

Chapter Two: The Trauma Response: Internal Factors

When I was young my mother allowed me to go to the Saturday afternoon matinee movies at one of two theaters within walking distance of our house. Sometimes I went with a friend. Other times I went alone. One Saturday on an "alone" day I watched a newsreel of the U.S. Army entering Hiroshima. The Americans were wearing space suits not unlike what the actors wore on Green Lantern and other such Saturday serials. I remember how Hiroshima looked on the screen – I can see it now as I write. The city was scorched white and leveled to the ground. There was a tower still standing, although that did not impress me. What got to me was a shadow.

The newsreel people had found a foot bridge at ground zero or near to it – and the bridge had been bleached of all color. But a man's shadow lay obliquely across the bridge. He must have been walking there, the movie announcer said, when the bomb vaporized him. (Vaporized!) We know he was there, however, the announcer went on, because the man's shadow had protected the bridge at the instant of highest intensity. (Protected!)

I took it all in. And I understood what I saw. It was either the most horrifying thing I have ever seen – or I was young enough to more fully absorb the horrors. At any rate, Hiroshima entered by way of the eyes, by dint of a shadow. That shadow still lives today in my mind.

*– Lenore Terr, *Too Scared to Cry*, New York, NY: Basic Books, 1990.*

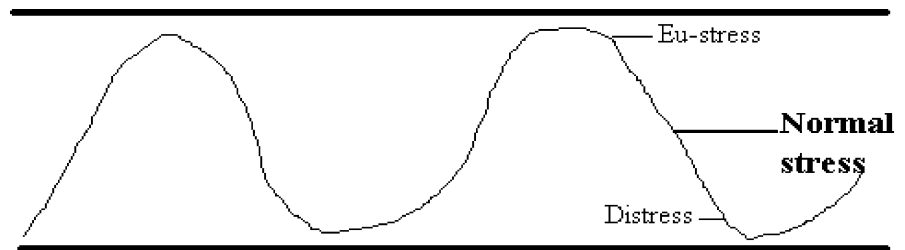
I. The Individual Equilibrium and Stressors

A. The concept of a fluctuating equilibrium

Adults establish a fluctuating physical, emotional,

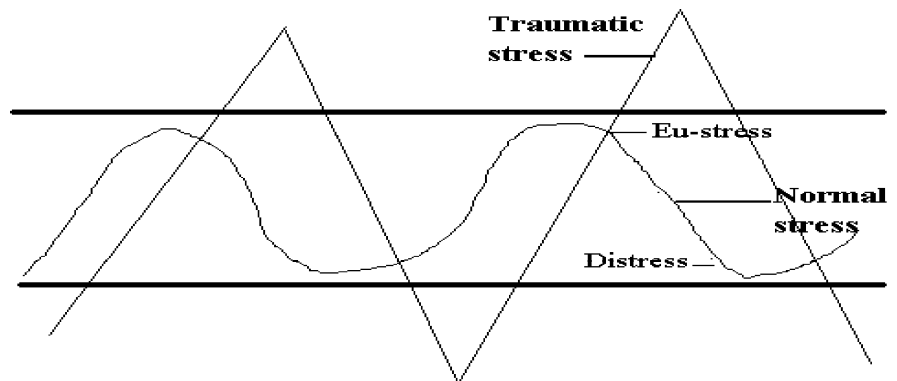
Participant's Notes

mental and social equilibrium on which they balance their lives. In the previous chapter, the concept of a well-functioning individual was depicted as one in which everyday stressors are balanced or successfully coped with through the adaptive capacities of the individual. This balancing act is not a steady state but one in which each day, individuals go through ups (eu-stress) and downs (distress) and use their strengths to maintain themselves and to continue to grow and change. See the Chart below.



B. The effect of crisis on equilibrium

When adults face trauma, they are thrown out of their ordinary equilibrium with such force that they are unable to re-establish former boundaries to their stresses. They must reconstruct a new equilibrium, incorporating the lessons of the trauma and their new adaptive skills. The new equilibrium may be more constricted than the one pre-trauma or it may be more encompassing of possible stresses. See the Chart below.



II. Manifestations of Crisis Reaction

A. The crisis reaction: physical response

1. Physical shock, disorientation, and numbness
This state tends to indicate a psychophysiological incapacity to acknowledge a dangerous threat.

“Your son was murdered last night.” Dorothy’s arms and legs went numb. The words hit her face like a brick. She couldn’t move; the bench was like stone and offered no comfort. She was out there alone with those words and this detective and the unbelievable thought that her Sheldon was no longer alive.

– “The Besses,” a chapter in *What Murder Leaves Behind*, D. Magee, 1983, Dodd, Mead & Co.: NY.

2. During the initial reaction of shock, the body begins to mobilize itself to fight or flee from the crisis.

As other council members ducked behind the U-shaped table, City Attorney William Dowell of Burlington unsuccessfully tried to wrest the gun from Davis. As members of the audience scattered and ran for help, Davis moved behind the table where other members of the council were crouched.

– Description of the December 10, 1986, murder of the mayor of Mt. Pleasant, Iowa; *The Des Moines Register*, December 12, 1986.

- a. Adrenaline begins to pump through the body.
- b. The body may relieve itself of excess materials through regurgitation, defecation, or urination in order to facilitate fight or flight.

Firefighters still have nightmares about what they saw when they stumbled through smoke into the Happy

Land social club on an early Sunday morning one year ago today. There on the dance floor, dozens of partygoers dressed in night-on-the-town clothes lay slumped on the ground, not burned but covered in a fine layer of soot. People still sat at the bar, holding drinks. Couples embraced. There was not a life left to be saved. Some firefighters vomited. Some just wandered, dazed.

– “Smoldering Memories: A Year After the Happy Land Fire, Unfulfilled Promises and an Unresolved Case,” Laurie Goodstein, *The Washington Post*, March 25, 1991.

- c. The body's heart rate increases.
- d. The body may begin to hyperventilate or sweat.
- e. The body increases its attention to sensory perceptions. In the initial reaction, attention will often be focused on one sense, sometimes to the exclusion of others. Visual sensations are normally most acute in human beings, but it is important to recognize that all senses are involved. While sights or sounds may leave indelible memories, so may things touched, smelled or tasted.

“It sounded like a big crack of thunder... I heard one loud explosion, one medium and one soft one, if not more than that.”

Maureen Cassidy] “What we saw looked like fireworks. ...It was kind of crazy because it was not very loud. It was sight more than sound.” [Paul Roberti] “I felt the ground shake, like a little tremor.” [Orson Cummings]

–“747 Explodes with 229 Aboard Shortly After Takeoff From N.Y.,” Phillips, D., *The Washington Post*, July 18, 1996.

- 3. Heightened physical arousal associated with fight or flight cannot be prolonged indefinitely. Eventu-

ally it will result in exhaustion. The impact of exhaustion affects an individual's psychological response. After the body rests, either as a result of sleep or faintness, an individual may feel depressed and disturbed. Sleep has served to pass the individual from the time when the disaster happened to a future time. Victims or survivors have gone on with their lives whether they wanted to or not. The disaster is an integral part of their past and their future has been altered irrevocably. Some of the distress at this process is caused by the sadness of what has happened and the fact that it can never be changed. It can be understood in the light of the following illustration where the brackets represent the sleep interruption of conscious thought.

yesterday [– today –] tomorrow

When disaster occurs for many, there is a desire to keep the present alive as long as possible in order to be able sustain the belief either that things can be returned to normal, or the emotional sense that so long as the present is still continuing, their life as it was will continue. Sleep brings the knowledge that time does go on and today's disaster – symbolized by an asterick in the illustration below – will become a part of history.

past	[– present*disaster –]	future
past*disaster	[–present/going-on–]	future

“Total hysteria spread when we found out there were over two fatalities,” [DeDe] Dunlap said. “I didn’t know how to feel at first, but now I am completely drained with no energy left.”

– A reaction to the traffic accident that killed 5 young coeds in Oxford, MS, and injured 11 others on Thursday, March 26, 1987, *The Daily Mississippian*, Friday, March 27, 1987.

