

Does Science Show What 12 Steps Know?

Data seem to support the 12-step program's benefits for addicts.

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Science has never revealed as much about addiction—potential genetic causes, influences, and triggers, and the resultant brain activity—or offered as many opportunities and methods for initial treatment as it does now.

Even so, the grassroots 12-step program remains the preferred prescription for achieving long-term sobriety. Since the inception of Alcoholics Anonymous (A.A.)—the progenitor of 12-step programs—science has sometimes been at odds with the notion that laypeople can cure themselves.

Yet the success of the 12-step approach may ultimately be explained through medical science and psychology. Both offer substantive reasons for why it works.

Climbing the Steps to Recovery

The "miracle" of A.A. can be traced to the evening of June 10, 1935, when a struggling alcoholic named Bill Wilson, fighting to stay dry while on a business trip to Akron, Ohio, met with an apparently hopeless drinker named Bob Smith in order to quell his own thirst.

It had been suggested to Wilson, through a religious organization called the Oxford Group, that talking to wet drunks about his experiences and trying to help them get sober would, in turn, help him stay dry. Smith, once a respected physician in the community, was referred to him as someone at bottom, beyond help.

Their discussion sparked the insight that the best hope for sobriety was a daily reprieve from alcohol, which stood with the singular practice of helping others.

Over the next five years, a non-denominational program emerged that drew much of its spiritual doctrine from Christian practices. It embodied an action plan in the form of 12 "steps" that are essentially guidelines for right living, including taking a personal inventory of one's strengths and shortcomings, making restitution for past wrongs, and helping others find sobriety.

A.A. reports that more than two million members worldwide currently stay sober by regularly attending meetings and implementing these steps.

In recent decades, the 12 steps have been applied to other addictions—everything from drugs, food, and other substances to various compulsive behaviors around gambling or sex.

Psychic Solution

Most addicts receive less than 30 days of inpatient treatment. But they must also accept that they need ongoing outside help.

The 12-step approach, said Paul Gallant, an interventionist with 27 years of sobriety, is "so popular with treatment centers because it's proven to work. When a person completes treatment, they have a place to go. "Self-knowledge is not a sufficient treatment for alcoholism," continued Gallant. "I've worked with people who have had years and years of psychotherapy and intensive analysis, but it's brought them no closer to ongoing abstinence."

However, experiencing what Gallant called a "psychic change," which in the 12-step world is linked to the marvel of a "spiritual awakening," often results in a distinct personality and behavioral transformation that leads to long-term sobriety.

"The not-drinking is really just a part of it," Gallant said. "It's not drinking and changing as a person. That psychic change needs to come from a program of spiritual development, and so far the greatest success has been Alcoholics Anonymous."

Community Spirit(ual)

Established treatment facilities like Sierra Tucson offer everything from traditional medicine to such alternative approaches as equine therapy and healing circles.

According to Nia Sipp, staff psychiatrist with Sierra Tucson, the goal is not just removing the substance or behavior but also facilitating self-reflection and creating social systems. "Oftentimes people feel that it's about

God and other things," Sipp said. But she believes that the A.A. concept is more about "the spirit of community."

Rev. Jack Abel, director of spiritual care at Caron Treatment Centers, agreed. "When we say spirituality, we're talking about connection. People who are addicted become disconnected. And spirituality, as it's emphasized in the program of the 12 steps, is profoundly reconnecting."

According to Marvin Seppala, chief medical officer at Hazelden and sober 37 years, attending 12-step meetings does more than give an addict warm, fuzzy feelings.

The unconscious neurological pull of addiction undermines healthy survival drives, causing individuals to make disastrous choices, he said. "People will regularly risk their lives—risk everything—to continue use of a substance."

Addicts don't want to engage in these behaviors, but they can't control themselves. "The only way to truly treat it is with something more powerful," he said—something, like the 12 steps, that can change patterns in the brain.

Left Brain, Right Brain

Andrew Newberg studies neurotheology—the science of how spiritual practices affect the brain.

He avoids theological opinions, noting that the positive mental and emotional effects that might come from believing in God are real to the individual. "Irrespective of whether God truly exists or not," Newberg said, "the brain is less interested in the accuracy of reality than the adaptability of how we respond."

Bill Wilson had a famous "white light" experience in a hospital room, where he was recovering from what would be his last alcoholic bender. He claimed it was a spiritual awakening that not only changed his outlook but also removed his desire to drink.

Newberg said that "large-scale, existential-type crises" such as Wilson's can bring instant changes to the brain. New neuronal pathways are activated or reactivated. This instant rewiring, Newberg said, generates a sudden and intense "aha" moment.

Newberg speculates that such an event may occur because of differences between the brain's left and right hemispheres, which approach problems differently. The left side struggles to work through a problem from an analytical, black-and-white perspective.

But the right side may suddenly kick in and apply a very different, more holistic solution. In such a moment, the neurons of the brain are immediately realigned, spurred on by intense emotion relating to the crisis.

This same experience, sometimes described as a "eureka!" moment—or a cognitive insight phenomenon—is often referenced in relation to creative breakthroughs.

