

TRAGEDY IN THE OZARKS

By **Dr. Travis Bradberry**

In 1984, Terry Wallis was a scrawny nineteen year old who loved to fix cars and crack jokes. Late one evening that July, he was driving a couple of friends down a mountain road when he lost control of his pickup, sending it vaulting over the guardrail and plunging more than twenty feet onto its roof in a dry riverbed below. One of his young companions perished, the other emerged unscathed, and Terry was left in a minimally conscious state with his body paralyzed from the neck down. Within months of the accident, his doctors had given up any hope of his recovery. Terry could breathe on his own, but he was unable to communicate, other than an occasional grunt or nod of the head. He stayed this way for nineteen years, trapped in a state his father, Jerry, describes as “there, but not there.”

And then, on June 11, 2003, Terry brought his mother to her knees. She greeted him at the home that morning the same way she had every day for the last nineteen years. “Who’s here? Who is it who came to visit you today?” But this time, Terry answered.

The walls seemed to come crashing in upon her as she watched her son’s mouth release a brief, guttural reply. “Mom,” he said. And then he asked her for a Pepsi.

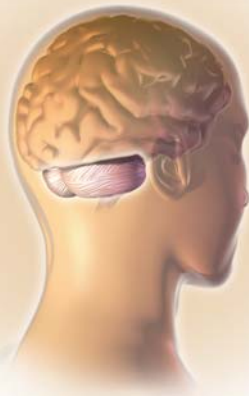
By that afternoon, he was debating the merits of Pepsi versus Coke with his doctors, who were cautiously optimistic. They explained to the family that recoveries this late in the game were incredibly rare and fraught with difficulty. The doctors shared cases like the police officer from Tennessee who emerged from an eight-year

coma to a day of jokes and recounting annual winter camping trips, only to return to silence permanently eighteen hours later. But the more time passed, the more Terry proved he was beating the odds. Words were replaced by phrases, and he even started moving his previously paralyzed limbs. He startled everyone by spontaneously remembering his Social Security number, and insisting that he was still nineteen years old. Terry had no memory of the years that had passed since the accident, but his life before the tragedy was still crystal clear. It took some convincing to get him to realize that nearly twenty years had gone by; he stubbornly tried to convince his father that Ronald Reagan was still the president. But Terry eventually acquiesced to the explanations offered by this family—it just took time for it to sink in that he was a human time capsule.

Neurologists estimate the chance of Terry’s recovery at just 1 in 300 million, which raises the question of what made his recovery possible. Recognizing that they may never see another patient like Terry again, a team of researchers from the medical school at Cornell University—armed with the latest brain-imaging technology—took a look inside his head to find out what had happened. Using a new twist on the MRI called diffusion tensor imaging (DTI), they discovered the damage inside his brain was severe; it looked just like brains did in patients who were still trapped in a semiconscious state. But the researchers also noticed something highly unusual—cells in and around his cerebellum had branched out to grow new connections with the rest of his brain.



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The cerebellum is the brain's communication center. This fist-sized bundle of tissue comprises just 10% of the brain's total volume, yet contains more neurons than the rest of the brain combined. The cerebellum ensures that the entire brain works in concert; when the cerebellum loses contact with another part of the brain, it's as if that area ceases to exist. While Terry lay trapped in a semiconscious state, his cerebellum was busy growing new connections to replace those lost in the accident. It took nineteen years for these connections to reach a critical mass, but once they did, Terry regained the ability to speak, to laugh, to love, and to go on living. His personality lay dormant for nearly two decades, and he emerged with the same motivations, preferences, and strengths he had before the accident. He's still quick to crack a joke, slow to change his opinion, and interested in what kind of car you drive—as long as it isn't a Chevy.

Terry Wallis recovered consciousness because our brains are plastic. At first glance, this may not seem like the most flattering term for the most complicated organ in the body, but it's an excellent way to

remember how neuroplasticity works. Similar to plastic, the regions of the brain are apt to maintain a persistent structure and function, but they can make important adjustments under the right kind of pressure. Each of the brain's 100 billion cells communicates by branching off small branches to reach out to the other cells. A single cell can grow 15,000 connections with its neighbors, and these connections are sprouted and pruned as they are needed. When enough cells build connections in concert, they pave entirely new pathways for information to travel in the brain. Researchers studying brain plasticity have learned that some areas are more prone to growth than others. In fact, some areas of the brains are so opposed to organized change that they're considered "frozen"—unable to build pathways that will affect their function substantially.

Recent advances in neuroscience can pinpoint the purpose of different brain regions with great specificity. For example, personality is predominantly housed in the right orbitofrontal cortex (ROC), directly above the right eye, whereas emotional intelligence sits in a separate region (above the left eye).



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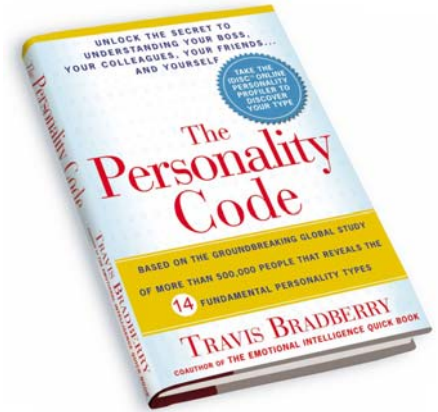
We tend not to see changes in personality in adulthood because the ROC has lost its plasticity by this point. Personality forms like molding clay. When we're born, our personalities lack form; they take their shape as we move toward adulthood. And reaching adulthood is the neural equivalent of throwing your project in the kiln—the shape it's in is the shape in which it's going to stay. This process isn't dictated solely by our environment, because genes have an important influence on the molding. Just as clays have texture—some are suited for hand-made objects, while others are ideal for throwing—we have genetic predispositions that determine how our personalities are formed.

Throughout childhood and adolescence, the ROC is highly plastic. By the time we reach adulthood, the plasticity of the ROC is lost, and our personalities are imprinted on our brains. The ROC gradually takes over more and more of our thinking as it becomes hardwired. Some inclinations are reinforced and stabilized during this development, while others become increasingly difficult to access. The cerebellum may be the brain's communication center, but the ROC provides command and control—the rest of the brain becomes dependent upon the master plan that's written there.

With personality changing less than 1% in adulthood, the question becomes, how can we use our innate personalities to our advantage?

Personality Resources:

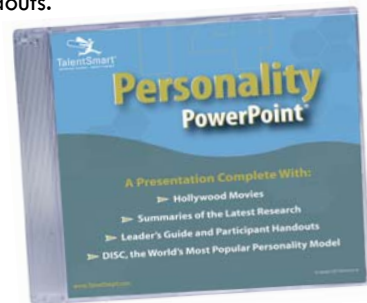
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