B. The crisis reaction: the mind's response

1. The mind's response parallels the physical response. There is typically an initial cognitive reaction of shock, disbelief, and denial. The mind simply cannot recognize the traumatic event as a reality in its initial encounter as it seeks to find a benign interpretation of the threat.

2. Regression

When cognitive functions seem to cease momentarily, it is not uncommon for individuals to experience a regression to a childlike state or infancy. In that state, emotions become dominant.

3. Cataclysm of emotions

After the physical danger has ebbed, the individual may feel overwhelmed with myriad, disorganized emotions but in fact there seems to be a logical order in which emotional reactions are manifested.

a. Fear and terror

Fear seems to be a primal reaction. Fear may be inspired by the loss of autonomy – the ability to control impulses and to address situations through planning, a uniquely human characteristic. It is also related to the state of regression. Fear is the most commonly seen reaction in children. When faced with a fight or flight situation, instinct warns that they lack the power to fight and so fear becomes the impetus for fleeing.

Fear becomes terror when victims internalize the knowledge that they, their loved ones, or their communities will not survive the threatening situation. Interestingly, there is some evidence that in abusive situations, the threat to inflict pain can trigger fears more damaging than the immediate sensation of pain, and the threat of death can be useless since it may confirm the hopelessness of a situation and offer surcease from pain.

However, in sudden random trauma, Robert Lifton refers to the “death imprint” when

people feel they have witnessed their own death and survived. Fear or terror may be generalized or enunciated in terms of specific literal threatening acts or individuals.

Numerous calls on the 911 tape illustrated the victims' terror. ... "There's a man in our office with a gun," a man's voice rasped on the 911 tape. "He has fired at several people."

Asked for details, the man dropped his voice, whispering, "It's a semiautomatic, definitely. He's still shooting. Yes. ... We're being killed ... and he's killing everybody."

*—"Jacksonville Gunman Shot 4 Others Before Rampage at Finance Company," L. Parker, *The Washington Post*, June 20, 1990.*

b. Anger, fury, and outrage

Anger's force derives from the need to respond aggressively to a threat through the "fight" reaction. Everyday anger at frustrating events does not begin to describe some victims' reactions to a traumatic event. Often, traumatic anger is directed at an offender or a person held responsible for a tragic event, although it may be displaced onto God, family members, or social institutions, or turned inward towards oneself. Traumatic anger also may result in overgeneralization in the definition of its target. Instead of focusing anger on an offender who happens to be Caucasian, the anger is focused on all Caucasians.

Anger may be associated with the desire for vengeance. Revenge is an augmentation of anger directed at an individual or class of individuals. It is a common response, but for many, the desire for revenge may subside even though overwhelming rage remains directed at the situation. Anger may also be associated

with hatred, which has been called “calcified anger.” It leaves people feeling empty, bitter, morally in conflict, and painfully dissonant with normal feelings of humanity. The intensity of anger and its antisocial aspects is often new to victims and survivors of catastrophe. Social reaction to the anger of others is often one of disapproval and disgust.

But among the survivors, shock turned to grief and grief to anger, and healing them became a thankless job at best. “People tend to lash out,” says Amy Hahn, director of the Edmond Ministerial Alliance’s Hope Center relief office. “They felt hurt, they felt forgotten, they felt wronged.” Hahn said for some victims, anger turned to wrath, and survivors started spitting venom at anything that moved.

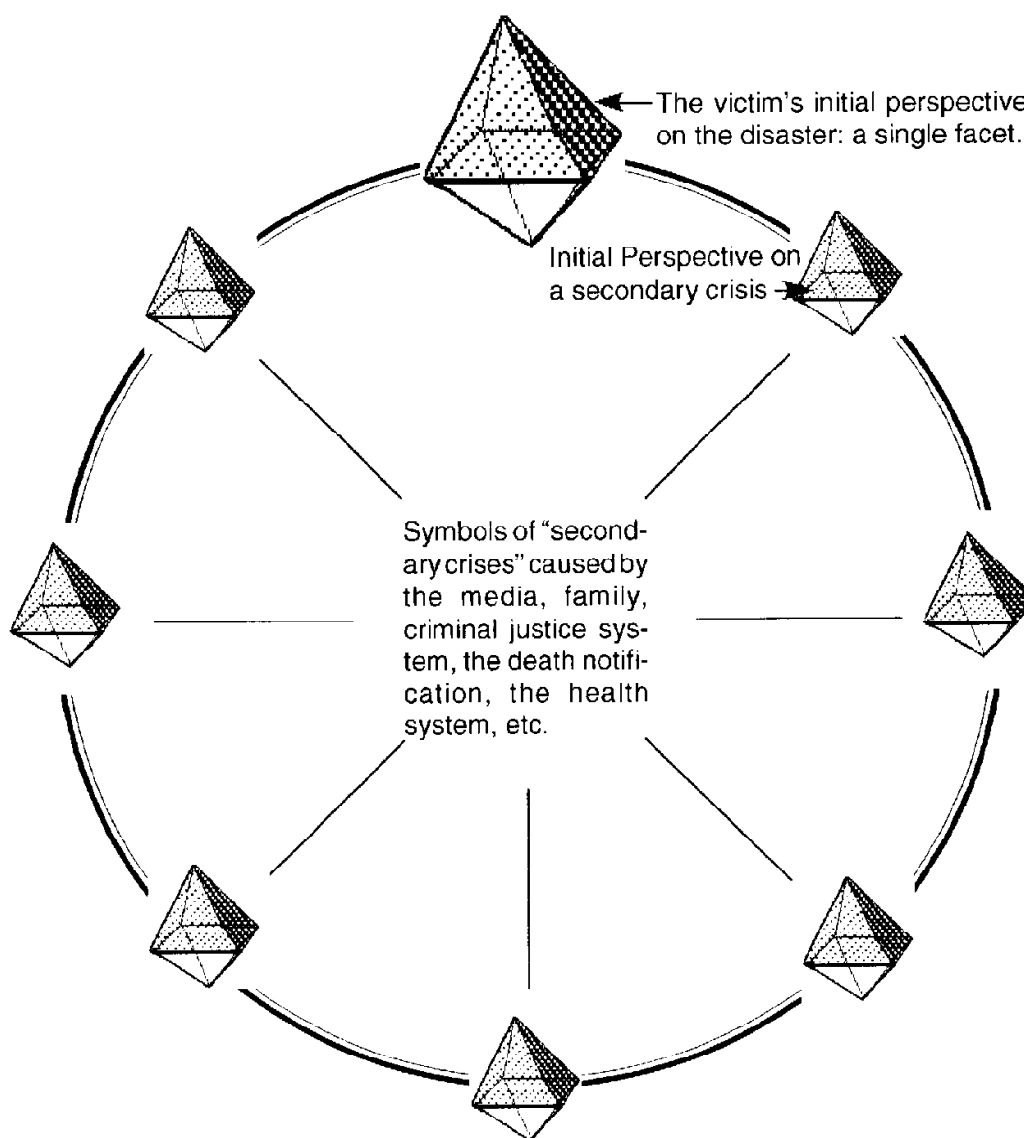
– Reflections on the year after the Edmond, OK, massacre in “Living with the scars of a massacre,” Tim Madigan, *Fort Worth Star Telegram*, August 9, 1987.

c. Confusion and frustration

Confusion stems from the victims’ initially narrow perspective on what happened and how [see “Multifaceted” Chart on the next page]. Victims often remember only scattered impressions of a traumatic event. Many of these impressions may be sensory perceptions or sporadic feelings about what happened, but they do not form a coherent whole. The confusion becomes frustration when victims think they should remember or could remember if they only tried. As they attempt to piece together a picture of the event, the confusion may be compounded as they try to understand why it happened – or why it happened to them. Often frustration is caused by the seeming unresponsiveness of institutions, from the criminal justice system to the victim’s family.

