Behavior

Saying no to the furies

In many cases of schizophrenia and depression, psychotic breaks are predictably preceded by less serious symptoms — emotional changes or insomnia, for example (SN: 5/14/83, p. 316). Psychiatrists have been very interested in these predictors of imminent psychosis because of the promise they hold for rapid drug intervention. A few case reports, and now a preliminary study, indicate that psychotic patients themselves are often aware of such warning signals and that some can use them as part of strategies to will away psychosis on their own.

Yale University psychiatrists Alan Breier and John S. Strauss interviewed 20 hospitalized psychotic patients about their experiences with trying to control their own psychiatric symptoms, and the researchers found that all but three had attempted — and achieved to varying degrees — self-control in one way or another. As the researchers report in the October Archives of General Psychiatry, the successful patients all met certain requirements for self-control: They were all capable of monitoring their own behavior and recognizing changes (feeling "high," for example) that signaled a coming break; and all were able to evaluate the behavior as undesirable. The patients without self-control either failed to recognize symptoms or found them pleasurable.

The actual strategies for fighting off psychosis, though varied, fit three patterns, according to psychiatrists. Some patients talked themselves through the crisis ("be responsible"; "act like an adult"); others intentionally reduced their level of activity; still others increased their activity. A major theory of psychotic behavior is that it results from a disturbance in attention and information processing systems. An inability to filter out irrelevant stimuli could cause hallucinations and disorganized thoughts, in which case — the authors speculate — decreasing activity and seeking isolation might compensate for the defect. On the other hand, there might be a defect in the later stages of information processing, where external stimuli compete with memories and fantasies for a single channel; in such a case, increasing activity (and thus the flow of non-psychotic information) might have a compensatory effect.

Memories are made of this

"When you awaken, you will remember everything," hypnotists claim, and increasingly officials of the criminal justice system have been accepting that claim. The Federal Bureau of Investigation routinely uses hypnosis in its investigations, as do many local police departments; and it is not uncommon for judges to accept the "enhanced" recall of witnesses as valid testimony. But they are taking the hypnotists' claims on faith. The scientific evidence remains inconclusive, and indeed a recent study suggests that hypnosis may do more in the way of making memories than extracting them.

According to psychologists Jane Dywan and Kenneth Bowers of the University of Waterloo in Ontario, any attempt to prod memory beyond its initial limits tends to increase the number of mistakes that subjects make in recall. And hypnosis, they report in the Oct. 7 Science, exaggerates this process. Dywan and Bowers tested subjects' memories by showing them 60 drawings of common objects and asking them to recall as many as possible. Then, either hypnotized or not, the subjects were urged to dig deeper into their memories. The hypnotized subjects did increase their correct recall, the researchers report, but only slightly and at great cost: They also made three times as many mistakes as the controls, recalling drawings they had never been shown. Furthermore, it was the subjects most prone to hypnosis who reported the false memories—suggesting, Dywan and Bowers conclude, that the hypnotic state itself may enhance the vividness of mental imagery and, in effect, trick the mind into a sense of recognition.

Biology

Artificial chromosomes mimic natural

Scientists have fashioned new chromosomes out of copies of selected DNA segments found in yeast. These constructions "behave in many respects like genuine chromosomes," Andrew W. Murray and Jack W. Szostak of the Dana-Farber Cancer Institute in Boston report in the Sept. 15 Nature. The artificial chromosomes when placed in yeast are faithfully copied and distributed to the two daughter cells during most instances of cell division. But the mimicry is imperfect. The artificial chromosomes have less stringent control over the number of copies made and are lost during cell division more often than are natural yeast chromosomes.

The new chromosomes are made up of natural yeast chromosome regions known to be important in normal function. These regions include the sites where chromosome replication originates; centromeres, the sites to which fibers attach to pull the chromosomes apart during cell division (SN: 7/2/83, p. 12); telomeres, the specialized structures at the ends of chromosomes; and yeast genes.

The smallest natural yeast chromosome is about 150,000 subunits (base pairs) long. The artificial chromosomes are about a third as long. In earlier experiments the scientists constructed much shorter artificial chromosomes that did not behave like normal chromosomes. The short chromosomes made too many copies and tended to be lost during cell division.

From further analysis of the behavior of the longer artificial chromosomes, the scientists hope to learn more about what is required for normal chromosomal function. The differences in behavior may be due to the shorter length of the artificial chromosome, the specific spacing of its elements or impaired function of one of the elements. But they might also reflect an absence from the artificial chromosome of some currently unkown element required for proper chromosome behavior.

The gene behind a lung cancer

The tumor of a lung cancer patient has been found to have a genetic difference from the patient's normal tissue. That difference is a single subunit (base pair) change among the about 45,000 subunits of a gene called "K-ras," Mariano Barbacid of the National Cancer Institute reported at a recent meeting at the Cold Spring Harbor (N.Y.) Laboratory. This gene is one of those previously implicated in cancer development (SN: 11/13/82, p. 316). In other cases, similar single subunit mutations have been shown to activate a normal cellular gene and allow it to make cells malignant. The finding that the genetic mutation in the lung tumor does not appear in the patient's normal tissue indicates that the abnormality, which appears to have activated the gene, was not inherited but occurred during the patient's lifetime.

Bacteria give shipworms their bite

The great amount of damage shipworms do to piers and boats around the world is based on an unusual microbe living symbiotically in shipworm gills. This still-unnamed bacterium is the first to be discovered that can both digest cellulose, the fibrous material of plant cell walls, and can convert nitrogen in air or water into a biologically usable form. The novel bacteria have been found living as a pure culture in a specialized organ of six species of shipworms, which are clam-like mollusks, collected from coastal waters of Massachusetts, Bermuda and Venezuela, report John B. Waterbury of the Woods Hole (Mass.) Oceanographic Institution and C. Bradford Calloway and Ruth D. Turner of Harvard University. They say in the Sept. 30 Science that the bacteria will grow in the laboratory with only powdered cellulose as food. Such bacteria are of potential commercial interest because they may be able to convert sawdust and other wood products into proteins suitable for fertilizer or animal feed.

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