Behavior

Bruce Bower reports from Washington, D.C., at the annual meeting of the American Psychological Association

'Limited amnesia': Fair or foul?

In December 1984, a 55-year-old man was found in his kitchen looking dazed and claiming that it was 1945, he was 14 years old and he had just been hit in the head by a baseball bat during a game with friends. The bat incident did actually occur in 1945, but the man insists that the intervening four decades never took place. His parents' deaths, the members of his family and numerous technological advances apparently were all unknown to him at first. When psychologist Michael McCloskey of Johns Hopkins University in Baltimore examined the man last summer, there was no evidence of brain damage.

Is the man feigning this strange type of amnesia, limited to a specific time period, or is he really trapped in 1945 and unable to get back to the future?

So far, it appears that it is very difficult – even for those who study memory – to tell when someone is faking amnesia. Daniel L. Schacter of the University of Toronto presented a small group of college students with a video tape or novel excerpt containing a violent episode. Some were told to recount the episode as best they could to an experimenter, while others were instructed to behave as though they had forgotten the whole incident. Experimenters were in fact memory researchers who did not know which subjects were trying to fool them. In short interviews, these "expert judges" were unable to detect the amnesia simulators, says Schacter.

Despite that discouraging news, a specific pattern of amnesia may characterize many genuine instances of multiple personality, says Eric Eich of the University of British Columbia in Vancouver. There are clinical reports of cases of "asymmetric amnesia," in which each secondary personality is able to remember both its own actions and those of the primary personality, but not those of the individual's other incarnations. Eich had 18 female college students produce word associations while consciously assuming three personalities; the primary identity was shy and retiring Sue, along with fun-loving, hedonistic Linda and angry Alice. The subjects then attempted to remember their associations while again pretending to be one of the personalities. In 13 cases, the secondary personalities had a poor memory for Sue's associations. Thus, the absence of "asymmetric amnesia" may be a strong indicator of feigned multiple personalities, says Eich, whereas the presence of the phenomenon may signal the real thing.

There are, however, no handy guidelines to distinguish real from simulated amnesiacs, notes McCloskey. His scientific approach to the "14-year-old" baseball bat victim will continue to be hit-and-miss.

Terrorists, up close and personal

There is a psychological profile that seems to hold for members of several diverse terrorist groups, according to Rona Fields of Associates in Community Health & Development in Alexandria, Va.

Fields administered a test of emotional temperament and reactivity to 28 members of a Northern Ireland paramilitary organization. All of their personality scores fell within the normal range, she says, indicating that political, social and individual factors can lead to the readiness of otherwise normal people to commit violence without remorse.

According to the study results, terrorists tend to be young people brought up amid intergroup violence who lack anxiety about their anger toward a perceived threat of annihilation and who have high levels of curiosity. They are attracted to organizations advocating violence to promote their identity group's cause and actively seek novel and adventurous ways to express their anger. Fields says the above pattern fits the Irish youths as well as previously studied members of Palestinian and South African terrorist groups.

Biology

A matter of balance: The eyes have it

Some Mexican salamanders are eyeless mutants. The defect does not seem to be in the eye region itself; previous studies have shown that if the eye region of such a mutant is transplanted into the flank of a normal salamander, the region will produce an eye. So what is it in a mutant that tells the eye primordium not to develop?

According to Rudolph Brun of Texas Christian University in Ft. Worth, normal development of sense organs in the salamander's head may depend on a proper balance of information from front and rear, perhaps signaled by different proteins produced by the two regions. The concentrations of the two proteins, like map coordinates, might tell the sense organs that they are in the correct place and are allowed to develop, Brun says. In the case of the eyeless mutants, an imbalance might tell the eyes that they should not develop.

Using both normal and mutant salamanders, Brun performed microsurgery on pairs of embryos very early in their development. He transplanted material from the nose primordium of one into the ear region of another; the excised ear material of the second was used to patch the nose region of the first. Brun found that, even though the eye regions were untouched during the operations, most of the mutants that received extra nose material implanted in their ear region went on to develop normal eyes. (Noses and ears developed normally.) "I really don't think the nose is that crucial," Brun says. Instead, what seems to matter is strengthening the mutant's front side of the balance by implanting nose material from the front of the normal head.

Shifting the balance between anterior and posterior apparently prompts a total rearrangement of head organization, Brun says: While each operation involved only the right side of the head, mutants that received anterior material from normal salamanders developed eyes on both sides.

Researchers have postulated the existence of such concentration-based "guidance systems" for years, Brun says, but have had no way to investigate the mechanism; the mutant salamander might prove the model system. A report on the salamander experiments is in press in the JOURNAL OF NEUROGENETICS.

Showing by glowing

Meanwhile, back at the genetic level of development: Researchers have found a way to tag gene products with light, making it possible to watch as genes on chromosomes in living organisms are turned on and off.

The researchers, at Texas A&M University in College Station and the Boyce Thompson Institute for Plant Research in Ithaca, N.Y., used genes that code for a light-producing enzyme called luciferase, from a glowing saltwater bacterium. They fused the luciferase genes to promoter sequences (essentially, "on" switches) of nitrogen-fixation genes, and inserted the engineered DNA into a nitrogen-fixing bacterium that lives symbiotically with soybean plants. "When the soybean plant calls for nitrogen," says Thomas Baldwin of Texas A&M, "the root nodules light up."

This method of gene-tagging has advantages over previous ones, Baldwin says. The assay is much more sensitive, capable of detecting single photons from single molecules of gene product. The assay does not disturb the living system, so biological processes can be monitored. (While some other markers can be assayed *in vivo*, they are generally "extremely cumbersome" techniques, Baldwin says.) And, since the substrate for the luciferase enzyme is present in nearly every living organism, the marker may be a way to study gene activity in higher organisms. The technique will be described in an upcoming PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES.