

[< Brain-based Learning: Changing Kids Brains](#)

[10 Most Effective Tips For Using Brain-Based Teaching & Learning >](#)

The Effects of Poverty on the Brain

Eric Jensen



How are kids from poverty different and what do the differences suggest we can do about it?

by Eric Jensen

Solutions for Teaching with Poverty in Mind

Many still believe “the poverty problem” is about a lack of money. Unfortunately, it’s not that simple. In fact, if that were the only problem, it would be good news, but it’s not. Nearly 22 percent of all children in the U.S. come from low-income families (U.S. Census Bureau, 2010). Others believe that poverty is due to a lack of values such as having a strong work ethic or motivation to succeed; but those theories have been dismissed by research that shows that those are effects, not causes of poverty (Sapolsky, 2005).

Poverty can also be explored as a product or result of classism, failed social policies, racism, unsafe housing, poor education, inadequate laws or a host of other issues. There is also a wide range of being poor from absolute poverty (lack of food, housing or shelter), to relative poverty (feeling poor compared to your neighbors), and generational poverty (long-term familial or community-based low SES) or situational (temporary economic disaster) poverty. In this article, we’ll focus on the long-term, explore the differences and what you can do to succeed at your school.

What is Poverty?

Poverty is a chronic, mind/body condition exacerbated by the negative, synergistic effects of multiple, adverse, economic risk factors. Kids from poverty are different because their brains adapt to suboptimal conditions. But brains can and do change everyday. You can facilitate that change.

But for them to change, you must change. Nobody’s telling you it’s a “piece of cake.” But those from poverty can (and do) succeed. It is happening all over the country. The schools that succeed with those from poverty are doing the right things, doing them over time, and as a result, changing young brains for the better. In addition, for your school to succeed with kids from poverty, you’ll want to understand how poverty changes the brain and use that knowledge to guide educational practices.

How are Brains of Those from Poverty Different?

The effects of poverty on any human being are truly staggering. In short, the kids are different

because their brains are different. Our neurons are designed by nature to reflect their environment, not to “automatically” rise above it. Areas of the brain that are affected by chronic exposure to poverty include those responsible for working memory, impulse regulation, visuospatial, language and cognitive conflict (Noble, et al. 2005). Evidence suggests children of poverty are more likely to have different brains via four primary types of experiences. They are: 1) exposure to toxins, 2) chronic stress, 3) chronic exposure to substandard cognitive skills, and 4) impaired emotional-social relationships. While not every single low SES child will experience all of these factors, the majority will. Let’s explore each of these.

Exposure to Toxins

Any type of toxin, from a food toxin such as artificial additives, coloring or those with carcinogens, to environmental toxins such as lead, noise or smog will impose stressors on the body and brain. These stressors consume resources and ultimately, a price is paid. When compared to their middle- or upper-income classmates, more children from lower SES are likely to:

- *Live on or near toxic waste sites (Brody et al., 1993).*
- *Live in areas that did not meet one or more of the Air Quality Standards (EPA 2000).*
- *Have had more exposure to pesticides (Moses et al., 1993).*
- *Have greater exposure to lead (Brody et al., 1993).*
- *Have more exposure to cigarette smoke (Childstats, 1999).*

These are relevant because, for example, high levels of lead are dangerous to children. They can cause neurological and developmental impairment. The behaviors we see in the classroom may be a result of years of toxic buildup. The aggregate of exposure to multiple toxins creates damage to the brain, which manifests in behavioral, cognitive, emotional and social ways. It is the aggregate of factors that ultimately prove challenging to overcome, not any single one.

Chronic Stress

Chronic stress creates an adjustment in the body’s “stress point” in the same way that we can create a different “set point” for eating and hunger signals. An example of an altered set point is PTSD or depression. This altered set point is known as allostatic loads, from the Greek word “allostasis” meaning “adjusted stability.” This devastating change is actually long-term, carry-over stress that continues day after day. Those living in poverty experience a chronic stress overload greater than their higher socioeconomic class (SES) counterparts (Almeida, et al., 2005).

How, specifically, are kids from lower SES affected by stress as compared to those of middle or upper income?

