

The Potency of Social Versus Drug Rewards

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We have known for decades that social stress, including isolation, is a major predictor of substance use and use disorders.¹ The landmark study was Bruce K. Alexander's "rat park" experiment in the late 1970s: Rats housed in isolation chose water with morphine over plain water, but those housed in a social group preferred plain water over morphine. Many studies since that time have also found that animals isolated or subjected to other stressors, such as being housed with higher-ranking animals, will self-administer drugs more readily than animals not subject to those stressors.²

However, in most animal research on addiction's social determinants, the conditions are set by the experimenter; the animals are not presented with a choice between social and drug rewards. Although prior research has shown that even addicted rats will choose palatable food over drugs if given the choice, analogous use of social rewards (instead of food) as a choice option has not been studied. This has hindered the translatability of this basic research to humans.

A major study led by Dr. Marco Venniro from NIDA's Intramural Research Program that was just published in *Nature Neuroscience* presented rats with a choice between social interaction and heroin or methamphetamine. Strikingly, the animals consistently chose social interaction, regardless of their prior experience (or lack of experience) with drug-taking. Even rats that had learned to self-administer drugs in a manner resembling addiction in humans consistently chose social interaction over the drug when it was an option.³

Rats housed with other animals also consistently chose further contact with other animals over drug self-administration. And interestingly, addicted rats that had become voluntarily abstinent through choosing social interaction did not show the increases in drug craving over time (i.e., incubation) typically seen with drug withdrawal. Addicted rats were more likely to relapse, choosing drug self-administration over social interaction, when access to other rats was delayed or punished.

The study authors argue that these striking findings underscore the possible importance of social reinforcers when treating addiction in humans. The community reinforcement approach (CRA) for example is one of the best-supported behavioral treatment modalities for drug and alcohol addiction, and building a new, rewarding social support system is a major

component of this approach. Other cognitive approaches also focus on increasing the salience of more distant social rewards in moments of immediate drug-taking opportunities and temptations. And of course, the best-supported recovery modalities are built on mutual support.

Venniro and his coauthors do acknowledge that humans' social needs are far more complex than those of rats. Beyond immediate or near-immediate access to a companion or companions, we also need the promise of meaningful participation in society; those who feel they lack such a "stake in conventional life" may be more likely to rationalize self-destructive behavior, whereas a sense of social purpose may (at least for some individuals) have a protective effect even in the absence of immediate companionship. And of course, there is great interindividual variability in the salience of social rewards—something seen also in the rat study, where proneness to relapse when social interaction was delayed varied between individuals.

But it is hard to ignore the bottom line that social animals respond powerfully to social contact and connection when it is perceived to be available and meaningful. The absence of such connection in neighborhoods, workplaces, schools, and online may be a contributor to America's current drug crisis.

Americans are lonelier than ever, according to recent studies and surveys,⁴ and it has been shown to have an impact on resistance to infectious and chronic disease as well as on mental health. Last year, the former U.S. Surgeon General Vivek Murthy described loneliness as an "epidemic," with its impact on longevity comparable to smoking and even worse than obesity.⁵ Deaths from overdose and the longer-term health consequences of drug and alcohol misuse have been called "deaths of despair," and isolation may be a component of that despair.⁶

While it is crucial to deliver effective medications more widely and effectively, as well as to develop new medications that can treat a wider range of substance use disorders, we may not solve the current opioid crisis or prevent future crises without additionally addressing issues of isolation and other social stresses in our physical and virtual communities. Addressing isolation should be a central focus for clinicians, both through utilization of behavioral treatments that focus on social reinforcement and encouraging patient engagement in recovery support services that foster social connection and mutual aid.

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