

Opioids, Addiction, and the Promise of Psychological Interventions

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In recent years, deaths by drug overdose have spiked in many countries, a result of the growing availability of fentanyl—a powerful synthetic opioid often used to treat pain—along with stresses of the global COVID-19 pandemic, including job losses and lockdowns that may have had a disproportionate impact on many drug users.

These casualties hit all-time highs in the United States, where an estimated 93,331 people died from drug overdoses during 2020, up 29.4% from the 72,151 deaths estimated in 2019, according to the National Center for Health Statistics. Of all the drug-related deaths in 2020, 75% were overdoses from opioids, including natural and synthetic opioids such as [prescription pain medication](#).

The Wide World of Opioids

Opioids are a group of drugs that include opiates and their synthetic analogues. Opiates are the naturally occurring alkaloids found in the opium poppy and include morphine and codeine. Their semi-synthetic derivatives include heroin, hydrocodone, oxycodone, and buprenorphine. Synthetic or pharmaceutical opioids include methadone, tramadol, and fentanyl, along with opioid receptor agonists such as research opioids and novel synthetic opioids. Initially developed by pharmaceutical companies for pain management, novel synthetic opioids are considered more potent than morphine. For example, synthetic analogues of fentanyl may be 50 to 100 times more potent than morphine.

“This is the highest number of overdose deaths ever recorded in a 12-month period, and the largest increase since at least 1999,” Nora Volkow, director of the National Institute on Drug Abuse, told National Public Radio in July 2021.

These rising drug overdoses aren’t unique to the United States. [According to the World Health Organization](#), about 36.3 million people worldwide suffered from drug use disorders in 2019. A growing proportion of them used prescription opioids, which are quickly catching up to heroin and illicitly manufactured opioids in popularity. For instance, the United Nations’ 2021 World Drug Report pointed to alarming increases in opioid use in Africa, which were mainly driven by nonmedical use of pharmaceutical opioids such as tramadol, a substance largely available in the region and not under international control.

The global scope of opioid addiction and its interconnection with pain management make it hard to tackle. Here’s a look at some insights from psychological science on how to change individual and collective behaviors to prevent and treat this problem.

Treating chronic pain: Psychological alternatives

A major impetus for the development of pharmaceutical opioids is persistent—sometimes lifelong—pain. Around 1997, however, opioid prescriptions for chronic pain management began increasing alongside a dual epidemic of heroin use and nonmedical use of pharmaceutical opioids. Between 1997 and 2005, the number of opioid prescriptions in the United States increased more than 500%, resulting in easy access to opioids that were considered safer than heroin, given their reliable quality and potency, and also carried less stigma (Mars et al., 2014). More recently, a retrospective study of opioid users indicated that 75% of those who began their opioid abuse in the 2000s had been introduced to opioids through prescription drugs (Cicero et al., 2014).

This state of affairs indicates the need for approaches to chronic pain management that do not rely on prescription opioids. In a 2021 article in [Psychological Science in the Public Interest](#), a group of researchers and practitioners led by Mary A. Driscoll (Yale School of Medicine and VA Connecticut Healthcare System) examined [psychological interventions for the treatment of chronic pain](#). Such interventions could improve functioning and quality of life among individuals with chronic pain while decreasing overreliance on opioids or invasive procedures such as surgeries that may pose more risks than benefits, the researchers proposed.

Driscoll and colleagues' proposal aligned with the National Pain Strategy, published by the U.S. Department of Health and Human Services in 2016, which recommended the dissemination of psychological interventions to treat chronic pain. Related to this strategy, the U.S. Centers for Disease Control and Prevention also published a guideline for prescribing opioids for chronic pain (Dowell et al., 2016), which specified a preference for nonpharmacological and nonopioid pharmacological treatments.

In their article, Driscoll and colleagues highlighted the biopsychosocial model of chronic pain, proposed in 1978 by George Engel, which addresses the complexities of chronic pain and is recognized as the principal model informing the study of pain and pain management. This model highlights the interrelatedness of biological factors (e.g., tissue damage, physical health, genetic vulnerabilities), psychological factors (e.g., attention, attitudes, catastrophizing), and social factors (e.g., cultural influences, social learning) in the context of health and illness, including pain and pain management.

