Fear, stress among the poor hinder learning

Students who grow up poor face many obstacles, including overcrowded schools and violent neighborhoods. Fear and stress also may be constants in their lives.

These emotions are a constant for the poverty-stricken. New ideas are emerging to combat the long-term effects.

By Rosemary Clandos, Special to The Times
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RAISED IN poverty, Dr. Shauna Blake Collins fought fear during nearly 14 years of education. A dropout from a South-Central Los Angeles high school, she earned a GED diploma at 22, became a licensed vocational nurse, a registered nurse, and finally, at 41, a physician. Confidence came only during the last two years of medical school.

"Every step of the way, I was petrified," says the Winnetka mother of two toddlers, who recently graduated from UCLA's David Geffen School of Medicine. "The pressure I put on myself made me paralyzed."

Students who grow up amid economic insecurity often face many obstacles: overcrowded schools, lack of enrichment activities, violent neighborhoods. Fear and stress can be two more problems. Brain science is showing how these emotions have effects on the brain and how they can directly impede learning. Some scientists and educators are suggesting ways in which kids and college students can combat the long-lasting effects of poverty-related stress.

Taking over thoughts

In response to fear or stress, the brain quickly releases adrenaline and cortisol, activating the heart, blood vessels and brain for life-saving action -- fighting or running. The brain gives the threat priority over anything else -- including schoolwork -- and it creates powerful memories to help prevent future threats. "All families experience stress, but poor families experience a lot of it," says Martha Farah, psychology professor at the
For 20 years, David Diamond, a neuroscience professor at the University of South Florida, has studied the effects of stress-related hormones in rats. He found that high cortisol levels affect the hippocampus -- a key learning center in the brain -- in three ways. They suppress electrical activity, decrease efficiency and reduce new cell growth.

These effects, thought likely to occur in humans as well, might be one reason it's hard for impoverished students to concentrate and learn -- especially if there is extra stress, violence or abuse in the child's environment, Diamond says.

In a 2006 issue of Brain Research, Farah reported that growing up in poverty affects thinking processes associated with several brain systems. Sixty healthy middle-school students matched for age, gender and ethnicity but of different socioeconomic status took tests that challenged brain areas responsible for specific cognitive abilities. Researchers found that children from low-income homes had significantly lower scores in areas of language, long-term and short-term memory, and attention.

Research, Farah says, suggests that the effect of stress on the brain may be the reason for these detected differences and disadvantages.

Fear also interferes with learning. A study published in the February online journal of Social Cognitive and Affective Neuroscience shows that students raised in low-income homes have stronger fear reactions -- with potential consequences for concentration.

In the study, 33 healthy undergraduate students viewed pictures of facial expressions -- angry, surprised and neutral -- while MRI imaging measured their brain activity. For students raised in low-income homes, the pictures of angry faces triggered a greater response in the amygdala, a brain region that processes fear and anger.

"Growing up in a socially disadvantaged environment often exposes people to threats to their health and well-being," says Peter Gianaros, an assistant professor of psychiatry and psychology at the University of Pittsburgh, who headed the research.

Changing the brain

There are science-supported ways to mitigate these accentuated fear and stress responses and nurture the brain, researchers and educators say. "Change the experience, and you change the brain," says San Diego-based educator Eric Jensen, author of a 2006 book "Enriching the Brain: How to Maximize Every Learner's Potential," who has developed a teachers' training program, "Enriching the Brains of Poverty."

"Many good schools have shown they can create experiences that change the brain for the better."

Among those experiences:

* Targeted preparation. To help children succeed in school, Jensen teaches educators to build students' brain capacity in areas shown by science to be lagging: attention, long-term effort, memory, processing skills and sequencing skills. He recommends a slate of activities for each -- for example, compelling stories, theater arts and fine-motor tasks all build attention skills, he says.

* Foster a mind-set of hope, determination and optimism -- and security. There are many ways to foster hope, Jensen says, including asking about and affirming a student's dreams, bringing successful students back to talk to new ones, giving useful feedback on schoolwork and teaching students how to set and monitor their own goals.

Studies by Dr. Helen Mayberg of Emory University have reported lower activity in the thinking parts of the brain in people with depression, and research has uncovered brain changes as people get better, either with medical treatments or psychotherapy.

And in a study to be published this month in Neuron, Dr. Eric Kandel, a Nobel laureate and neuroscience professor at Columbia University, found that positive emotions -- safety and security -- affect learning capabilities of mice.

"Behaviors and thoughts that relate to hope, love and happiness can change the brain -- just as fear, stress and anxiety can change it," Kandel says. "It's completely symmetrical."

* Meditation. This has been proven in studies to lower stress.
* Social connectedness. According to Diamond's work at the Veterans Hospital in Tampa, Fla., "When people are experiencing strong stress, they recover much better when they have social support than when they are socially isolated," he says.

Jensen recommends mentoring programs for children and student groups.

* Take control. "Feeling helpless increases stress hormones," Diamond says. To offset learned helplessness and develop a sense of control, Jensen advised students to learn time-management skills and goal setting -- and reward small accomplishments.

* Exercise. "Exercise stimulates and energizes the brain to more efficiently process information. Exercise actually makes more brain cells," Diamond says. Sports, aerobic exercise, yoga, dance, walking and even exercising the smaller muscles used for playing a musical instrument can change the brain. Music is calming, Diamond says. "If you feel better, you learn better."

* Eat well. Marian Diamond, a neuroscientist and professor at UC Berkeley, has been using dietary changes to improve the learning capabilities of orphans and impoverished children in Cambodia. For students living in poverty in the U.S., she said, "Be sure you're getting good sources of protein and calcium. Each day, eat an egg -- or egg whites -- a glass of milk, and take a multivitamin." Other researchers recommend cutting back on sugar and smoking because they raise cortisol levels.

* Spirituality. In the January 2003 journal Urban Education, researchers reported that African American and Latino high school seniors who reported that they were very religious and were raised in intact families scored as well as white students on most achievement tests. "The achievement gap disappeared," says William Jeynes, an education professor at Cal State Long Beach.

clandos@att.net

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