Potential and IQ

How BRAIN SCIENCE promises to unlock your child's opportunity for success

By Russell Griffiths, Ph.D.

Years of misinformation about learning and intelligence have left parents with few satisfying choices for a child who struggles to learn or read. Now contemporary learning science, and courageous professionals who apply it, offer encouraging new options that promise to unlock the hidden potential.

As a result of many years of evaluating the intellectual capacities of children and adults ranging from the gifted to the severely deficient, I reached a juncture in my career where I was compelled to ask the question, "Is our intellectual capacity fixed, or can it be truly modified?" This question arose from the reality that my colleagues and I had little to offer by way of intervention other than modifications, accommodations, or possibly a psychiatric evaluation for medication.

As an educational psychologist both in private practice and in the public school system for the past 14 years, I have completed well over a thousand psycho-educational evaluations and intelligence tests on struggling learners, preschool to adult. Early in my career, the purpose of this evaluation was almost exclusively to establish a baseline required by state mandates to qualify a student for special education services. I encountered vast numbers of families who had surrendered to the notion that their child would always struggle. They had all but given up on the dream of them attending college or any institute of higher learning. They were merely happy to see their child receive a diploma, regardless of its value. This hopelessness spanned all ages and demographics. My practice was in an affluent area of south Orange County, CA but I also worked in Alternative Education for Social Service wards and dependents at various foster homes and detention facilities. Even those that were 'fortunate' to meet the stringent exclusionary criteria for special education eligibility were poorly served. Long-term results were disappointing.

Help for Struggling Learners

Disillusioned with due process hearings and IEP's (Individualized Education Programs), with attorneys and directors of special education, I sought to apply the rapid advancement in brain science to my skills and expertise in educational psychology. One clear correlation emerged from current research: the observable relationship between cognitive deficiencies and academic struggles. These struggles carry over into poor self-esteem, family discord, and other behavioral problems. So now the question was not just, "Can intelligence be modified?" but, "How can these struggling learners be helped?"

In an interview with a colleague of mine, Dr. Ron Kotkin, Professor of Pediatrics and Clinical Director of the UC-Irvine Child Development Center, he stated, "Neuropsychologists have made tremendous strides in understanding the development of neuropathways at work in the development of intelligence. This has led to a focus on strengthening the cognitive skills of individuals through targeted exercises. We are now in an era where neurobiology and behavioral science can combine to enhance an individual's cognitive functioning beyond the static concept of IQ."

Simply stated, we can enhance intellect. We have the science, research, and know-how to improve and develop areas such as processing speed, memory, visual and auditory processing, and logic and reasoning. Changes in these basic cognitive areas positively impact intelligence. Appropriate mental exercises are the key.

Early Theories

Early brain research in ancient times postulated that a person's measure of intelligence was directly related to the size of their head or skull diameter. Today we know that most human brains look the same and can vary in size and weight, but neither have anything to do with intelligence. It is what is inside that counts. When studying the brain of Albert Einstein following his death, Dr. Marian Diamond, a California brain scientist, discovered that his brain wasn't unusually large, but that the area responsible for math thinking had more synaptic connections than most. As amazingly complex as the brain appears, its function is fairly simple if we break it down to the synaptic level. This is where and how the brain communicates and organizes new and learned information.

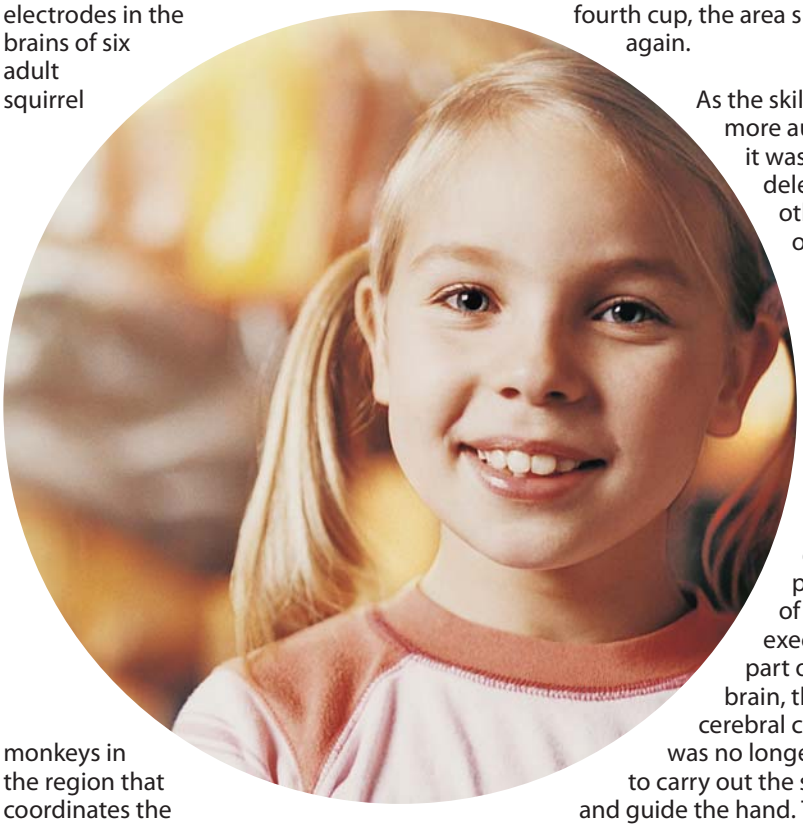
Brenda Patoine, science journalist for the Dana Forum on Brain Science, writes, "Reduced to its common denominator, all brain function, from moving a finger to solving a mathematical equation to planning one's future, occurs at the synapse… intellectual capacity itself (learning, memory, reasoning, planning, and all other cognition) results from networks of individual synapses operating in

