

HIGH PRICE

A man with dreadlocks, wearing a dark suit and a light blue shirt, stands on a brick-paved balcony with a black metal railing. He is looking towards the camera. In the background, a city street with cars and tall buildings is visible. The scene is brightly lit, suggesting daytime.

**A Neuroscientist's Journey
of Self-Discovery That Challenges
Everything You Know About
Drugs and Society**

Dr. Carl Hart

A pioneering neuroscientist shares his story of growing up in one of Miami's toughest neighborhoods and how it led him to his groundbreaking work in drug addiction.

As a youth, Carl Hart didn't realize the value of school; he studied just enough to stay on the basketball team. At the same time, he was immersed in street life. Today he is a cutting-edge neuroscientist—Columbia University's first tenured African American professor in the sciences—whose landmark, controversial research is redefining our understanding of addiction.

In this provocative and eye-opening memoir, he recalls his journey of self-discovery and weaves his past and present. Hart goes beyond the hype of the antidrug movement as he examines the relationship among drugs, pleasure, choice, and motivation, both in the brain and in society. His findings shed new light on common ideas about race, poverty, and drugs, and explain why current policies are failing.

Though Hart escaped neighborhoods that were dominated by entrenched poverty and the knot of problems associated with it, he has not turned his back on his roots. Determined to make a difference, he tirelessly applies his scientific research to help save real lives. But balancing his former street life with his achievements today has not been easy—a struggle he reflects on publicly for the first time.

A powerful story of hope and change, of a scientist who has dedicated his life to helping others, *High Price* will alter the way we think about poverty, race, and addiction—and how we can effect change.

ADVANCE PRAISE FOR

HIGH PRICE

“A hard-hitting attack on current drug policy by . . . a neuroscientist who grew up on the streets of one of Miami’s toughest neighborhoods. . . . An eye-opening, absorbing, complex story of scientific achievement in the face of overwhelming odds.”

—*Kirkus Reviews* (starred)

“Carl Hart is a peerless contributor to America’s discourse on drug policy. He combines the rigor of a scientist with the street smarts of a former hustler. The result here is *High Price*, a fiercely uncompromising look at public health and an inspiring personal journey.”

—*Eugene Jarecki, award-winning author and documentary filmmaker*

“Life stories are powerful tools in clarifying paths to success and failure and motivating people to envision and pursue their dreams. Dr. Hart shares in a deeply personal way his story of growing up in Miami and the apparently circuitous route he took to becoming a professor at an Ivy League university. In a unique and innovative approach, he recounts his child- and early adulthood as a black man growing up in America and his career as a substance-abuse research scientist in conjunction with telling the story of drug use and policy in America. . . . *High Price* is highly edifying as we struggle to come to terms with our country’s perceptions of drug users and positions on drug laws and policies.”

—*Lula Beatty, former director, Special Populations Office, National Institute on Drug Abuse, National Institutes of Health; and senior director, Health Disparities, American Psychological Association*

ISBN 978-0-06-201588-4



9 780062 015884

CONTENTS

<i>Author's Note</i>		<i>xi</i>
Prologue		1
Chapter 1	WHERE I COME FROM	9
Chapter 2	BEFORE AND AFTER	20
Chapter 3	BIG MAMA	42
Chapter 4	SEX EDUCATION	65
Chapter 5	RAP AND REWARDS	83
Chapter 6	DRUGS AND GUNS	102
Chapter 7	CHOICES AND CHANCES	125
Chapter 8	BASIC TRAINING	143
Chapter 9	"HOME IS WHERE THE HATRED IS"	169
Chapter 10	THE MAZE	197
Chapter 11	WYOMING	219
Chapter 12	STILL JUST A NIGGA	238
Chapter 13	THE BEHAVIOR OF HUMAN SUBJECTS	254
Chapter 14	HITTING HOME	277
Chapter 15	THE NEW CRACK	288

Chapter 16	IN SEARCH OF SALVATION	313
Chapter 17	DRUG POLICY BASED ON FACT, NOT FICTION	322
<i>Acknowledgments</i>		333
<i>Notes</i>		336

CHAPTER 13

The Behavior of Human Subjects

It is not heroin or cocaine that makes one an addict. It is the need to escape from a harsh reality.

—SHIRLEY CHISHOLM

Robert sat on a hospital bed, surrounded by about a half-dozen people. He was a tall, slender, light-skinned brother with a goatee and short hair, in his early thirties. He was reclining in a typical, austere single room, with a small window and the usual pale and sterile hospital decor. At the center of the group was Dr. Ellie McCance-Katz, the woman who had recruited me to a postdoctoral position in Yale University's Psychiatry Department.