The Multi-Faceted Dimensions of Disaster

Depicting the victim's initial perspective on a disastrous event and the additional perspectives the victim may develop over that event and related events that may cause crisis or trauma.



d. Guilt or self-blame

Guilt or self-blame are cognitive emotions that arise from the effort to sort out confusion. They often are characterized by two aspects. The first can be called “cognitive” guilt, which may be legitimate or illegitimate. Legitimate cognitive guilt focuses on the could’ve, would’ve or should’ve of the victims’ or survivors’ actions before, during, or immediately after the event. They involve actions that might have been taken but were not because there is no way to predict the future. They are often exacerbated when the traumatized individuals compress time chronologies in their minds, such that things that happened after an event are thought to have happened before it, thereby offering some clue that the event was going to happen. Self-blame based on an erroneous reconstruction of facts is “illegitimate,” as it is when there are no facts on which to attribute any guilt to the victim.

Another type of guilt is known as “survivor guilt” or “existential guilt.” Victims are often plagued with internal questions about why they survived while others died, or why their loved ones didn’t survive when others did. Some may think themselves unworthy of survival or may feel guilty because someone chose to save them while others died.

The question “why” hangs over Indianapolis today – as it has for the past two days. In the aftermath of an unexpected tragedy such as Tuesday’s Air Force jet crash landing into the lobby of a Ramada Inn, the natural tendency is to search for reasons. Why did nine persons have to die? Why did some survive while others perished? Why couldn’t the jet’s engine have flamed out over some desolate area instead of one that is heavily populated? Understandable as all those questions are, the people who ask them probably never will get an

answer that satisfies them.... Human lives always will be subject to chance. Sometimes even the brutal chance that brings an airplane out of the sky and into a hotel lobby.

– Editorial, *The Indianapolis News*, October 22, 1987.

e. Shame or humiliation

Shame seems to be associated with guilt or self-blame but it reflects the internalization that victims are responsible for the event as well as that they are somehow intrinsically more vulnerable to such tragedies.

Many personal testimonies of trauma survivors indicate that not being supported by the people they counted on, and being blamed for bringing horrendous experiences upon themselves, have left deeper scars than the traumatic event itself. Victims often feel the same way about themselves: They feel ashamed and disgusted by their failure to prevent what has happened. Thus, for many victims, a breach in their relationship to their expectations of themselves and of their culture becomes part of the traumatic experience.

– van der Kolk & McFarlane, “Trauma and Its Challenge to Society,” in *Traumatic Stress*, van der Kolk, McFarlane & Weisaeth, eds., New York, NY. Guilford Press, 1996.

Lenore Terr talks about the feelings of being subhuman among child victims, but adult victims also suffer a loss of status, self-esteem, and power as a result of their victimization. Both victimization and responses to it may be shameful to the victim and often communities respond by stigmatizing the shamed.

*...The kids of Chowchilla hated their notoriety. They hated what had happened to them. They hated their story. And so they hated "The Rock [a memorial at the place where the school bus they were in had been buried while their kidnappers sought a ransom for their lives]." It served as a symbol of all that. If the monument stood for anything at all, it stood for the children's utter helplessness. It stood for once having been diminished to less-than-human status. As V.S. Naipaul would have said, it stood for "being reduced to nothing, [for] being crushed." The rock marker celebrated something better kept secret. It proclaimed that you weren't as invulnerable as your nontraumatized brother. That you had been out of control. That you were unlucky. "The Rock," in other words, was a marker of "shame."
– Lenore Terr, *Too Scared to Cry*, 1990.*

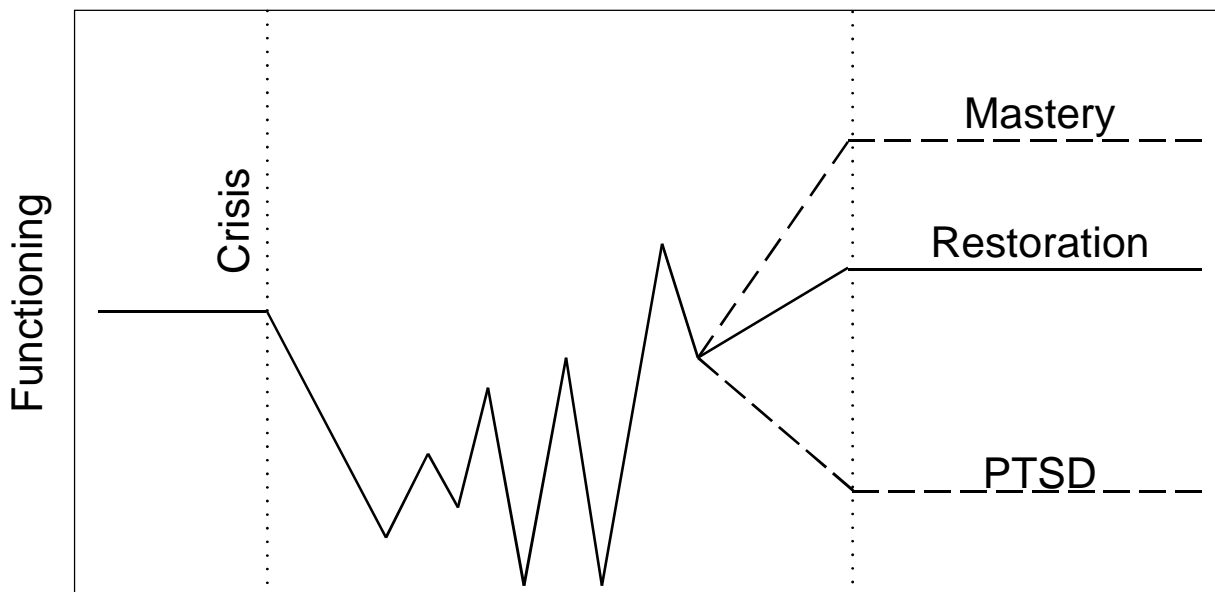
f. Grief or sorrow

Grief may be the most intense long-term emotional reaction to traumatic loss. It is not ordinary grief. The traumatic emotions that are also precipitated by the extraordinary event complicate the grieving process. These complications and some of the issues that are involved in traumatic death will be discussed in more detail in the chapter on Death and Dying.

4. Reconstruction of equilibrium

With good support systems and effective interventions, the emotional roller-coaster can eventually turn into a new equilibrium for functioning. It will be different from the original equilibrium. The new equilibrium may continue to be punctuated by traumatic memories or grief spasms, as illustrated in the next chart, but individuals can learn to enhance their adaptive capacities to cope with these punctuations and move towards new growth and self-actualization.

Reconstruction Involves Trial and Error



II. How the Brain Reacts to Trauma

A. The brain's structure

The interrelationships between brain, mind, and body are complex and interactive. In this manual, the terms brain and mind are used interchangeably, although there has been a long historical debate concerning issues of monism or dualism. The brain may be distinguished as the bodily structure of cells while the mind may be identified as the mental processes that are the result of these interrelationships between the brain and body which affect layers of neurons via chemicals carried through the blood stream. But in order to function they both need to be used. Similarly, the brain is a part of the body; hence, discussions that seek to separate bodily functions from the brain's work can be misleading.

Despite current research, there is still much that is unknown about normal brain functions and even less about the mind's reactions to trauma. However, a basic understanding of brain functions and the communication network in the brain is helpful in explaining crisis and trauma reactions as well as suggesting why some types of immediate and long-term interventions may be effective.

1. Brain functions

One way of describing the body/brain relationship is to think of the body as the recipient of and conduit for information about the state of the body itself and its environment through the five senses. These senses are sight, sound, touch and motion, smell, and taste. Each of these senses have several facets, for example:

- Sight: hue, tint, saturation, distance or depth, and shape
- Sound: pitch, rhythm, volume, tone, and timbre
- Touch or motion: shape, size, texture, temperature, moisture, direction, and speed
- Smell: spicy, minty, floral, musky, resinous, foul, and acrid
- Taste: salty, sweet, sour, and bitter.