- *Poor families move twice as often, get evicted five times as much (Federman et al., 1996).*
- *Children of poverty face 50 percent more street crossings with a six times greater risk in pedestrian accidents (McPherson et al., 1998).*
- *Poor children have more contact with aggressive peers (Sinclair et al., 1994).*
- *They experience more community violence; from an unsafe home, neighborhood or a dangerous path to school which can hurt academic performance (Schwartz & Gorman, 2003).*
- *Greater safety concerns, leading to academic underperformance (Pratt et al., 1997).*
- *Significantly more daily stresses—up to 35 percent more daily hassles and the toll on the body adds up (Attar et al., 1994).*
- *Worse food choices because appetite and eating habits becomes altered by chronically higher levels of cortisol (Cartwright, et al., 2003).*

One study actually gave randomized, double blind, placebo controlled, fixed oral doses of cortisol (a chemical associated with stress) and the placebo (colored water) to subjects. After several days of exposure, the researchers found that the cortisol treatment reversibly decreased specific elements of memory performance in otherwise healthy individuals (Newcomer et al., 1999). Other studies highlight the effects of chronic stress on the schoolage brain. This allostatic load increases the likelihood that kids from poverty will have emotional problems (Burgess et al., 1995), lowers IQ and reading scores (Delaney-Black, et al. 2002), and significant memory loss (Lupien, et al., 2001).

Chronic stress is clearly bad and humans respond with adaptive allostatic loads in one of two ways: we become more angry and aggressive or we become much more passive, even helpless

(Johnston-Brooks, et al., 1998). This understanding helps educators realize that the frustrating behaviors they see in the classroom from kids from poverty (aggressiveness or giving up) are not causing their problems—they are the symptoms of their problems (Sapolsky, 2005).

This is fundamental change for many educators—moving away from a blaming mentality and getting to work being an ally for their students.

Cognitive Skill Development

There is considerable evidence that children from poverty are more likely to have impaired exposure to critical enrichment factors resulting in substandard cognitive skills.

Here are some differences from those from poverty vs. those in middle and upper income homes:

- *Parents from poverty use different vocabulary words every day, both fewer and less complex than those heard in families of greater income (Hoff, 2003).*
- *Poor children are more likely to have parents who are less likely (by a factor of three or four) to initiate conversation just to maintain social contact or build vocabulary (Hart & Risley, 1995).*
- *Kids from affluent communities have more books in their homes than low-SES children had in all school sources combined (Korat, & Haglilii, 2007).*
- *Low SES parents are only half as likely to read to their kids as compared to high-income children (Coley, 2002).*
- *Have lower quality of nutritional intake in low-income infants and toddlers which is linked to lower cognition (Frank et al., 1995).*

These issues are relevant because, for example, while children from poverty typically have cognitive deficits, they can be improved with specific skill-building programs in reading, writing, math and problem-solving.

Emotional-Social Relationships

Right from birth, the formation of a secure attachment between parent and child creates the baseline strengths and coping skills which will set in motion the quality of future relationships with teachers and peers (Szewczyk-Sokolowsky and Bost, 2005). Unfortunately, children from poverty are far less likely to get the baseline of a solid, strong two-parent family and the resulting parental support. As an example:

- *Poor children experienced less parental support and were parented in a less responsive more authoritarian, harsher fashion than their higher income counterparts (Evans, 2004).*
- *Low SES children felt that their parents were not very interested in their activities, and as a result, are less open with their parents about their feelings (Rosenfeld, Richman and Bowen, 1998).*
- *They develop fewer social ties and have more chaos, stress and disruption in their lives (Jensen et al., 1983).*
- *Kids in these homes also hear less responsive, fewer supportive, and less interactive conversations among others in their homes (Hart & Risley, 1995).*
- *They are also more likely to spend time in foster care or to have parents who are divorced (Evans, 2004).*
- *Poor parents are half as likely as professional parents to be able to track down their children playing in the neighborhood (Evans, 2004).*
- *Among American 13-year-olds, those watching six or more hours of television per day are nearly twice as likely to be living in low income households (Evans, 2004).*
- *Poor parents are more likely to leave their children home alone for extended periods of time and not regulate the amount of television their kids watch (Bradley and Corwyn, 2002).*

All of the disconnect in relationships takes its toll. Children from poverty believe themselves to have fewer friends and have lower acceptance among their peers (Rosenfeld, Richman and Bowen, 1998). Unfortunately, children from poverty are much more likely than their counterparts to have impaired relationships. This can affect self-esteem and even influence their everyday choices regarding whom they'd like to have as friends. And, once at school, their peers are a greater influence on their lives than their parents (Harris, 1998). But remember that chronic stress is a key factor and it increases the likelihood of inappropriate attachments (Schore, A., 2002). This creates a vicious cycle where poor kids lack the grounded strong quality home relationships, yet, they are more likely to seek the wrong ones at school. Positive relationships lower stress, provide guidance

and support.

Can Those from Poverty Succeed?

The neurobiological evidence may sound pretty depressing, but there's hope. First, brains are designed to respond to experiences, both good and bad. This means that while those from poverty may have suboptimal brains, positive experiences can (and do) change their brain. If you're thinking that lower IQ kids cannot catch up, the research says otherwise. As example, researchers found that low SES children (with a mean IQ of 77) adopted by higher-SES parents averaged IQ gains of 14-20 points when tested eight years later (Duyme, et al., 1999). This is an entire standard deviation increase!

In sum, we know that children of poverty often have suboptimal brains and we know that brains can change for the better. It takes quality schools and quality teaching. Average teachers working well at a great school climate (collaborative, committed, focused, mission-driven, etc.) can succeed. Or, high-performing teachers at a school with an average climate can succeed. But the reality is that low SES kids will expose the weakest links in the education you provide. In short, it's the ability of each school staff to understand not just "what it takes" but also be "able and willing to deliver" the factors that actually drive positive change.

There's a reason most Title 1 schools struggle. Many teachers do not even get one year's AYP with middle class kids. With low income kids, their AYP is worse.

Yet, to succeed, your staff will need to know how to get 1.00-2.00 year's worth of AYP in a single year. Teachers cannot do it if they just "try harder." They must learn the strongest "drivers" of student achievement, based on the research.

Years of research now tell us what effect sizes are for more than 150 teaching factors (Hattie, 2010). We know, for example that some things, like homework, rarely matter. We know that other factors matter tremendously. I share these with teachers in person and many are surprised that no one told them.

For example, five of the upcoming 10 factors are of very little value in contributing to student achievement:

1. High engagement
2. Computers/technology
3. Meta-cognitive skills
4. Class size
5. On-going formative assessment
6. Team teaching
7. Developing deep coherent representations
8. Homework
9. Challenging teaching for mastery
10. Advance organizers

If you say to yourself, "They all look good!" The problem is that teachers do not have unlimited time. Quality teachers use more productive strategies, more often and they're better at the execution and consistency. Average teachers just want to know the "magic list" of top 10. But these high-effect size factors are merely the basis for years of reflection, error-correction and personal commitments to mastery. The expert teachers on your staff (as measured by 1.25 AYP or better) are critical of their own teaching. They constantly try out better ways to do something and often find themselves obsessing over how to reach a single kid. Does your leadership foster this kind of teacher? That's one of the roles of instructional leadership.

During my [workshops on poverty](#) and how it affects the brain, educators often ask, "Where are the schools that actually do this? Who is succeeding?" There are many, many schools, in Texas and around the country that do enough of the right things, and enough things right to get miracles. One example is a secondary school I've worked with that has a low SES population of 100 percent free and reduced lunch, with just 6 percent Anglos.

But this high school attendance averages 98 percent, its graduation rates are more than 90 percent, and last June, the percentage of its graduates accepted to our nation's top-tier, four-year universities was a staggering 96 percent (Jensen, 2007). The point here is that even if you don't have the background to understand the science behind changing brains for the better, your staff must believe in the possibility of change and have hope for every student. Hope drives change. The

staff at this school provides hope every single day—it is their mission.

Do you provide that kind of hope?

As you know, the role of leadership has changed. While it is not the intent of this article to provide all the potential strategies for positive change, the message here is that brains do change and by doing the right things at your school, success can be yours. The secrets?

We are all familiar with the list: shrink the changes, collaborate, publicize progress, focus on what matters, and support teachers not in working harder, but in working smarter. There are some amazing schools all over Texas and if your school's not one of them, pause, take a breath and take some time for a personal and professional inventory. Talk with others who are succeeding; and get an upgrade in your skill sets.

The good news is that this is doable, you can do it.

References:

- Almeida, D.M., Neupert, S.D., Banks, S.R. & Serido, J. (2005). Do daily stress processes account for socioeconomic health disparities? *Journals of Gerontology Series B-Psychological Sciences and Social Sciences*, 60. (Spec. No. 2):S34-S39.
- Attar, B.K., Guerra, N.G. & Tolan, P.H. (1994.) Neighborhood disadvantage, stressful life events, and adjustment in urban elementary-school children. *Clinical Child Psychology*, 23. pp. 391-400.
- Bradley, R. H. & Corwyn, R. F. (2002). Socioeconomic status and child development. *Annual Review of Psychology*, Annual, 371-400.
- Brody, D., Pirkle, J., Kramer, R., Flegal, K., Matte, T., Gunter, E., Bullard, R. & Wright, B. (1993). Environmental justice for all: Current perspectives on health and research needs. *Toxicology and Industrial Health*, 9. pp. 821-841.
- Burgess, A.W., Hartman, C.R., & Clements, P.T. (1995). The biology of memory and childhood trauma. *The Journal of Psychosocial Nursing and Mental Health Services*, 33(3). pp. 16-26.
- Capron & Duyme. (1989). Assessment of effects of socioeconomic status on IQ in a full cross-fostering study. *Nature* 340, 552 – 554 (17 August).
- Cartwright, M., Wardle, J., Steggle, N., Simon, A. E., Croker, H. & Jarvis, M. J. (2003, July). Stress and dietary practices in adolescents. *Health Psychology*, 22(4). pp. 362-9.
- Childstats. (1999). Federal Interagency Forum on Child and Family Statistics. Federal Agencies Report on Nation's Children: Teen Smoking, Birth Rates Down, Children's and Youth's Diets Need Improvement, taken from <http://www.childstats.gov>.
- Coley, R.J. (2002). *An uneven start: Indicators of inequality in school readiness*. Princeton, NJ: Educational Testing Service.
- Delaney-Black, V., Covington, C., Ondersma, S.J., Nordstrom-Klee B., Templin, T., Ager, J., Janisse, J. & Sokol, R.J. (2002). *Arch Pediatr Adolesc Med*:156. pp. 280-285.
- Duyme M., Dumaret, A.C., Tomkiewicz, S. (1999). How can we boost IQs of "dull children"? A late adoption study. *Proceedings National Academy of Sciences USA*, 96: 8790-8794.
- Environmental Protection Agency (EPA). (2000). Indoor air quality and student performance. EPA report number: EPA 402-F-00-009. Washington, D.C.: Environmental Protection Agency.
- Evans, G. (2004, February/March). The environment of childhood poverty. *American Psychologist*. Vol. 59. No. 2, 77-92.
- Federman, M., Garner, T., Short, K., Cutter, W., Levine, D., McGough D. & McMillin, M. (1996). What does it mean to be poor in America? *Monthly Labor Review*, 3-17.
- Harris, J. (1998.) *The Nurture Assumption*. Free Press, NY.
- Hart, B. & Risley, T. (1995). Meaningful differences in everyday experience of young American children. Baltimore: Paul Brookes Publishing Co., MD.
- Hoff, E. (2003). The specificity of environmental influence: socioeconomic status affects early vocabulary development via maternal speech. *Child Development*, 74(5). pp. 1368-78.
- Hattie, J.A. (2010). *Visible Learning*. London, UK: Routledge Press.
- Jiaxu, C. Y. & Weiyi, Y. (2000, May). Influence of acute and chronic treadmill exercise on rat brain POMC gene expression. *Medicine & Science in Sports & Exercise: Volume 32(5)*. pp. 954-957.
- Jensen, E., James, S., Boyce, T. & Hartnett, S. (1983). The Family Routine Inventory: Development and Validation. *Social Science and Medicine*, 17. pp. 201-211.
- Jensen, E. (2006). *Enriching the Brain*. San Francisco, CA: Jossey-Bass, a Wiley Imprint.
- Jensen, E. (2007, June 22.) Personal communication with principal.
- Johnston-Brooks, C. H., Lewis, M. A., Evans, G. W. & Whalen, C. K. (1998, Sep-Oct). Chronic stress and illness in children: The role of allostatic load. *Psychosomatic Medicine*, 60(5). pp. 597-603.
- Korat & Haglil. (2007). Maternal evaluations of children's emergent literacy level, maternal mediation in book reading, and children's emergent literacy level: A comparison between SES groups *Journal of Literacy Research*, 39(2). pp. 249-276.
- Lupien, S. J., King, S., Meaney, M. J. & McEwen, B. S. (2001). Can poverty get under your skin? Basal cortisol levels and cognitive function in children from low and high socioeconomic status. *Dev Psychopathol*, 13(3). pp. 653-676.
- McPherson, et al. (1998). A New Definition of Children With Special Health Care Needs *Pediatrics*, 102. pp. 137-139.
- Moses, M., Johnson, E., Anger, W., Burse, V., Horstman, S. & Jackson, R. (1993). Environmental equity and pesticide exposure. *Toxicology and Industrial Health*, 9. pp. 913-959.
- Newcomer, J. W., Selke, G., Melson, A. K., Hershey, T., Craft, S., Richards K. & Alderson, A. L. (1999, June). Decreased memory performance in healthy humans induced by stress level cortisol treatment. *Archives of General Psychiatry*, 56(6). pp. 527-33.
- Noble K.G., Norman M.F., Farah M.J. (2005, January). Neurocognitive correlates of socioeconomic status in kindergarten children. *Dev Sci*, 8(1). pp. 74-87.
- Pratt, P., Tallis, F. & Eysenck, M.(1997, November). Information processing, storage characteristics and worry. *Behav Res Ther*, 35(11). pp. 1015-23.
- Ramey, C. T., Bryant, D. M., Wasik, B. H., Sparling, J. J., Fendt, K. H. & LaVange, L. M. (1992). The Infant Health and Development Program for low birthweight, premature infants: Program elements, family participation, and child intelligence. *Pediatrics*, 3. pp. 454-465.
- Rosenfeld, L. B., Richman, J. M. & Bowen, G. L. (1998). Low social support among at-risk adolescents. *Social Work In Education*, 20. pp. 245-260.
- Sapolsky, R. (2005). Sick of poverty. *Scientific American*, 293 (6). pp. 92-99.
- Schore, A. (2002). Advances in neuropsychanalysis, attachment theory, and trauma research: Implications for self-psychology. *Psychoanalytic Inquiry*, 22. pp. 433-484.
- Schwartz, D. & Gorman, A. (2003, March). Community violence exposure and children's academic functioning. *Journal of Educational Psychology*. Vol 95(1). pp. 163-173.
- Sinclair, J., Pettit, G., Harrant, A., Dodge, K. & Bates, J. (1994). Encounters with aggressive peers in early childhood: Frequency, age differences and correlates of risk for behavior problems. *Intnl. Journal of Behavioral Development*. 17. pp. 675-696.
- Szewczyk-Sokolowski, M. & Bost, K. (2005). Attachment, temperament and preschool children's peer acceptance. *Social Development*, 14, (3), 379. Retrieved July 23, 2007 from Academic Search Premier database.



