

Psychology: Why Some Don't Learn from Their Mistakes

New brain research may help explain why some people don't seem to learn from their mistakes.

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April 24, 2007 - Benjamin Franklin was no brain scientist. He was a keen observer of human behavior, and of the natural world, but he was a couple centuries too early to explore the intricate neuronal interplay of physics and biochemistry that makes us the people we are: healthy, wise, quirky, self-destructive. So, when he famously defined insanity as "doing the same thing over and over and expecting different results," this 18th-century polymath was really being more intuitive than rigorously scientific.

Yet it looks like he got it right. New neuropsychological research is now suggesting that the inability to learn from one's mistakes may indeed be at the root of a broad range of human problems, ranging from childhood bullying and truancy to aggressive acts like road rage to all manner of substance abuse. And this cognitive aberration, deep-wired into the neurons and genes, may even underlie the vagaries of normal human behavior and personality. (It's important in the wake of the tragic events at Virginia Tech to emphasize that this column is not about such deeply disturbed psychology.)

The research starts with electricity, appropriately enough. A while back, psychologists discovered a new and very faint electrical signal coming from the brain, specifically from a region of the brain called the anterior cingulate cortex. This particular conglomeration of neurons is important, because it appears to light up when we are faced with especially demanding mental tasks. Moreover, the recently discovered brain signal appears to peak just milliseconds after we have made a mistake, suggesting that in the normal brain it plays a role in anticipating, spotting and correcting errors. In other words, it's the neurological engine that let us learn from our mistakes.

Psychologists call this electrical pulse ERN, for "error related negativity," but the neurological jargon is not all that important. What's important is that an abnormal pulsation may be the neurobiological underpinning for a serious cognitive deficit, which in turn may lead to a host of pathologies related to lack of impulse control. It's not like addicts and bullies don't know their behavior is harmful, yet they persist in hurting themselves and others despite the consequences. Why? Why do certain people simply fail to learn from experience?

Psychologist Jason Hall and his colleagues at the University of Minnesota decided to explore this perplexing psychology in the laboratory. They wanted to see if perhaps people who are destructively impulsive actually fail to detect their mistakes in the ordinary way—and therefore repeat them. The scientists started by giving an elaborate psychological examination to more than 1,600 subjects, measuring a constellation of traits like irresponsibility, boredom, rebelliousness and alienation. They also queried the subjects about their drug and alcohol use and their criminal records, including instances of theft and fraud.

Based on this personality test, the researchers selected out the ones who scored highest and lowest for impulsivity and antisocial behavior and had them take part in a brain study. They wired these subjects to an EEG to measure the electrical activity of their brains, and while doing so had them take a very difficult cognitive test involving rapid perception and hand movements. Before the test began, the psychologists emphasized the importance of accuracy, although in reality they weren't all that interested in how well the subjects did on the test. In fact, they wanted them to make a lot of mistakes, and they also wanted them to muster as much brain power as they could to avoid and correct errors.

When Hall and his colleagues watched the subjects' brains in action, they got some interesting results. As reported in the April issue of the journal *Psychological Science*, the subjects who were most impulsive and antisocial had EEGs that were quite different from those who were low on these traits. Specifically, the electrical pulse associated with error monitoring was much lower in this group, and it was lower immediately after the subjects erred on a test item, suggesting that the brain's normal response to making mistakes was malfunctioning.

Scientists have not worked out all the neurology yet, but one theory about this electrical pulse is that it is somehow sending messages to several distinct brain regions, perhaps through the neurotransmitter dopamine. These structures, in turn, are responsible not only for monitoring and correcting immediate errors but also for enhancing cognitive control long term. Or not, depending on the potency of the signal. It appears that those with a sputtering electrical generator just keep making the same mental and emotional slips again and again.

All of the subjects in this experiment were healthy university students. This is important because it means that even those at the extremes of the impulsivity scale were in the normal range. None were in jail, for example, and it's unlikely many are heading there. But those with this early antisocial bent could well be heading toward some difficulties in life. Other EEG

studies have linked the same weakened electrical pulse to a deficit in such traits as sense of duty, responsibility and reliability. Such personality deficits may not be pathological, but they reflect a lack of conscientiousness about detail that makes for less than ideal workers, spouses and citizens. To quote the great American psychologist Poor Richard: "A little neglect may breed great mischief."

Wray Herbert writes the "[We're Only Human . . .](#)" blog.

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