This sensory information is then sorted, analyzed, organized or consolidated, and interpreted by the brain to determine what, if any, response should be made to the information.

While the whole brain is involved in decision-making (conscious or unconscious), there are three systems with different primary functions based on the evolution of the human species.

The *spinal cord* is connected to the brain at the *brain stem* which regulates breathing, metabolism, and innate reactions of the body. It is the same structure that appears in reptiles and hence has been termed the *lizard brain*. The lizard brain ends in the *rhinencephalon* which is the source of smell and interpretation of smell, and so has been called the *nose brain*.

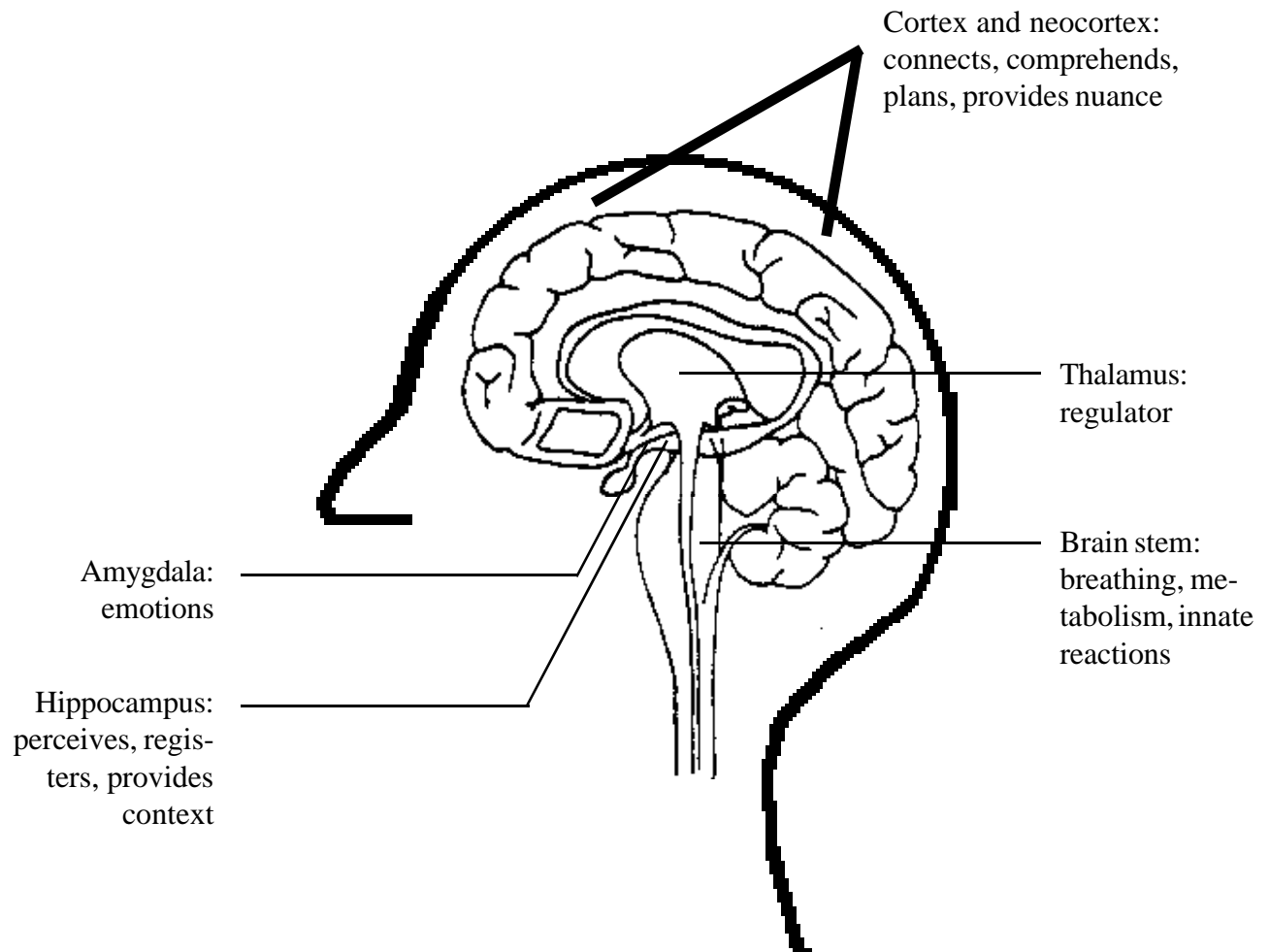
As the brain evolved from reptile to mammal, it developed the capacity for emotion, differentiation of perceptions and response. This expansion of the brain resulted in the *limbic system* which surrounds the nose brain and has been described as being in the shape of a bagel with a bite out of it where the nose brain connects. The limbic system includes the *hippocampus* which perceives, registers, and associates incoming data and provides

the mind with the context of an event. It receives information from the *amygdala* which has already added emotional content to the sensory information. The amygdala works in concert with the hippocampus and holds the blueprint for emotional life – negative reactions such as fear or anger and positive reactions such as love and joy. The psychological function of emotion seems to be to alert the brain to pay attention to what is happening and adapt or react to the information received.

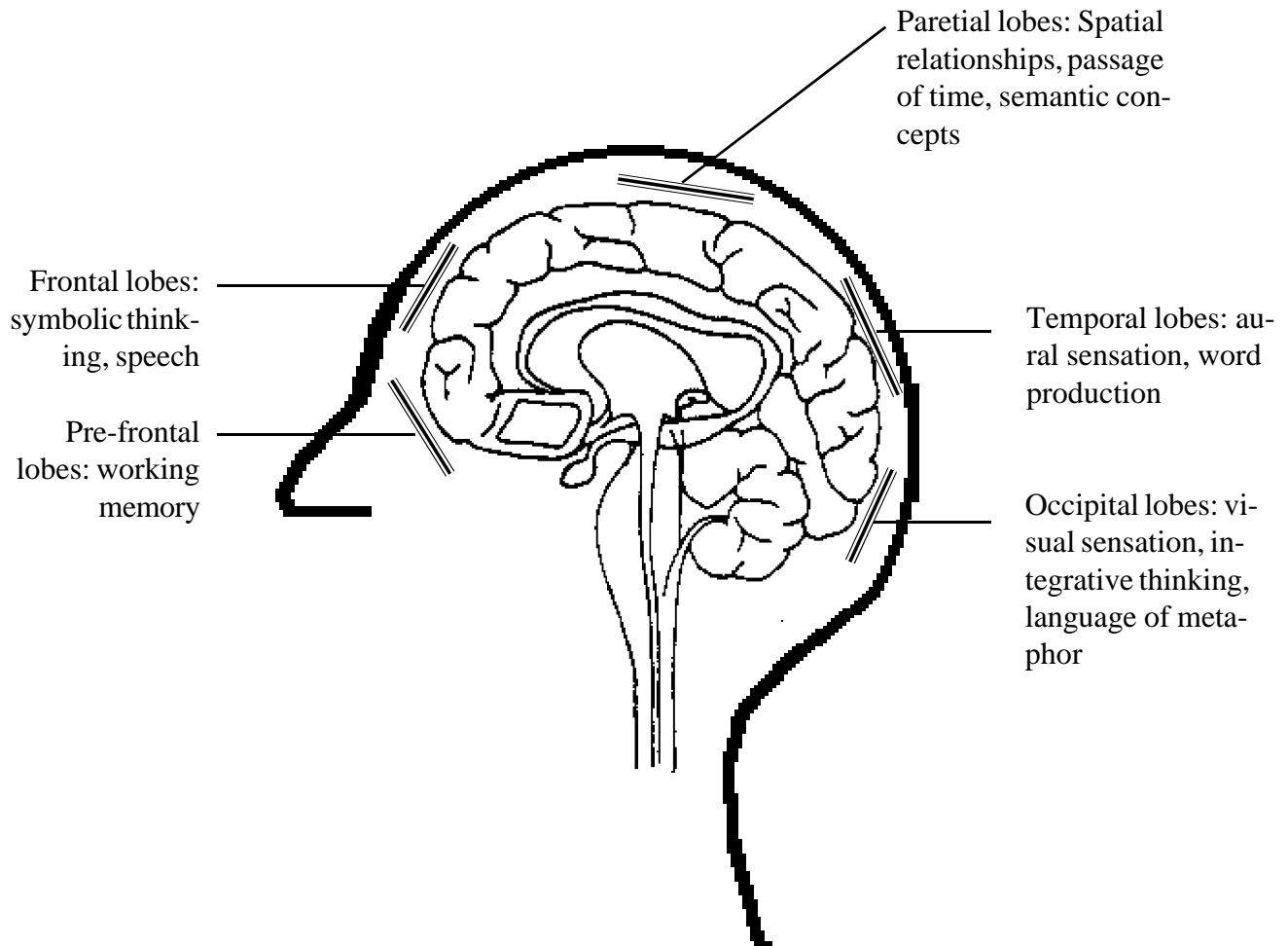
The most recent evolutionary stage has been the development of the cerebral cortex, which is like an umbrella over the limbic system and includes the *cortex* and *neocortex*. These systems provide the ability to comprehend events, connect information in a rational manner, perceive nuances of senses, analyze events more deeply, solve problems, develop memory, and engage in long-term planning. The *thalamus* rests deep within the brain and serves as a regulator of all senses, acting as an internal alarm system when the body is overwhelmed by sensory information that is threatening. It sends information to the neocortex and the amygdala simultaneously, but the information arrives more quickly at the amygdala and so people initially react to things based on instinct and emotion with the neocortex mediating these reactions through organization and the translation of experience into language. [See the “Brain Systems” chart on the next page.]

The cortex and neocortex, the tools of normal thinking, are divided into four parts, each with two lobes (left and right brains): the *frontal lobes*, *parietal lobes*, *temporal lobes*, and the *occipital lobes*. [See the “Lobes of the Cortex and the Neocortex” chart on page 17.] Each stores and processes particular types of information and is responsible for different memory functions. The frontal lobes handle motor actions, impulse inhibition, speech production, imagination, foresight, social consciousness, symbolic thinking, calculation, and

Brain Systems



Lobes of the Cortex and Neocortex



long-term memory. They also house the prefrontal lobes that are the focus of working memory. The frontal lobes are key in the expression of emotion. The limbic system may generate emotional responses, but it is the cortex that interprets that response into a verbal reaction.

The parietal lobes are the locus of spatial relations, physical sensations, body awareness, language, semantic concepts, and the sense of a passage of time. The temporal lobes are the focus of aural sensations, word production, and balance. The occipital lobes are the source of visual sensations, determination of color, integrative thinking and the language of metaphor.

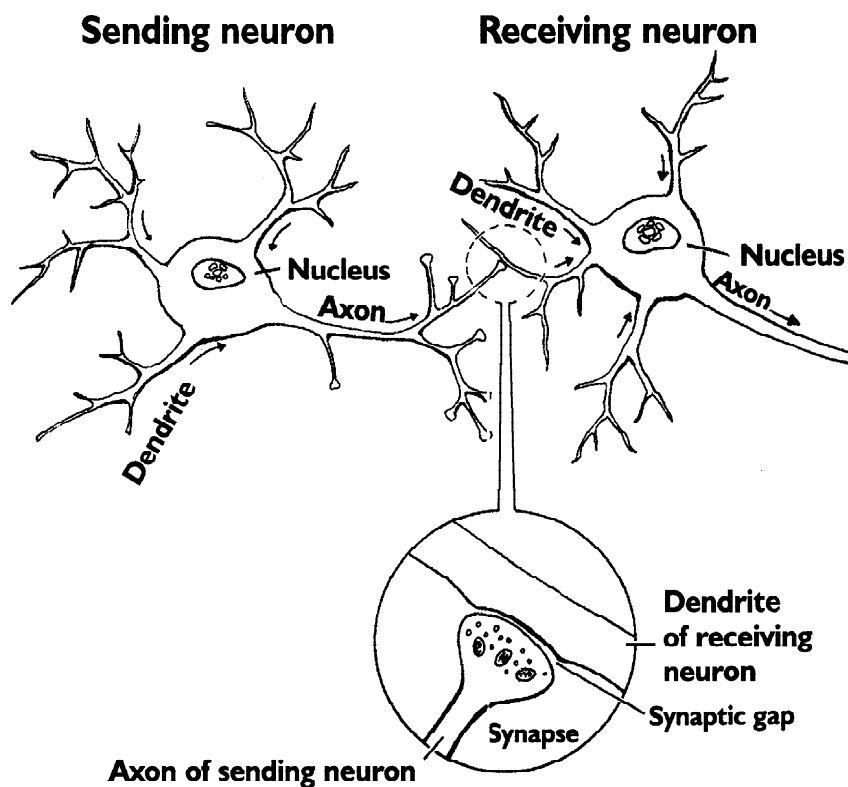
The relevance of understanding the various functions of the cortex and neocortex is to begin to comprehend the complexity and interconnections involved in ordinary thought processes. There is no one location of thought or memory; rather, all parts of the brain are involved in processing and remembering information received. The production of language is a good example of the interconnections between various parts of the brain. The frontal lobes are the source of actual speech, the parietal lobes register semantic concepts, the temporal lobes contribute to word production, and the occipital lobes translate perceptions into the language of metaphor. The integration of all these parts and functions give rise to the expression of thoughts and feelings through language.

2. Communication within the brain

Communication within the brain is conducted through the connections made between about 100 billion *neurons* or nerve cells that are influenced by incoming sensory information as well as the release of chemicals and hormones in the blood stream. A neuron is composed of a nucleus and branches that receive and send messages. When one neuron sends out an electrical signal it goes through an outgoing branch (*the axon* or “acts

on”) passing over a *synapse* or gap between the nerve cells to a receiving branch (*the dendrite* or “end right”) of another neuron. When that signal is received, it triggers a chemical change in the second neuron which in turn triggers another electrical signal that is sent to a third neuron, and so forth. If two neurons communicate often enough a bond between the two is created that over time becomes imprinted in the mind. That imprint seems to be the basis of memory. [See the chart below.]

When individuals are born, their brains have all of their potential neurons, but the brain’s size is only 25% of its adult weight. Growth occurs over the next few years with the formation of synaptic connections between the neurons. Birth seems to jump start this growth process. Some have likened the process to the impact of spring on deciduous trees. The trunk is alive and well. When warm weather begins to occur,



buds of leaves develop upon the existing limbs and grow and flourish. It is the formation of synaptic connections that increase the density of the brain. The number of these connections and their health or condition may be what distinguishes differences in mental capacities. Synaptic gaps must be clear to allow static free communication between the neurons. Calcium helps to keep the gaps free of static and protein tends to clog the gaps.

Some of the new brain cells nourish neurons and are responsible for the development of *myelin*. Myelin surrounds the axions of some neurons in order to protect them and to reduce the random spread of impulses from one neuron to another. While the majority of myelination is completed by the time the child is two years old, some myelin continues to develop until adolescence. As neurons become myelinated, they pass impulses more rapidly and efficiently. Initially, it is the primary areas of the brain which are responsible for more primitive behaviors such as motor coordination and vision. The cortical association areas, which are responsible for integrating and interpreting the stimuli, lag behind in the early stages of development. Thus, communication between the various parts of the brain is limited. Increased functioning occurs as myelination increases.

Neurons do not reproduce or replace themselves. They grow old and some of them will begin to fail or die. However, there are billions of neurons, so even though the brain cannot grow new neurons, the neurons themselves can form new connections with one another. If a certain neuronal connection is destroyed, alternate connections may be created and the combinations are virtually unlimited. Memory may be improved when an individual thinks about an event in many different ways and thereby creates multiple networks of neuron-synaptic con-

nections, making recollection of the event possible through multiple paths.