Psychological Interventions for Pain Management

The following psychological interventions are among the most widely accepted within the paincare community, according to Mary A. Driscoll and colleagues (2021):

- **Supportive psychotherapy:** Emphasizes unconditional acceptance and empathic understanding.
- **Relaxation training:** Uses breathing, muscle relaxation, and visual imagery to counteract the body's stress response.
- **Biofeedback:** Uses biofeedback equipment to monitor physiological responses to stress and pain (e.g., heart rate, sweating) and teaches how to down-regulate the body's physiological responses.
- **Hypnosis:** Involves a clinician's hypnotic suggestion to reduce pain and incorporates relaxation training.
- **Operant-behavioral therapy:** Seeks to replace maladaptive behaviors consistent with the "sick" role with healthier "well" behaviors.
- **Cognitive-behavioral therapy:** Identifies and seeks to change maladaptive thoughts about pain that cause distress and unhelpful behaviors, such as isolation and withdrawal; promotes the development of helpful behavioral coping strategies (e.g., relaxation).
- **Acceptance and commitment therapy:** Encourages acceptance of chronic pain and focuses on strategies for identifying and reinforcing behaviors consistent with desired goals.
- **Mindfulness-based interventions:** Aim to disentangle physical pain from emotional pain via increased awareness of the body, breathing, and activity.
- **Emotional-awareness and expression therapy:** Highlights the interconnectivity of brain regions responsible for processing physical pain and emotions; encourages confronting avoided emotions to reduce the connection between emotions and pain.
- **Psychologically informed physical therapy:** Integrates physical therapy and cognitive behavioral therapy.

The role of those psychological factors in chronic pain implies that psychological interventions capable of modifying the psychological processes that underlie or contribute to pain, distress, or disability might serve as strong alternatives to medication. In fact, there is "overwhelming evidence for the effectiveness

of psychological interventions in the management of chronic pain,” Driscoll and colleagues wrote. They identified a number of psychological interventions that are empirically based and widely accepted within the pain-care community (see sidebar, Psychological Interventions for Pain Management).

Persuading people to adopt psychological interventions

Despite evidence that psychological interventions can be as effective as drugs for pain management, patients and providers, especially those who aren’t psychologists, “may misunderstand psychological treatments’ rationale, mechanism of action, or components and therefore doubt their relevance or benefit,” wrote Driscoll and colleagues. Hence, providers “may pass these doubts on to patients either subconsciously or consciously and may discourage their patients’ participation either actively or passively (e.g., by failing to recommend these treatments).” To overcome these barriers, the researchers suggested better education and marketing, which might incorporate behavioral strategies that have been shown to lead consumers to choose certain products or modify behaviors.

In a 2020 article in [Perspectives on Psychological Science](#), Mitchell R. Campbell and Markus Brauer (University of Wisconsin–Madison) suggested that an approach adapted from social marketing could minimize the gap between what is known about prejudice and real-world methods to reduce prejudice. Social marketing is mainly concerned with changing behaviors; rather than identifying general principles in human behavior, it addresses specific behaviors in specific contexts. Social marketers determine the target behavior (what needs to change), the target audience (who must make the change), and the barriers and benefits that should be made salient for the change to occur. Overall, this idea is congruent with Driscoll and colleagues’ recommendation that “potential benefits [of psychological treatments] should be made tangible and personal to the consumer, and the treatments themselves should be appealing, engaging, and effective.”

However, practitioners should recommend psychological interventions from the beginning of treatment rather than considering them only after pharmacological or physiological treatments have failed. “Evidence from the broader pain literature supports the idea that psychological and behavioral treatment options should be offered at the outset of pain care,” wrote Beth D. Darnall (Stanford University School of Medicine) in a commentary on Driscoll and colleagues’ article. She added that increasing patients’ early access to psychological treatment would require practitioners to meet patients where they are—both physically and psychologically—and reconceptualize how treatment accessibility might be equitably achieved, at the lowest cost and lowest burden for patients.

Understanding addiction

In a 2019 article in *Psychological Science in the Public Interest*, Antoine Bechara (University of Southern California) and a team of researchers reviewed theories of [addiction](#) aimed at explaining both why people seek drugs in the first place and why some people who use drugs eventually become addicted.

A Public Health Approach to Addiction Treatment

Treatment approaches to addiction are heterogeneous; there does not appear to exist a single approach

that most experts endorse. The difficulty starts with the lack of understanding of why some individuals become addicted, whereas others can consume opioids without developing an addiction. As an example, a 1975 study indicated that about 90% of the American servicemembers who became addicted to opioids in Vietnam stopped using or became controlled users when they returned to the United States (Robins et al., 1975). Some researchers think of opioid addiction as a chronic, relapsing disorder that will last for an individual's lifetime, whereas others see it as a disorder with high remission rates (Heyman, 2011).

