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*Adverse learning experiences in childhood may affect the adult's capacity to learn throughout the lifespan. Suggestions for adult educators are provided.*

## Fear and Learning: Trauma-Related Factors in the Adult Education Process

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Simply stated, trauma changes the brain. Some of the most persistent changes in the brain involve the capacity to acquire new cognitive information and retrieve stored information—both essential for effective functioning within our current educational system. The result is that, all too often, traumatized children experience the added insult of doing poorly in school, thereby failing within the one setting that might have been safe, predictable, and trauma-free. Even the fortunate children who have not been traumatized outside of school may experience shame and humiliation in the classroom. Too many children therefore grow up hating school, think they are stupid and incapable, and soon give up on themselves and the process of academic learning.

But many grow up to become adult learners who eventually need to return to school. This chapter reviews fundamental issues that may help educators better understand the nearly one-third of the adult population who bring to their classroom a history of abuse, neglect, developmental chaos, or violence that influences their capacity to learn, as well as those who, in response to stress-inducing pedagogical methods, have acquired cumulative educational trauma leading to fear conditioning.

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This work was supported in part by grants from the Richard Weekley Family Fund of the Houston Community.

## The Brain

Both learning and the trauma response are mediated by, and alter, important neural systems in the human brain. The human brain is complex, comprising hundreds of billions of cells (neurons and glia) organized into thousands of neural networks. The brain mediates hundreds of important functions ranging from heart rate regulation to appetite to motor movement to thinking and creating.

To keep us alive, our brain is designed to sense, process, store, perceive, and act on information from the external and internal worlds. To do this, a brain has hundreds of neural systems, all working in a continuous, dynamic process of modulating, regulating, compensating—increasing or decreasing activity to control the body's physiology. Each of our many complex physiological systems has a rhythm of activity that regulates key functions. For example, if blood sugar falls below a certain level, a set of compensatory physiological actions is activated. If tissue oxygen is low from exertion, or an individual is dehydrated, sleepy, or threatened by a predator, still other sets of regulating activity are turned on to respond to the specific need. For each of these systems, there are “basal” (or homeostatic) patterns of activity within which the majority of environmental challenges can be sustained. When an internal condition (such as dehydration) or an external challenge (such as an unpredictable and unstable employment situation) persists, this is a stress on the system.

*Stress* is a commonly used term in both lay and professional language. Using a concept more common among biologists, we would say that stress is any challenge or condition that forces our regulating physiological and neurophysiological systems to move outside their normal dynamic activity. In essence, stress occurs when homeostasis is disrupted (Perry and Pollard, 1998). Traumatic stress is an extreme form of stress.

It is well known that adult learners may have experienced maltreatment, shame, and humiliation in childhood, leading to traumatic stress. It is clear, however, that not only do many adult learners have a history of significant trauma, but they are also sensitized to the ordinary demands of schooling. Deadlines, exams, and having to speak in class, for example, will result in moderate activation of the stress response. We know that moderate chronic activation of the stress response systems can also have an impact on key brain areas involved in learning and memory. The end result is that many adult learners are doubly stressed as they return to the classroom setting.

**The Response to Threat.** The human body and human mind have a set of important, predictable responses to threat. Threat may come from an internal source, such as pain, or external source, such as an assailant. One common reaction to danger or threat has been labeled the fight-or-flight reaction. In the initial stages of this reaction, there is a response called the alarm reaction.

As the individual begins to feel threatened, the initial stages of a complex, total-body response begin. The brain orchestrates, directs, and controls this response. If the individual feels more threatened, the brain and body shift further along an arousal continuum in an attempt to ensure appropriate mental and physical responses to the challenges of the threat (see Figure 3.1). The cognitive, emotional, and behavioral functioning of the individual reflect this shift along the continuum. During the traumatic event, all aspects of individual functioning change—feeling, thinking, and behaving. Someone feeling threatened does not spend a lot of time thinking about the future or making an abstract plan for survival. At that moment, feeling, thinking, and behaving are being directed by more “primitive” parts of the brain. A frightened person does not focus on words; he or she attends closely to what appear to be threat-related signals in the environment.

As an individual feels threatened, he or she moves along the arousal continuum from left to right. The further along he or she is on this continuum, the less capable he or she will be of learning or retrieving cognitive content; in essence, fear destroys the capacity to learn. Individuals exhibit differing styles of adaptation to threat. Most use some combination of these two adaptive styles. The adult learner with a history of trauma or with a background of educational failure or humiliation is sensitized and moves along the arousal continuum faster in the face of significantly less challenge or perceived threat.