[** Neurotransmitters are chemicals that are secreted to assist and promote neural transmissions. They include hormones such as *epinephrine* and *norepinephrine* which assist in memory consolidation, as well as *serotonin* which modulates the effect of norepinephrine and allows the brain to monitor information and respond appropriately. Serotonin may also be associated with aggression when found at high levels, or depression when found at low levels. Neuron activity is also affected by the *hypothalamic*, *pituitary*, and *adrenal* systems when they release chemicals such as *cortisol*, *glucocorticoids*, *vasopressin* and *oxytocin*. These seem to stimulate coping behaviors.

Emergency response is stimulated by the release of the *corticotropin hormone*. Under high-stress situations, the brain also is affected by the secretions of *endogenous opioids* that have a numbing effect and create *stress-induced analgesia*. This may inhibit the storage of experience in explicit memory and prohibit either remembering the experience or learning from it.**]

B. Thinking patterns: everyday and traumatic

1. Everyday thinking patterns

Thinking may be described as the brain's effort to process sensory information through associating it with previous experiences, responding to it, organizing it, and interpreting it. The *association* is to other cognitive and emotional memories. The *response* is the behavioral reaction which is simultaneously processed. *Organization* of the experience is the development of a communicable narrative through time chronology and the sensory context of an event. *Interpretation* is the effort to further integrate the experience into an individual's personality and social or cultural meaning systems

based on values and beliefs. Thinking is dependent upon learning and memory.

Learning is the modification of behavior by experience. And memory is the retention of that experience over time. Even the simple behavior of a simple animal activates many nerve cells and many connections to other cells. Modified and retained behavior is embedded in neural circuitry, no matter how simple the animal. Memory involves a lasting change in the relationship between cells.

—Terr, Lenore, *Unchained Memories*. New York, NY, Basic Books, 1994.

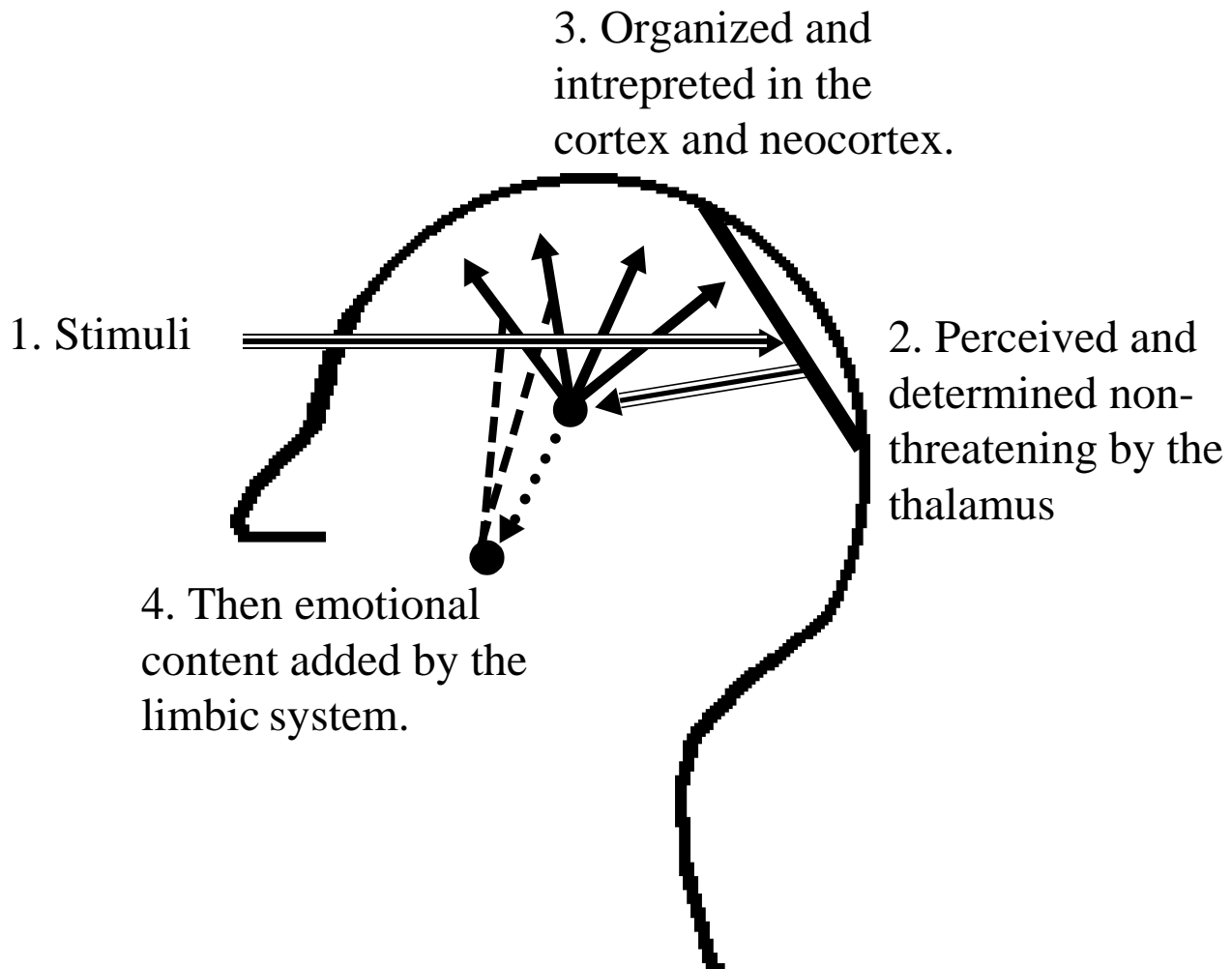
Our identity and personality develop over time as a series of memories related to the narrative of our life story.

In periods of low stress, an event is perceived through the senses, the sensory information is sent to the *thalamus* which in turn sends it to both the cortex and the limbic system. The cortex assembles the information from the various parts of the brain in an organized way and refers to the amygdala and the hippocampus for information on the relevance of the event and the emotional content (see the illustration on the next page). When the information is unthreatening the hippocampus stores it momentarily while the cognitive functions take place.

2. Trauma-related thinking patterns

To explain how memory and cognitive thought become disorganized as a result of a traumatic event, it is important to refer back to the brain's structure. The process of evolution seems to have been quite orderly. The brain stem controls innate necessary for survival. The limbic system evolved in mammals as an enhanced ability to identify information and associate it with previous information in order to better cope with survival needs.