concert." On the flip side, when not operating efficiently (as in the case of a person with deficits in one or more skill areas) our ability to learn and connect new information can be seriously impaired.

Use It or Lose It

The old adage "use it or lose it" holds true. In the field of neuroplasticity (how the brain changes physically in response to stimulation) the truth applies not just to the infant or child brain, but to adolescent, adult, and older brains as well.

Michael Merzenich at UC-San Francisco documented changes in mature brains. He implanted electrodes in the brains of six adult squirrel monkeys in the region that coordinates the movement of their fingers. Using computer imaging, he created a map of the neurons that fired when the monkeys manipulated objects with their hands. Four food cups of decreasing diameter were placed outside each of their cages.



A single banana-flavored food pellet was put in the widest cup. The monkeys would reach through the bars and work their fingers into the cup until each was able to grasp its pellet and eat it. They practiced this dozens of times for several days. Once they mastered the widest cup, Merzenich put the pellets in the next smaller cup and then the next. By the end of the experiment, the monkeys were extremely skilled with their fingers. After only one day however, the computer images revealed that the area of the brain that became active when the monkeys moved their fingers had increased in size. As the animals conquered successively smaller cups, the area got bigger and the number of cells that participated in the task increased. But after the neurons in the cortex mastered the fourth cup, the area shrank again.

As the skill became more automatic, it was delegated to other parts of the brain.

The expanded portion of the executive part of the brain, the cerebral cortex, was no longer needed to carry out the skill and guide the hand. This commanding part of the brain, the control center, reverted back to its original size, freeing up neurons to learn other things. (Ratey, *A User's Guide to the Brain*). This has been confirmed in humans using Magnetic Resonance Imaging (MRI). When acquiring new skills, more neurons and synaptic connections are developed, and when the skill becomes automatic, fewer connections are used and the task is relocated, freeing up areas that can be used for additional learning. Ratey concludes that, "brain structure is not predetermined and fixed. We can alter the ongoing development of our brains and thus our capabilities."

I feel fortunate as a professional to now have practical responses to the question, "Can intelligence be changed?" The answer, of course, is, "Yes!"

A New Realm of Possibilities

Unfortunately our educational systems are light years behind current research. This year there will continue to be a multitude of students who struggle, drop out of school, fall victim to anxieties and depression related to school failures, or even resort to delinquency. These behaviors are unnecessary alternatives to the educational fulfillment, career satisfaction, and personal success they could experience. I feel fortunate as a professional to now have practical responses to the question, "Can intelligence be changed?" The answer of course is "Yes!" Intervention through appropriate skills testing and training can open up a whole new realm of possibilities that were once never dreamed of.

Editor's note: If you believe there is unrealized learning potential in yourself or someone you love, a simple cognitive skills test could be the key to unlocking that potential. At BrainRx, we offer such testing as a wise and affordable first step. Please give us a call today. We can answer your questions and help test and strengthen skills that can lead to that brighter future.

BrainRx™

Dr. Russell Griffiths, a Licensed Educational Psychologist, was awarded the Outstanding School Psychologist of Orange County by his peers in 2004/2005. He worked as the school psychologist for the Orange County Department of Education for 6 years, and also with Probation and Social Service students. He is a recipient of the prestigious Crystal Bell Award by the Orange County Department of Education for outstanding service to the community. Dr. Griffiths taught at the School of Psychology and School Counseling at Alliant International University in Irvine, and is now pursuing his own practice.