A short, fortyish woman with auburn hair, Ellie led the team. A nurse and another doctor monitored Robert's blood pressure and other vital signs. A female research assistant and I were also clustered around Robert as he slowly received an intravenous injection of cocaine. It was December 1997.

Postdoctoral work is an important step in scientific training,

which, if things go well, can lead to the ultimate academic prize: a tenure-track job at a reputable university. My Yale postdoc was also my first experience of studying the effects of psychoactive drugs on a human being. It was exciting to finally get to do this work.

Over time, I'd come to see the limitations of the animal research that had been my initiation into neuroscience. For example, there's a phenomenon seen in animals, called sensitization, that occurs when they are given stimulant drugs like cocaine. Typically, when rats take a drug repeatedly, they become tolerant to its effects and a higher dose is needed to reproduce the initial response. But with some effects of stimulants, animals actually become more sensitive to the drug and they have a bigger response to a smaller dose than they did at first: the opposite of tolerance.

In humans, this sensitization was said to cause addicted stimulant users to become more paranoid and anxious over time. However, that result isn't seen consistently in human drug users and it isn't seen when stimulants are used therapeutically, which suggests that it is not an important pharmacological effect for people. As I continued to study drugs, I found many similar phenomena that just didn't carry over. It all made me think that in order to discover what I really wanted to know about drug use, I'd have to study it carefully in humans.

Robert was an affable, handsome man. Dressed neatly but casually, he didn't look overly thin or sickly: there was nothing to suggest to anyone who saw him that he was a crack cocaine user. While we were blinded as to the dose of drug he was receiving and to whether it was a placebo, cocaine, or a cocaine-related compound called cocaethylene, I soon learned to tell when he got a decent dose of drug. Then all he wanted to do was talk. He'd go on and on, sometimes describing how cocaine gave him insight and creativity.

Our study was designed to compare the effects of IV cocaine to IV cocaethylene, a compound that is created in the body when cocaine and alcohol are taken together. At the time, there were concerns that cocaethylene was more potent and more dangerous to the heart and blood vessels than cocaine taken alone. Under carefully controlled conditions, we wanted to learn whether this was true when the drug was given to healthy people who typically used cocaine and alcohol together.

I recognize that some may question the ethics of giving drugs like cocaine and cocaethylene for research purposes. Over the course of my career, however, I have come to the conclusion that it would be unethical *not* to conduct this type of research, because it has provided a wealth of information about the real effects of drugs and the findings have important implications for public policy and the treatment of drug addiction. From this study, for example, we found out that fears about the dangers of cocaethylene were not supported by evidence. Cocaethylene turns out to be less potent than cocaine.¹ It actually has less of an effect in terms of raising heart rate and blood pressure than does cocaine itself, meaning it probably carries less risk for heart attack or stroke.

Back in 1997, when I started working on this study, I still had many misconceptions about drugs myself. Like the idea that cocaethylene was a major new threat, my other hypotheses were being repeatedly contradicted by the data during my graduate and postdoc studies. I'd had a previous postdoctoral appointment at the University of California, San Francisco, in 1996, which I'd received right after graduating from Wyoming. I had been eager to start studying human drug users and I knew I'd have a chance to do so at UCSF.

But in California, I wasn't able to study people actually taking drugs in the lab: the researchers I worked with were focused

on drug craving, which was supposed to drive addiction. These scientists didn't study the effects of drugs themselves; they examined only what drug users were reporting about their desire for them. I rapidly discovered that craving wasn't as important as I had initially thought. This was another step in the evolution of my thinking about drugs.

The problems with craving first became clear when I interacted with real people who had sought help for addiction. To try to understand their desire for drugs, I had become a facilitator for group sessions required of the patients in a methadone program. Almost immediately, however, I began recognizing that I had much more in common with them than I'd expected. Although they did discuss drug-related issues, unless they were prompted, craving wasn't their primary concern. The patients' real issues were mainly related to practical things like the high cost of housing and other essentials. That was something I'd had a very acute personal experience of as I started my postdoc.

It had been so hard for me to find an affordable place to stay in the Bay Area that I'd actually spent the first several weeks of my postdoc sleeping in my office. This was one of the many frustrations I experienced during my postdoctoral training that sometimes made me seriously question my desire for a future in science. Postdoctoral work is critical to a scientist's career, but even now in 2013 it pays only \$40,000–\$50,000 a year. Back then the salary was a meager \$19,000–\$24,000. I understood what these men and women in treatment were going through, trying to survive on not much money and manage their work and relationships. I'd thought these drug users were going to be much more different from me than they actually were.

Instead, I found that people with addictions weren't driven only by drugs. Moreover, they weren't any more antisocial or criminal than people I'd grown up with, many of whom rarely or

never got high; in fact, their behavior wasn't much different from what I'd engaged in myself with my friends back home. They didn't seem overwhelmed by craving: they basically sought drug rewards in the same way that they sought sex or food. I began to see that their drug-related behavior wasn't really that special and to think that perhaps their drive to take drugs obeyed the same rules that applied to these other human desires. The notion that addiction was some kind of "character defect" or extreme condition that created completely unpredictable and irrational actions began to seem misguided.

