Behavior

AA's motivated benefits

Substance abuse treatment in the United States consists mainly of 12-step self-help programs such as Alcoholics Anonymous (AA). Nonetheless, few studies have examined the factors that make or break recovery for those who complete a typical 12-step program in a hospital or private clinic.

A new investigation, directed by Jon Morgenstern of Mount Sinai School of Medicine in New York, suggests that when the AA approach works, it does so for much the same reasons as other drug abuse treatments or even self-initiated quitting without formal treatment. These common factors consist of determination to pursue a particular treatment (or self-defined goals), confidence in one's ability to resist drug use in various social situations, and embrace of strategies to avoid drug consumption (such as talking regularly with a trusted friend).

Morgenstern's group studied 93 men and women who completed treatment for alcohol or illicit drug abuse, or both, at one of two private hospital-based programs grounded in the 12-step approach. Treatment, which lasted about 3 weeks, stressed overcoming denial of addiction, fostering a sense of belonging to self-help groups, and thinking of addiction as a disease.

Self-reported substance use declined most sharply, both 1 month and 6 months after completing treatment, for those who had initially expressed a strong desire to attend a 12-step program, the researchers report in the October JOURNAL OF CONSULTING AND CLINICAL PSYCHOLOGY. The same participants often attended self-help meetings after leaving formal treatment, felt confident that they could abstain from drug use, and devised strategies to minimize or halt drug use.

On the other hand, individuals who had reported scant motivation to enter a 12-step program remained uninspired when treatment ended and returned to their accustomed levels of alcohol and drug consumption.

Clinicians who use the 12-step model frequently try to induce motivation in people referred to their programs by challenging them to overcome denial of their addiction and to heed a higher spiritual power.

The new findings indicate that more effective ways are needed to light a motivational fire under substance abusers receiving formal treatment, Morgenstern and his coworkers hold. —*B.B.*

Getting a read on the brain

Although scientists have long posited that only a few areas of the brain orchestrate human language abilities, brain-imaging studies increasingly challenge that position. A team of researchers reports in the September JOURNAL OF COGNITIVE NEUROSCIENCE, for instance, that reading sentences galvanizes several relatively small neural regions in patterns that vary to a surprising extent from one person to another.

Native English speakers reading English sentences, as opposed to strings of consonants, display heightened activity in three regions of the brain's left hemisphere traditionally associated with language—Broca's area, Wernicke's area, and the angular gyrus—assert Daphne Bavelier of Georgetown University in Washington, D.C., and her colleagues. Sentence reading also sparks surges of oxygenated blood—a sign of increased neural exertion—at the top of the temporal lobe (on both sides of the brain) and in part of the prefrontal cortex in the left hemisphere.

Eight adult volunteers who underwent functional magnetic resonance imaging as they read both sentences and consonant strings exhibited large individual differences in the precise location of elevated activity in these regions.

Some temporal lobe areas activated by sentence reading may help to discern grammatical meaning, Bavelier and her colleagues theorize. —*B.B.*

Biology

Hot stuff: A receptor for spicy foods

For people with painful memories of biting down on a chili pepper or touching the side of a boiling pot, it's probably cold comfort that scientists have discovered a cell surface protein that links the two burning sensations. Yet the finding may lead to help someday for millions of people desperate for pain relief.

Both extreme heat and capsaicin, the agent that puts the hot in hot peppers, trigger pain-sensing nerves by activating a cell surface protein, or receptor, that allows calcium ions to rush into the cells, David Julius of the University of California, San Francisco and his colleagues report in the Oct. 23 NATURE.

As aficionados of spicy food can appreciate, scientists have wondered whether capsaicin's fiery taste had anything to do with how the body normally senses heat. "If you put capsaicin on your skin, you'll feel a tingling and a burning," notes Julius.

To identify receptors that recognize capsaicin's presence and therefore trigger the burning feeling, researchers isolated genes active in sensory nerve cells that connect to the spinal cord. They added small groups of the genes to non-neuronal cells, observing which ones then took in calcium when exposed to capsaicin. Eventually, the investigators closed in on one gene that made the cells sensitive to the spicy compound.

This gene encodes a kind of protein called an ion channel, and capsaicin isn't the only thing that will open it. Increasing cell temperature from 22°C to 45°C also activates the receptor, Julius' group discovered.

Capsaicin interests physicians because, paradoxically, prolonged exposure to it can relieve pain (SN: 11/14/92, p. 333). Scientists remain uncertain whether this analgesic action results because pain nerves gradually become less sensitive or because an overabundance of calcium ions kills them.

Identifying capsaicin's receptor may help researchers design an improved form of the analgesic that would help people with chronic pain by inhibiting or destroying pain-sensing nerves. "What would be ideal is, instead of activating this receptor [as capsaicin does], to block it painlessly," says David E. Clapham of Harvard Medical School in Boston. —*J.T.*

New genes debut on the Y chromosome

When eggs form in women, all 23 pairs of chromosomes swap genes in a process called recombination. When sperm are produced in men, however, only a part of the Y chromosome, perhaps 5 percent, can recombine with its partner, the X chromosome. Over time, this lack of communication has caused genes in the nonrecombining portion of Y to degenerate, prompting most researchers to declare the large region a genetic wasteland.

A new survey of the area, reported in the Oct. 24 SCIENCE, reveals signs of life, however. Bruce T. Lahn and David C. Page of the Whitehead Institute for Biomedical Research in Cambridge, Mass., have found a dozen novel genes in Y's nonrecombining region. Since seven of the new Y genes are active only in testes, they may play a role in sperm creation. Mutations in these genes may account for unexplained cases of male infertility, notes Lahn. The discovery also bolsters the hypothesis that this nonrecombining region specializes in harboring genes crucial to male fertility or fitness (SN: 11/16/96, p. 311).

The other new genes are active in many organs, suggesting that they perform duties essential to all cells, says Lahn. Their indispensability may explain why they haven't degenerated like most other genes on the Y chromosome.

The genes have counterparts on the X chromosome, which means that two working copies of each gene may be required for good health. Consequently, the genes may explain some of the problems—such as short stature, infertility, and organ defects—associated with Turner's syndrome, a condition in which women are born with only one X chromosome. —*J.T.*

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