Normal cognitive process



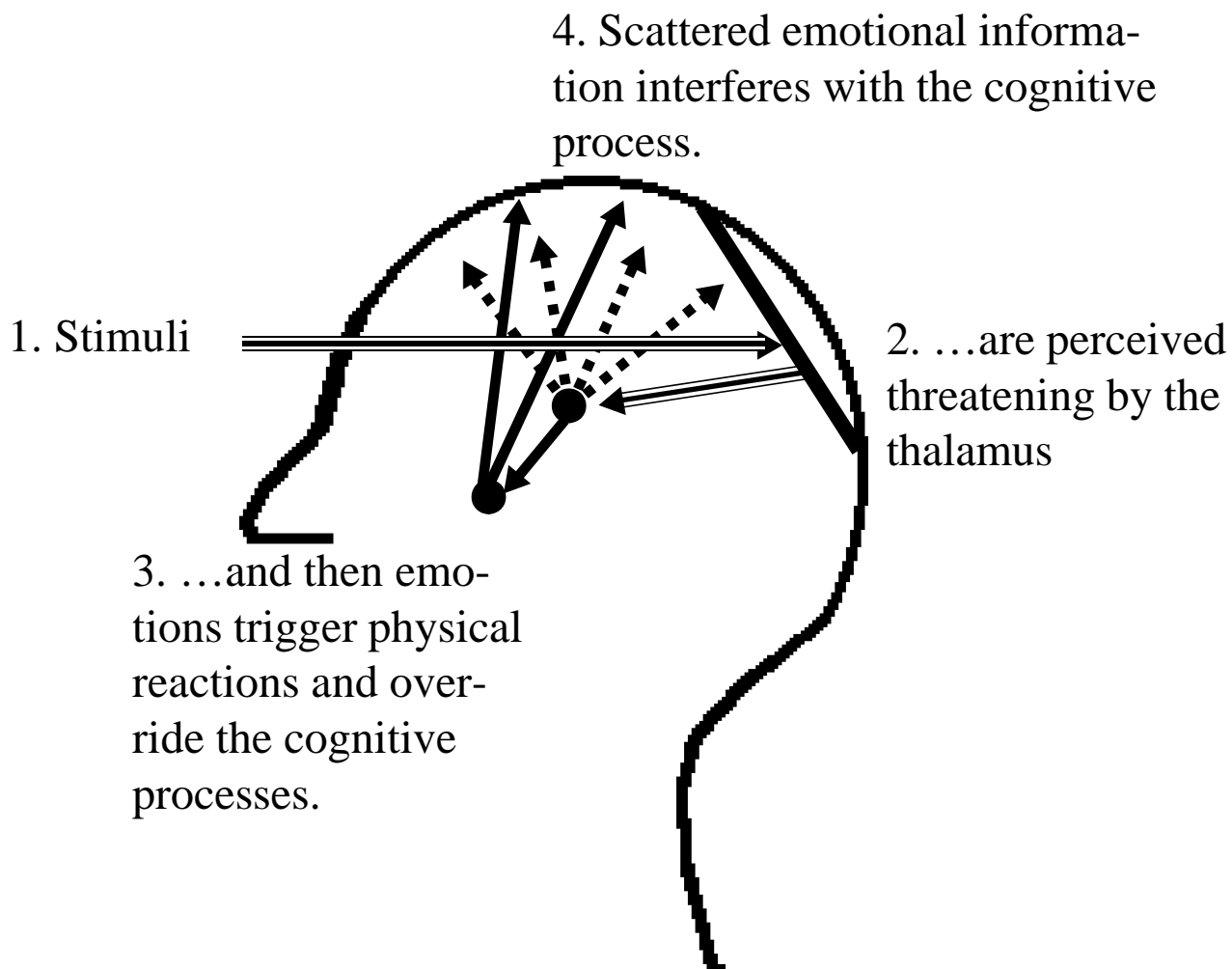
Hence the hippocampus does an initial sort and association in communication with the amygdala, which adds emotional context. Threats to survival activate emotions of fear and the response of “flight” as well as anger and the response of “fight.” The release of adrenaline causes the secretion of epinephrine and norepinephrine, causing a memory imprint recording the threat and activating emergency response. The amygdala also activates neurons to signal other brain regions to strengthen memory.

Since the amygdala receives information from the thalamus more quickly than the cortex, when this information is threatening, the reaction is one of alarm. All systems are activated based on the emotional intelligence in the brain and the cognitive systems are disregarded, disrupted, and sometimes shut down while the emotional system responds with anger and fear. This “shut-down” is pictured in the illustration on the next page.

The cortex, which is the locus of rational thought, can only begin to function when the emotional turmoil in the brain subsides, so that the cortex regains its ascendancy in analysis, organization, and interpretation of data. When this cognitive functioning begins, it is understandable that its initial reiss one of confusion as it attempts to sort out what happened and how. It is also understandable that the interaction between the cognitive processes and the emotional perceptions result in frustration. The memory of the event has been distorted, partially recorded, and possibly stored in a disorganized fashion. The mind simply cannot comprehend what happened, and when it does begin to understand the impact of the realized threat, its distress once again triggers the amygdala into emotional responses.

As the brain sorts out its confusion and develops a “story” for what happened, it also searches for explanations of the story in the context of the individual’s identity and experience.

Processing traumatic stimuli



It is no wonder, then, that this part of the cognitive process triggers the amygdala, again eliciting feelings of guilt or shame. As the mind tries to integrate the event into the individual's life story, the individual is self-interpreted in a pivotal role. Actions that the trauma victim may have taken may be construed as causal to the event or its consequences. Actions that exposed the person's vulnerability may be remembered as humiliating. Recognition of loss and its scope is reflective of further cognitive appraisal and association that occasions the release of further emotions – feelings of grief.

C. Memory: everyday and traumatic

1. Ordinary memory

Memory involves the whole brain, although as indicated, different parts are involved in specific functions. The memory system consists of networks throughout the brain that associates information. The activation of any part of these networks can activate other parts and stimulate retrieval or facilitate storage of memory. Not all perceptions are recorded in memory. Some can simply be dismissed.

We cannot possibly file away every single thing we experience. We must discard much of the new information we receive. Some material does not fully register and thus does not move well into storage. And some does not last after it has been stored. I cannot now remember the name of last week's substitute newscaster on one of the national morning TV shows – nor, for that matter, can I remember what show it was. I cannot remember the number of my hotel room from a trip a few weeks ago. Except for trivia collectors, most of us shuck off tons of unnecessary information each day. Even the trivia hound rids himself of what he considers unnecessary.

*–Terr, *Unchained Memories*.*

Memory formation involves three processes: *encoding*, the laying down of memory traces; *storage*, the consolidation of the perceptions and establishing permanent memory traces; and *retrieval*, bringing the perceptions to consciousness for cognitive appraisal. Retrieval is dependent upon external cues that may be state- or mood-dependent and are derivative from other perceptions and contexts.

There are two types of memory: declarative, explicit memory which involves free recall and working memory, and non-declarative, implicit memory which functions unconsciously and provides priming cues, conditioned responses, and skilled responses.

There are also five basic forms of cognitive memory.

There is *semantic* memory, memory of words and symbols, the most firmly entrenched memory in adults and usually the last to deteriorate in aging.

Implicit associative memory involves conditioned response and skills, and it seems to be the second most enduring type of memory.

Remote memory is a collection of events and data along with impressions of those events. It can also be characterized as a narrative memory of one's life story. It is the third longest-lasting memory function.

Immediate memory functions in the present, allowing one to remember a word or an impression long enough to process it into further cognition. A sub-type of immediate memory is *working* memory, used when one starts a sentence and remembers how to finish it, or when a person goes into a room and remembers what he or she wanted to do there. Immediate memory is one of the least stable memory functions.

Finally, there is *episodic* or short-term memory, the memory of current events. It allows one to remember what happened yesterday or last week. It is the most fragile memory function.

Each of these functions works together to organize and interpret experiences.

Memory can be blocked at any stage of the process, as when the brain perceives something it does not consider relevant to survival, identity, or the interpretation of the world around it. It simply discards the perception without processing it further. Under stress, the “neural static” interferes with the ability of immediate or working memory to retain the perception. It may also be lost at the storage stage – the brain perceives something relevant but because of overwhelming perceptions, the release of stress hormones and chemical changes, the perception is stored in an inappropriate location where it is difficult to access. It may be lost in the retrieval process when the brain does not respond to cues, or may be distorted, as when two distinct memories are associated with specific cues and become merged, or become chronologically rearranged.

2. Traumatic memory

Memory of trauma is particularly powerful because the perceived threat to survival triggers the release of the powerful hormones and chemicals that help to consolidate memory traces. In addition, they increase neuronal activity that indelibly forms pathways of brain activity in response to the memory and cues concerning the trauma. These indelible pathways may be so strong that one never forgets what happened. The emotional memory may last a lifetime. But note: traumatic memory is non-narrative and nonverbal. Even with these iridescent memories of a trauma, most people are able to integrate the memory into their cognitive understanding of their life story while comprehending that cues will remind them, painfully, of the trauma itself. For some people, however, the traumatic memory reinvents itself. There may be a number of reasons for this. Sometimes when people are particularly distressed, the cognitive functions become so dysfunctional that a

memory cannot be translated into a narrative. The emotional memory remains reactive and separate from cognitive functions. Traumatic memories are recorded as sensory impressions or behavioral reactions without conscious awareness. The memory is dissociated from other experiences. [See the chart entitled, “The Effects of Extreme Stress on Declarative Memory” on the next page.]