The person’s internal state shifts with the level of perceived threat; as it increases, vigilance may proceed along the arousal continuum to terror. This is characterized by a graded increase in sympathetic nervous system activity, which in turn causes increased heart rate, blood pressure, and respiration, a release of glucose stored in muscle, and increased muscle tone. Changes in the central nervous system cause hypervigilance; the person tunes out all noncritical information. These actions prepare the individual to fight with or run away from the potential threat. The total-body mobilization of the fight-or-flight response is highly adaptive and involves many coordinated and integrated neurophysiological responses across multiple

**Figure 3.1. The Arousal Continuum**

<i>Hyperarousal Continuum</i>	Rest	Vigilance	Resistance	Defiance	Aggression
<i>Dissociative Continuum</i>	Rest	Avoidance	Compliance	Dissociation	Fainting
<i>Regulating Brain Region</i>	Neocortex Cortex	Cortex Limbic	Limbic Midbrain	Midbrain Brainstem	Brainstem Autonomic
<i>Cognitive Style Internal State</i>	Abstract Calm	Concrete Arousal	Emotional Alarm	Reactive Fear	Reflexive Terror

brain areas. Though it is also the most common and familiar response to threat, it has become increasingly clear that individual responses can vary tremendously (Perry and others, 1995).

For example, whenever physically fighting or fleeing is not possible, people use avoidant and psychological fleeing mechanisms that are dissociative. Dissociation is basically a mental mechanism by which one withdraws attention from the outside world and focuses on the inner world. It may involve a distorted sense of time, a detached feeling of “observing” something happen as if it is unreal, or the sense that one may be watching a movie of one’s life. In extreme cases, individuals may withdraw into an elaborate fantasy world where they believe they assume special powers or strengths. Like the alarm response, this “defeat” or dissociative response is graded. The intensity of the dissociation varies with the intensity and duration of the traumatic event. Even when we are not threatened, however, we use dissociative mental mechanisms all the time. Daydreaming is an example of a dissociative event that occurs in many classrooms.

If, during development, the threat response apparatus is persistently stimulated, a commensurate stress response apparatus develops in the central nervous system in response to the constant threat. These stress-response neural systems (and all the functions they mediate) are overactive and hypersensitive. It is highly adaptive for a child growing up in a violent, chaotic environment to be hypersensitive to external stimuli, hypervigilant, and in a persistent stress-response state. These adaptive changes in the brain make a child better suited to sense, perceive, and act on threat in such an environment, but these “survival tactics” ill serve the child when the environment changes (as at school or in peer relationships). Furthermore, the changes in a child’s brain related to “use-dependent” alterations in the developing brain can persist to adult life, resulting in a lifetime of anxiety, hypervigilance, and cognitive distortion (Perry, 1998, 1999). The impact of adverse childhood experiences on a host of learning-related functions and outcomes in adult life is therefore devastating (Anda and others, in press).

**How Fear Changes Thinking, Feeling, and Behaving.** A traumatized person in a state of alarm (for example, thinking about an earlier trauma) is less capable of concentrating, more anxious, and more attentive to non-verbal cues such as tone of voice, body posture, and facial expressions—and may, in fact, misinterpret such cues because of anxiety-induced hypervigilance. This has important implications for understanding how adults who earlier experienced negative learning situations in classrooms might respond in a new learning environment that occurs many years later.

A major mistake one can make with these individuals is to misjudge their internal state. According to Kerka (2002), these adults may have difficulty in risk taking, which could include starting new tasks, responding to questions, or considering an alternative viewpoint. They may have difficulty maintaining self-esteem, and if they feel overwhelmed or inept they may become angry or feel helpless. Some may dissociate, which can mani-

fest as going quiet or a glazed expression. More seriously, such students may become avoidant and miss classes. Once we recognize that this is happening, it can be minimized or prevented.

We may think someone is in a state of vigilance and capable of taking our directives when the adult learner is actually in a state of fear. A compound command such as “Take out your book, open to page 52, and write out the key concepts related to the lesson for today” is often processed inaccurately. The learner gets confused and therefore more anxious; this anxiety can then escalate, making the learner even less capable of following directions. If the learner makes a mistake or asks a neighbor to repeat the teacher’s clear directives, the teacher can become frustrated and impatient. If this impatience is revealed by word or tone (“OK, I’ll say it again”) the learner’s anxiety escalates still further, possibly leading to a hostile, inappropriate, and immature or dissociative response. This can lead to a cascade of mutual misunderstanding. The teacher is frustrated and the learner comes to dislike the teacher or—worse, still—learning in general and may replicate his or her earlier pattern of disengaging and disinvesting in school and learning.