By Eric Jensen

Eric Jensen is a former teacher with a real love of learning. He grew up in San Diego and attended public schools. While his academic background is in English and human development, he has a real love of educational neuroscience. For over 20 years, he has been connecting the research with practical classroom applications.

Related Posts



Jumpstarting Learning for Children in Poverty

September 27, 2016



Expanding the Brain's Capacity with Second Language Learning

December 30, 2014

Brain, heart and mind: An holistic perspective on the classroom

September 18, 2014



Prepping the Brain for Learning: Simple Strategies, Powerful Results

May 18, 2014

1 Comment



Dr. Margo Turner · December 31, 2015, 8:40 pm

After watching the recent TED talk by the current director of the 70 + year Harvard study on adult happiness, psychiatrist Robert Waldinger, I was reminded again what I have heard you say over and over, Eric: relationships matter; relationships can affect learning; teachers can change brains! I found this to be true when teaching children in Honduras who were in extreme poverty and who had been abandoned. Knowing what to do in my teaching, caring deeply for my students, and being HOPEFUL day in day out (patience and encouragement by staff/leaders) resulted in learning!

[Reply](#)

Leave a Reply

Your email address will not be published. Required fields are marked *

Comment

Name *

Email *

Website

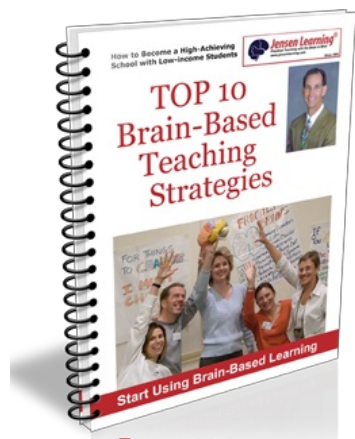
[Post Comment](#)

Search Articles

Posts |



The Top 10 Brain-Based Teaching Strategies



It's Yours Free!

Get The Strategies

More Brain Based Learning Articles

[View my Flipboard Magazine.](#)

Eric Jensen's Brain-Based Learning:

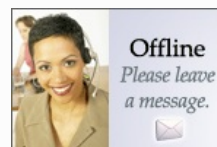
Eric Jensen's brain-based learning approach focuses on practical strategies linking brain research to student achievement. Brain-based learning is all about smarter, more purposeful teaching that can reach a greater number of students. It's not any one single thing you do. It's more about the on-going, purposeful aggregate of environment, instruction and curriculum strategies that makes it all work.

About Jensen Learning

Jensen Learning integrates cutting-edge neuroscience with practical, user-friendly classroom strategies, to overcome challenging teaching environments such as poverty, AD/HD... helping you create a high performance school environment.



Contact Jensen Learning:



✉	Email:	info@jensenlearning.com
☎	Phone:	808-552-0110 (9am-5pm PST)