And when I heard lectures by addiction researchers who studied animals, I began to realize how they extrapolated from extreme situations in ways that created a caricature of addiction. One researcher talked about how you could leave a hundred-dollar bill in the room and "you or I wouldn't take it" but a drug addict always would. They talked about humans in simplistic ways that, ironically, lacked the careful qualifications they always included in their discussions of animal research.

Later, I also came to see how our distorted images of addiction played out in the attitudes the researchers had toward the study participants at Yale. For instance, Robert's musings on how cocaine made him more focused and creative were discounted as drug-induced drivel—and yet studies of the impact of cocaine on concentration do show that it can improve alertness and concentration, exactly as he claimed.

Other experiences led me to see even more similarities. David, a thirty-five-year-old Italian-American construction worker, also participated in the cocaethylene research. He once described his experience to me of the day he was recruited to participate in the study. He'd seen an ad in a local alternative newspaper, seeking frequent cocaine users willing to be in an experiment in which they might be administered cocaine. They

had to be otherwise healthy and willing to live in the hospital for two weeks. If accepted and if they stayed the whole time, they'd be paid a thousand dollars upon completion.

We'd interviewed David and determined that he was an appropriate candidate. Then we arranged for him to get a physical at a clinic at Yale-New Haven Hospital. The building had a strange address—it was 950½ or something like that, which sounds distinctly fishy. As he left our facility and sought this bizarre address, he noticed that there were several police cars parked outside.

That made him anxious. But he did want to participate in the study and possibly make some money, so he persevered. When he got near to where he thought the address was, however, he saw police outside that building, too. He began thinking that we'd set him up, that when he got inside and asked about the study, he'd be arrested. He walked around the facility a few times, trying to figure out what to do and whether he should even ask someone about the weird address. Maybe asking for that number would be the cue for the police to arrest him?

From the perspective of a nonuser of illegal drugs, of course, this sounds like sheer paranoia. When I told the story to other people working on the study, they laughed knowingly about how cocaine can make users paranoid. But from David's perspective, there was nothing irrational about his fears. He was involved in illegal activity. Police actually were engaged in an intense war on drugs. Tens of thousands cocaine users had been arrested. And we had all seen those movies or TV shows where lawbreakers are lured to some building by promises of a prize of some sort, only to be arrested for some earlier crime.

David had been asked to go into a government building and admit his drug use, which is a crime, in order to supposedly get paid to possibly take an illegal drug. His worries were an under-

standable response to his experience in the cultural setting in which it took place. While cocaine and marijuana can certainly increase these kinds of fears, anyone engaging in illegal activity does need to be cautious if he wants to avoid getting caught.

It became increasingly clear to me how our prejudices about drug use and our punitive policies toward users themselves made people who take drugs seem less human and less rational. Drug users' behavior was always first ascribed to drugs rather than considered in light of other, equally prominent factors in the social world, like drug laws.

And in reality, virtually all of us sometimes find ourselves in situations where we persist in behavior despite negative consequences, just like addicted people do. Most people can't stick to a diet, many continue to eat fatty and sweet foods when they are gaining weight, or have had periods of heavy drinking or stayed in bad relationships and ignored the negative results, which is the same pattern of behavior seen in drug addiction. Sure, there are extreme cases where addicted people commit absurd crimes—but there are plenty of equally stupid crimes planned or committed by people who are stone-cold sober.

I thought about my friends and family back home and where they'd wound up while I was working my way up in academia. I considered behaviors that were impulsive and often seen as associated with alcohol and other drugs. I myself had shoplifted and stolen batteries and sold drugs. But while I had plenty of less than perfect qualities, I had no addictions. Many of my siblings and cousins also engaged in petty theft as teenagers, but again, this was usually unrelated to their alcohol or other drug use or lack thereof.

In my immediate family, three of my five sisters had had teenage pregnancies. One of my sisters did become a heavy drinker (although she nonetheless always met her occupational

and family obligations). And she had her first child at age nineteen but married the father a few months after the child's birth. They are still together. But she is not the sister who stabbed a woman in a fight over a man and was later stabbed herself in a similar situation. The sister who got into those altercations does not have substance abuse problems.

One of my sisters' husbands was arrested in connection with a deadly shooting but not convicted—but that is not the brother-in-law who went to rehab for crack cocaine abuse. And the in-law who did have a crack problem? He went on to get a job in plumbing, has a house twice the size of mine, and is a loving father and husband.