**Baseline State of a Traumatized Learner.** Neural systems that are activated change permanently, creating “internal” representations; this is the stuff of memories. The brain makes cognitive memories, emotional memories, motor-vestibular memories, and state memories. The physiological hyperarousal state associated with fear and pervasive threat results in a brain that has created all of these memory types (that is, cognitive, motor, emotional, state) and in doing so has adapted to a world characterized by unpredictability and danger. Such hypervigilant people are in a persisting state of arousal and consequently experience persisting anxiety.

The key to understanding the long-term impact of trauma on an adult learner is to remember that he or she is often, at baseline, in a state of low-level fear. This fear state reflects either hyperarousal or a dissociative adaptation pattern, or a combination of both. The major challenge to the educator working with highly stressed or traumatized adults is to furnish the structure, predictability, and sense of safety that can help them begin to feel safe enough to learn.

A common clinical observation made by teachers is that these individuals appear to be quite bright but at times perform poorly in an academic situation. School has been frustrating and sometimes humiliating for these adults. They come into the adult learning situation with a history of failure, and sometimes with an expectation of further failure.

This context is critically important in understanding why an adult learner with a history of trauma (therefore in a persisting state of arousal) can sit in a classroom and not learn effectively. The capacity to internalize new verbal cognitive information depends on having portions of the frontal and related cortical areas activated, which in turn requires a state of attentive calm. The traumatized adult learner has difficulty reaching this state

because different areas of this person's brain are activated and thus different parts of the brain control functioning.

**Retrieving Information in a State of Fear.** The adult learner in a persisting low-level state of fear retrieves information from the world differently than do adults who feel calm. We are all familiar with test anxiety, but imagine what life would be like if all learning experiences evoked a similar and persisting emotion of anxiety. Even if an adult has successfully stored information in cortical areas, this information is inaccessible while the learner feels so fearful.

In a higher state of arousal, the creative and "mature" problem-solving capabilities mediated by the cortex are not easily accessed. Therefore, when threatened, the individual is likely to act in an "immature" fashion. Regression, a retreat to a less mature style of functioning and behavior, is commonly observed in all of us when we are physically ill, sleep-deprived, hungry, fatigued, or anxious. During the regressive response to the real or perceived threat, less-complex brain areas mediate our behavior. If an adult learner was raised in an environment of persisting threat, he will have an altered baseline such that an internal state of calm is rarely obtained (or only artificially obtained, via alcohol or drug use). In addition, the traumatized individual has a "sensitized" alarm response, overreading verbal and nonverbal cues as threatening. This increased reactivity results in dramatic changes in behavior in the face of seemingly minor provocative cues. A similar, if somewhat attenuated, pattern is often seen with individuals raised in less traumatic homes who were nevertheless subject to shaming and humiliating at home or in classroom experiences.

## Safety and Learning

We humans are explorers. We are fascinated by, and drawn to, the unknown—to new things. Curiosity drives us to explore, and when exploration leads to discovery it brings us pleasure. As adults we enjoy finding a new restaurant or new author, or mastering a new skill. Optimal learning depends on this process—a cycle of curiosity, exploration, discovery, practice, and mastery—which leads to pleasure, satisfaction, and the confidence to once again set out and explore. With each success comes more willingness to explore, discover, and learn. The more a learner experiences this cycle of discovery, the more he or she can create a lifelong excitement for, and love of, learning.

The fear or alarm response, however, kills curiosity and inhibits exploration and learning. If people are anxious, uncomfortable, or fearful, they do not learn. If they are unwilling to explore or if they develop anxiety when faced with something new, they place increasing limitations on themselves. How can we prevent this?

The fear response is deeply ingrained in the human brain. When we feel threat of any kind—hunger, thirst, pain, shame, confusion, or information that is too much, too new, or too fast—our body and mind respond in

ways designed to keep us safe. Our mind focuses only on the information that is, at that moment, important for responding to the threat. Rather than explore new things, we are disinterested in or even further overwhelmed by novelty. When the learner feels safe, curiosity lives. When we are safe and the world around us is familiar, we crave novelty. Conversely, when the world around us is too new, we crave familiarity. In such situations, we are more easily overwhelmed, distressed, frustrated. Therefore we want familiar, comforting, and safe things.

By accurately attending to the learner's internal state, an effective educator can identify where the learner is on the alarm-arousal continuum. A creative and respectful educator can create safety by making the learning environment more familiar, structured, and predictable. Predictability, in turn, is created by consistent behavior. This implies not rigidity but rather consistency of interaction. The invisible yet powerful web of relationships that effective educators create between themselves and learners, and between and among learners, is crucial to an optimal learning environment (Perry, 2006). In sum, the necessary sense of safety to encourage adult learning comes from consistent, nurturing, and sensitive attention to the learner's state of mind (Daloz, 1999).

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