One 2008 study found that when the left side of the person's brain dwells on a problem, it produces an excessive amount of obstructive gamma waves. The more the person ruminates on the problem, the harder it becomes to solve.

Conversely, when concentration is relaxed—or as Newberg said, when the person manages to quiet the left side of the brain and involve the right—the sudden appearance of new answers and insights can feel profound.

Neglected Realm

David Shurtleff, acting deputy director of the National Institute of Drug Abuse (NIDA), described addiction as a mainstream medical problem suffering from a lack of coordinated efforts.

The first four years of medical school routinely provide doctors with only a few hours of instruction on addiction. Shurtleff said his agency would like to see more training for primary care physicians, including equipping them with a standardized assessment to diagnose addiction. "We do the best we can," he said, "but it's an uphill fight."

Meanwhile, brain science marches on. Understanding of addiction at the cellular level continues to yield revelations that seem to cast light on why 12-step meetings succeed.

Power of Dopamine Receptors

D2 dopamine receptors connect dopamine, a key neurotransmitter, to neurons. When these receptors are not functioning—or there are too few of them available to connect the dopamine to neurons—memory, mood, and thinking may all be impaired.

A shortage of D2 receptors, some researchers surmise, could predispose a person to addiction.

Nora Volkow, NIDA's director, led two studies that involved artificially increasing the number of D2 receptors in rats by administering adenoviral vectors directly into their brains. Viral vectors transmit their genetic material

and makeup into foreign cells, in this case increasing the number of D2 receptors in the new cells to match their own.

In one study involving rats and alcohol, the increased number of D2 receptors led the rodents to consume less alcohol, compared with their baseline intake.

In the other study, the D2-receptor increase caused rats to significantly reduce their intake of cocaine.

Michael Nader, a researcher at Wake Forest School of Medicine, is investigating ways to raise D2-receptor levels naturally. One experiment he helped conduct focused on five separate groups of four monkeys. Each had been self-administering cocaine to the point of habit and were then deprived of the drug for an eight-month period. To create a picture of D2-receptor availability, the monkeys were given a radioactive tracer that competes with dopamine for receptors.

The monkeys were then randomly put in social groups of four and given the opportunity to self-administer the drug again.

Positron emission tomography (PET) imaging of the monkeys over time showed fluctuations in dopamine levels, which allowed the researchers to estimate the changing numbers of available D2 receptors. After only three months, the socially dominant monkeys in each group had naturally increased their numbers of D2 receptors.

There was no increase in the subordinate monkeys. Further, the subordinate monkeys reverted to using cocaine at much higher levels than the dominant monkeys.

"There is an interesting relationship between D2-receptor numbers and vulnerability to drug addiction," Nader said. "It appears that individuals with low D2 measures are more vulnerable compared to individuals with high D2-receptor numbers."

Why did the socially dominant monkeys show D2-receptor increases? "One hypothesis," Nader said, "is environmental enrichment." For the monkeys, it seems, being dominant was the enriching trigger.

One physiological consequence of involvement in 12-step meetings, therefore, could be an increase in the natural production of D2 receptors. "That's another whole area to be studied beyond the animal world," Shurtleff said.

Need for Attachment

Philip Flores, author of *Addiction as an Attachment Disorder*, said the human need for social interaction is a physiological one, linked to the well-being of the nervous system.

When someone becomes addicted, he said, mechanisms for healthy attachment are "hijacked," resulting in dependence on addictive substances or behaviors.

Some believe that addicts, even before their disease kicks in, struggle with knowing how to form emotional bonds that connect them to other people. Co-occurring disorders, such as depression and anxiety, make it even harder to build those essential emotional attachments.

"We, as social mammals, cannot regulate our central nervous systems by ourselves," Flores said. "We need other people to do that."

While it's commonly understood that early childhood attachments to parents and family are necessary for healthy development, Flores maintains that emotional attachments remain necessary throughout adulthood. This is where a 12-step program becomes valuable.

It's not enough, Flores said, to remove the addiction, which in itself has become an object of unhealthy emotional and physical attachment. To achieve long-term well-being, addicts need opportunities for forging healthy emotional attachments.

"What A.A. does on the basic level is what good psychotherapy does," Flores said. It provides "a community for people to break their isolation and to start to connect on an emotional level with other people."

Helping Heals

Lee Ann Kaskutas, a scientist with the Alcohol Research Group, has faced skepticism from colleagues for studying A.A., in part because of the numerous spiritual references that go with the 12-step program. It puts A.A. on "the fringe" in the minds of many scientists, Kaskutas said.

Kaskutas, a self-proclaimed atheist, said that the 12 steps bear fruit regardless of one's spiritual beliefs. "If you don't believe in God, the way it weasels in is in the help and behaviors that the 12-step group inculcates."

Helping others, Kaskutas said, "is the internal combustion engine of A.A. I think that is the connection to spirituality."

People feel better about themselves after helping someone else, Kaskutas said. "So it's reinforcing—when you help somebody, I think your brain chemistry changes."