply threat. Antonio Damasio, in his book, *The Feeling of What Happens*, describes a woman with bilateral injury to the amygdala. Although otherwise functionally normal, she showed no capacity for fear or rage. Somehow we need to down-regulate or shut down the amygdala while the patient images, or otherwise accesses the somatic sensations linked to the traumatic event. Without the amygdala "on-line" the somatic feelings of arousal will not occur, and implicit procedural memories of the trauma - body sensations and emotionally linked declarative memories - will no longer have a meaning of threat in the present moment of their perception. They will be relegated to past memory, a prerequisite to dissolution of the dissociative capsule. Effectively down-regulating the amygdala in the face of experiencing the somatic perceptions of the trauma should extinguish this conditioned association in relatively few trials. This process may explain the seemingly inexplicable and sudden healing of traumatic memories seen in a number of the somatically based therapies, such as EMDR and EFT.

What therapy processes would down-regulate the amygdala?

Rituals, especially those associated with intense social interaction, are often part of the healing process in non-western and especially indigenous societies, sometimes as part of the cultural norms, sometimes as practiced by tribal

healers, or shaman. They may involve repetitive behaviors such as drumming, dancing or singing, and frequently induce trance states that are hypnotic. The use of hypnosis in treating trauma may have its roots in this process. Ritual may well play a role in the eye movements of EMDR, the tapping of EFT and TFT and the repetitive affirmative statements of the latter two techniques. We know that brain centers that participate in social and maternal-infant bonding - the orbitofrontal cortex and the limbic cingulate gyrus - also inhibit and down-regulate the amygdala. It makes sense that social ritual would facilitate this process.

Integration of the cerebral hemispheres brings the left hemisphere online, a condition that is inhibited in arousal, where the left frontal cortex and Broca's speech area seem to be selectively inhibited. Integration of the hemispheres would theoretically interfere with and inhibit the independent function of the right amygdala. Cerebral hemispheric integration may be achieved through alternating visual, tactile and auditory stimulation, and might down-regulate the right amygdala while the patient images the traumatic event, removing the arousal charge. Bilateral hemispheric integration may be the desired effect in the alternating touch, auditory and visual stimulation of EMDR. It also may occur with the eye rolling, counting (left hemisphere) and singing (right hemisphere) employed in EFT. The reprocessing of traumatic memory attributed to EMDR might well be relegation of traumatic memories to the past through extinction of their somatic components.

Empowerment is the ultimate goal of all trauma therapy - it removes the state of helplessness that is intrinsic to the trauma experience. There are many ways to accomplish this, including replicating intentionally in a symbolic fashion the defensive movement patterns that accompanied the traumatic event but were truncated by the freeze. This is accomplished unconsciously through accessing the felt sense in Somatic Experiencing, and intentionally in a number of other somatic techniques, including dance, balance, equestrian and art therapy. The ritualistic affirmative statements of EFT and TFT also may function as tools of empowerment. Finally, providing a conscious cognitive structure for the meaning of the contents of the dissociative capsule after its components have been extinguished empowers one with the knowledge that occasional recurrence of somatic symptoms reflecting the capsule is actually an event from the past, and not once again part of an imminent threat.

These hypotheses are clearly speculative at best. Nevertheless, the field of trauma has yet to solve the dilemma of the cascade of often-somatic posttraumatic symptoms that persist long after the criteria based symptoms of PTSD have subsided. The concept of the dissociative capsule provides a wholistic model that reflects the content of the late posttraumatic experience, and begs for a novel approach to its resolution through the use of techniques that address the feelings of the body. Although EMDR has achieved recognition after years of exhaustive study, the esoteric nature of most of somatically-based techniques has relegated them to the dustbin of accepted trauma therapy,

despite their widespread use in many parts of the world, and the many uncontrolled studies that reflect positive results. We may have at our disposal therapeutic techniques that ultimately promise the quality of healing trauma that we have yet to achieve.

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