Regardless, public health approaches to drug policy have proved effective in reducing addiction rates and preventing drug-overdose deaths. In 1999, for example, Portugal's National Strategy for the Fight Against Drugs introduced a vast program of harm-reduction efforts and doubled investment in drug treatment and prevention services while restructuring the legal framework around minor drug offenses. This strategy was a departure from the country's previous drug demonization campaigns, which were akin to "the war on drugs" in the United States and similarly unsuccessful.

In the 1990s, Portugal had an estimated 100,000 heroin users out of a population of about 10 million and the highest rate of HIV transmission among drug users in the European Union. "It was completely transversal," cutting across all layers of society, said João Castel-Branco Goulão, the Portuguese national coordinator for drugs and drug addiction and the general director of the Service for Intervention and Ethics Behaviors and Dependencies in Portugal's Ministry of Health, in a 2021 webinar. Goulão, a medical doctor by training, is the most visible face of the group that shaped the Portuguese drug policies.

Ironically, according to Goulão, the far-reaching nature of the epidemic, which seemed to affect every Portuguese family, was key because it helped society as a whole to be sensitive to the problem and support the end of policies that treated addiction as a crime and disproportionately targeted poor minorities.

Portugal's National Strategy for the Fight Against Drugs was guided by two main principles. *Humanism* signaled the recognition of the drug user citizen's full dignity as a human being, treated within the complex framework of their individual, family, and social history as well as their health and social conditions. *Pragmatism* signaled openness toward innovation and the rejection of dogma or preconceived ideas. To follow these principles, the strategy involved multidisciplinary teams, which included psychologists, and fostered scientific research in academic and applied settings, including contributions from university psychology departments around the country.

In 2000, the Portuguese parliament approved a new legal framework suggested by this multidisciplinary team, stating that:

- A drug user is a person in need of health and social care.
- Dissuasion intervention provides an opportunity for an early, specific, and integrated interface with drug users.
- Dissuasion intervention is targeted at each drug user's characteristics and individual needs.

The country decriminalized (but still prohibited) the consumption, acquisition, and possession of any type of drug, meaning that drug users no longer had a criminal record that would extend for life and stigmatize them. As a result, users were—and remain—able to seek medical and psychological treatment without fear of incarceration. This strategy was made easier because of the health care system in place in

Portugal. “We have a universal health system for free, easily accessible for everybody without difficult issues of insurances and coverages,” Goulão said in the 2021 webinar.

Under this model, when police officers discover that someone is taking a drug or possesses an amount considered acceptable for personal use (i.e., below a threshold specified by law), they are referred to a multidisciplinary commission composed of a psychologist, a social worker, and a lawyer—a Commission for Dissuasion of Drug Addiction. Within 72 hours, they must meet with the team, which seeks to understand their individual needs and circumstances; if the team determines that the person needs treatment, the members invite (but do not obligate) them to have facilitated access to treatment. A network of methadone clinics, needle exchange programs, programs encouraging small businesses to hire addicts in treatment, and support teams of psychologists, social workers, medical doctors, and peers (many of them former drug users) ensures integrated care and emphasizes social reintegration.

This approach, focused on health and not punishment, led to a drop in the rates of drug-overdose deaths and new HIV infections attributed to injection drug use. It also moved Portugal from the top of the ranking of European Union countries by overdose deaths to the bottom. In 2019, Portugal counted 6 deaths per million among people aged 15 to 64, whereas the European Union averaged 23.7 deaths per million.

Will other countries shift to similar models? In 2021, the administration of President Joe Biden released its strategic drug policy plan for the United States, which focuses on enhancing evidence-based harm-reduction efforts, expanding access to treatment, and eradicating racial, gender, and economic inequities that currently exist in the criminal justice system. The U.S. President also stated that “people should not be incarcerated for drug use but should be offered treatment instead.” This program might mark a turning point away from the war on drugs in favor of an approach favoring drug treatments and prevention as well as harm reduction.

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Theories of addiction fall into four major categories, according to the researchers:

- *Traditional explanations* based on pleasure and withdrawal emphasize the euphoria caused by drugs (i.e., positive reinforcement) and the need to alleviate distress or withdrawal (i.e., negative reinforcement).
- *Habit explanations* emphasize the repetition of drug use, which can make drug-use routines become automatic.
- *Incentive-sensitization explanations* emphasize the excessive intensity of addictive cravings even after withdrawal ends, due to dopamine-related sensitization.
- *Cognitive-dysregulation explanations* emphasize loss of self-control as a result of disruptions in the brain systems involved in cognitive control.

Each type of explanation is backed by psychological and neuroscience research, and all may apply to a degree, Bechara and colleagues wrote. However, some may be better than others for explaining why particular drug users ultimately become addicted, they added.

Proposing a neurobehavioral approach to addiction, Bechara and colleagues described how addiction could result from abnormal functioning in three brain systems: the amygdala-striatum (the “impulsive” system), the prefrontal cortex (the “executive” system), and the insula (an area involved in urges and cravings). Individual differences in both brain functioning and societal circumstances can also influence addiction and patterns of recovery and might explain why some opioid users never become addicted.

Treating addiction at the individual level

Bechara and colleagues proposed the competing-neurobehavioral-decision-systems (CNDS) approach, which links mechanisms of addiction and treatments, to treat addiction at the individual level. According to the CNDS, a person’s choices result from the interaction between their impulsive-decision system and their executive-decision system (i.e., a more controlled system). Among people with addiction, the impulsive-decision system tends to predominate. Hence, any intervention that restores balance between the two decision systems, either by weakening the impulsive-decision system or strengthening the executive-decision system, may reduce substance abuse.

For instance, interventions such as episodic future thinking (mentally simulating future events), transcranial magnetic stimulation of the prefrontal cortices (TMS; noninvasive brain stimulation that can have analgesic effects), and working memory training might increase the dominance of the executive-decision system. TMS can also reduce the dominance of the impulsive-decision system by reducing activation of the dopamine circuit, which is associated with cravings.

Other researchers have also emphasized an individualized approach. In a 2021 article in *Current Directions in Psychological Science*, Kathleen M. Carroll (Yale School of Medicine) wrote that the heterogeneity of substance use disorders calls for individualized treatment plans. In these, researchers

and practitioners identify the features driving addiction in particular individuals and create a wider range of interventions that target the core mechanisms of addiction as well as co-occurring problems.

A 2020 article in *Current Directions in Psychological Science* outlined an individualized treatment approach that, although not specifically aimed at opioid addiction, could potentially be used to automatize new inferences and behaviors that replace the habitual behaviors involved in addiction. The approach uses ABC training, in which patients are trained in the context of personal antecedents (A) to make behavioral choices (B) according to their goals and in light of potential consequences (C). Reinout W. Wiers (University of Amsterdam), Pieter Van Dessel (Ghent University), and Catalina Köpetz (Wayne State University) suggested the use of ABC training in cognitive-bias modification, a commonly used intervention that targets distortions in thinking to improve addiction treatment.

In fact, Wiers and Alan W. Stacy (University of Southern California) had already described the idea that treatments targeting implicit cognitions could help to reduce addiction. “The central paradox in addictive behaviors is that people continue to use drugs even though they know the harm. Recent research on implicit or automatic processes provides clues to understanding this paradox,” they wrote in a 2006 article in *Current Directions in Psychological Science*. “The growing focus on these processes does not imply that explicit or deliberate processes are unimportant, but rather that implicit processes must be acknowledged if addictive behaviors are to be understood and treated.”

Theoretical approaches to addiction have also placed motivation as a central factor—specifically, the motivation to experience the pleasure a drug causes and to avoid the negative effects of withdrawal or life stressors. For instance, in behavioral economics, addiction has been “approached as the result of a ‘rational’ choice justified by instrumentality of drug use to maximization of a desired outcome (e.g., feeling good, not feeling bad, smooth social interaction) and the lack of alternative options or means to these particular outcomes,” wrote Köpetz (then at the University of Maryland) and colleagues in *Perspectives on Psychological Science* in 2013. Thus, treatments that incorporate some of the principles underlying goal-driven behavior in general may be promising for reducing addiction. As an example, the researchers cited behavioral activation approaches that aim to boost the value of important goals by increasing individuals’ engagement in rewarding, goal-supporting activities. These approaches have been successful in increasing substance-use treatment retention, according to Köpetz and colleagues. “Furthermore, treatments designed to promote the use of healthier, nonsubstance-related strategies... to fulfill chronic motivations related to substance use (e.g., sensation seeking) may lead to reductions in motivation to drink alcohol or use illicit drugs,” they wrote.

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