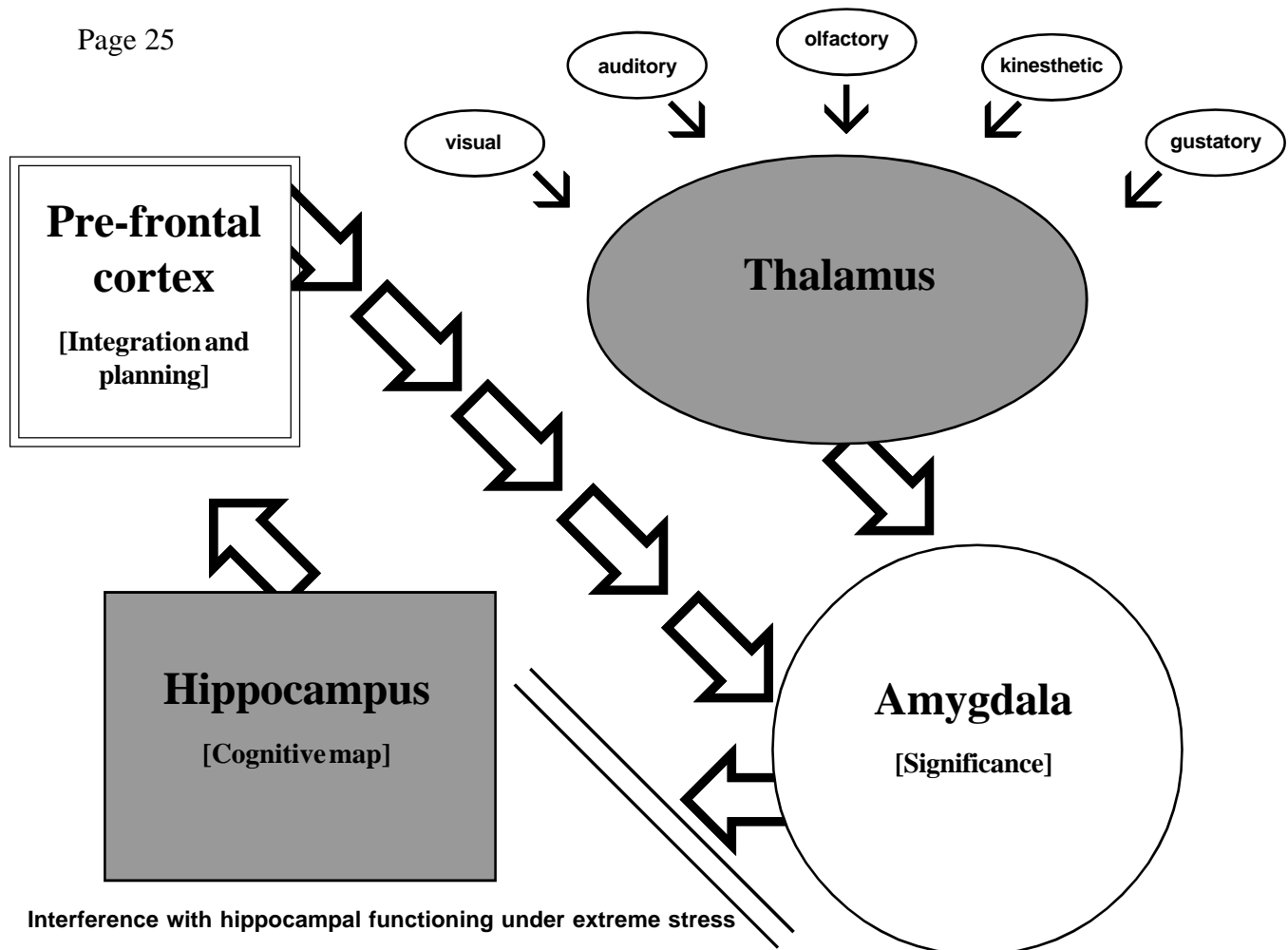
Sometimes, the trauma may be so overwhelming that it becomes fixed in the mental processes. The initial imprints of the traumatic experience are so strong that, when remembered, it reaffirms and strengthens the initial response. This may result from the physiological response to stress and the brain’s understanding of the threat and stress confronted.

Sometimes, people may already be in a vulnerable state of stress so that when trauma occurs, the brain cannot assimilate the event or integrate it and so the mind refuses to acknowledge it. Because the initial stimuli was so confusing, and the emotional response occurred without cognition, the mind tries to create scenarios that clear up its confusion – but they don’t fit. In that internal process, the confusion is increased as the scenarios don’t align with the conceptions that the person had before the event – social or cultural values, personal identity or behaviors. For whatever reason, when the traumatic memory becomes the pre-occupation of individuals, they cannot shed the feeling that the trauma is happening in the present rather than the past. It is an unresolved trauma memory.

Trauma memories may be resolved and integrated into an individual’s life or unresolved or rejected by the mind. When they are resolved and integrated they serve as a learning experience and help individuals to adapt to the “impossible.” When they are unresolved or rejected, they may result in amnesia, dissociation, posttraumatic stress disorder, or violence.

The Effects of Extreme Stress on Declarative Memory

Page 25



Schematic representation of the hypothesized effects of emotional arousal on declarative memory. The thalamus, amygdala, hippocampus, and prefrontal cortex are all involved in the stepwise integration and interpretation of incoming sensory information. This integration can be disrupted by high levels of arousal: Moderate to high activation of the amygdala enhances the long-term potentiation of declarative memory mediated by the hippocampus, while extreme arousal disrupts hippocampal functioning, leaving the memories to be stored as affected states or in sensorimotor modalities, as somatic sensations and visual images. These amygdala-mediated emotional memories are thought to be relatively indelible, but their expression can be modified by feedback from the prefrontal cortex.

From van der Kolk, B., "Trauma and Memory," *Traumatic Stress*, van der Kolk, B., McFarlane, A., and Weisaeth, L., eds.

Bessel van der Kolk sums up the nature of memory – both traumatic and non-traumatic – in the following way:

The irony is that although the sensory perceptions reported in PTSD may well reflect the actual imprints of sensations that were recorded at the time of the trauma, all narratives that weave sensory imprints into socially communicable stories are subject to condensation, embellishment, and contamination. Although trauma may leave an indelible imprint, once people start talking about these sensations and try to make meaning out of them, they are transcribed into ordinary memories – and, like all ordinary memories, they are then prone to distortion. People seem to be unable to accept experiences that have no meaning; they will try to make sense of what they are feeling. Once people become conscious of intrusive elements of the trauma, they are likely to try to fill in the blanks and complete the picture.

Like all stories that people construct, our autobiographies contain elements of truth, of things that we wish had happened, but did not, and elements that are meant to please the audience. The stories that people tell about their traumas are as vulnerable to distortion as people's stories about anything else.

–van der Kolk, B. “Trauma and Memory,” *Traumatic Stress*, van der Kolk, McFarlane and Weisaeth, New York, NY:Guilford Press, 1996.

3. Traumatic and narrative memory compared:

Participant's Notes

Traumatic and Narrative Memory Compared

Traumatic Memory

Images, sensation, affective and behavioral states
Invariable – does not change over time
Highly state-dependent; cannot be evoked at will
Automatically evoked in special circumstances
No condensation in time

Narrative Memory

Narrative: semantic and symbolic
Social and adaptive
Evoked at will by narrator
Can be condensed or expanded depending on social demands

– van der Kolk, B. and Fislser, R., “Dissociation and the Fragmentary Nature of Traumatic Memories: Overview and Exploratory Study,” *Journal of Traumatic Stress*, Vol. 8, No. 4, 1995.

D. Goal of responding to psychological crisis

1. To defuse the emotional memory so that cognitive processes can take place.
2. To help with the organization and interpretation of the cognitive process.
3. To assist individuals in the integration of traumatic events into their “life story.”
4. To assist individuals with interpreting the traumatic event in order to derive and create meaning from past and present experience.

To accomplish goals of crisis response, it is important to understand the external factors that seem to affect the intensity of the crisis or trauma for an individual or community as well as to examine possible predictors of vulnerabilities.