Where was the connection between drugs and problems here? Among my family—just as I was beginning to understand from the research as well—the link between addiction and other forms of dysfunctional behavior was not as prominent as the stereotypes suggest. In some cases, alcohol use or its after-effects exacerbated violence: for example, when my father beat my mother. Some of my cousins had struggled with crack. But illicit drugs and addiction were far from the greatest threats to our safety and chances of success. There seemed to be at least as many—if not more—cases in which illicit drugs played little or no role than there were situations in which their pharmacological effects seemed to matter. And if the drug highs themselves didn't explain behavior, for me that meant behavior related to lack of drugs—that is, craving—was even further away from allowing us to predict it.

I had left my San Francisco postdoctoral position disillusioned by the whole concept of craving. Some addicts certainly reported drug craving: there was no doubt about that. But it didn't really predict whether they relapsed, according to the majority of research. Sometimes people would report severe craving but

not use drugs; other times, they'd use drugs in situations where they said they'd experienced no craving at all. It seemed to me that it would be much more useful to study people's actual decisions about whether to take drugs, rather than focus so much on what they said about what they wanted or craved in some hypothetical future. That's why I responded with enthusiasm when Dr. McCance-Katz had suggested I do a postdoc with her at Yale.

Although I didn't get to study drug-taking decisions at Yale, at least with Dr. McCance-Katz, I was able to observe people's behavior while under the influence, not just their ratings of their desires to use drugs. That brought me closer to the types of experiments I really wanted to do so I could understand the real effects of drugs, not just our projections of them.

In order to find people to participate in our research in New Haven, I also had to interview many drug users. At the time, I wasn't even making a distinction between drug use and addiction. Despite what I was starting to learn, I still thought all illegal drug use was problematic and that most people engaged in it were headed for addiction if indeed not already there. I didn't distinguish between addictive use that interferes with major life functions like relationships and work, and controlled use that is pleasurable and not destructive.

Like the addicted people I was studying, I was influenced by my social milieu. Everyone around me in the addiction field acted as though pathological use was more common than controlled use. Certainly if you read the scientific literature unskeptically, this is the impression with which you are left. Consequently, when I interviewed users at this time whose lives seemed unscathed by their drug use, I figured I just hadn't yet become skillful enough to ferret out their denial. After speaking with dozens of them, though, I started to think twice. Maybe I wasn't the one who was wrong.

I thought back on what I'd learned about behavior and how it is affected by punishment and reward, going back to B. F. Skinner. Were drugs really that different from other reinforcers or pleasures? I looked at the existing data on that question. In the animal research, the graphs representing how hard an animal is willing to work for a food or drug reward were almost identical: make access easy and provide few alternatives and animals will definitely eat a lot of sweet or fatty food or take a lot of cocaine or heroin.

However, the harder they have to work for any reward—whether it's a natural pleasure like food or sex or a more artificial one like drugs—the less of it they will tend to seek. This is true whether the animal being studied is a mouse, a rat, a monkey, or a human being. And both in humans and in other animals, these responses will vary depending on the presence of competing reinforcers.

For example, studies have found that when rhesus monkeys have to repeatedly press levers to get either a cocaine injection or a highly desirable food (banana pellets), their responses vary with both effort and dose. Quite sensibly, the monkeys will work harder to get a higher dose of cocaine and put in less effort for a lower dose or placebo. They will also choose larger quantities of banana pellets over smaller doses of cocaine. Even at the highest dose of cocaine offered, these animals will never choose cocaine over banana pellets more than 50 percent of the time.² Addictive behavior follows rules and is shaped by situations just like other types of behavior. It's not as weird or special as we make it out to be.

You may say, "Yes, that's fine with a drug like cocaine that doesn't produce obvious withdrawal symptoms. But what about a drug like heroin?" Indeed, physical withdrawal symptoms can be seen in chronic opiate (for example, heroin, morphine) users

if they abruptly stop drug use. The symptoms usually begin about twelve to sixteen hours after the last heroin dose and look something like a case of the twenty-four-hour, or intestinal, flu. Most of us have experienced these symptoms at some point in our lives: nausea, vomiting, diarrhea, aches, pains, and a general sense of misery. While this condition is most unpleasant, rarely is it life-threatening or accurately depicted in films that suggest the sufferer is on the verge of death.

Throughout the 1960s, drug addiction was defined solely on the basis of the presence of physical dependence (a withdrawal syndrome). About that same time, a group of researchers began publishing findings that questioned this dominant view. They reported that: (1) monkeys would begin and maintain lever-pressing for opiates without first being made physically dependent; and (2) monkeys who had given themselves small amounts of a drug and who had never experienced withdrawal symptoms could be trained to work very hard for their opiate injections.³ More recently, researchers have demonstrated that monkeys' lever-pressings for heroin injections do not correspond with the timing or severity of their withdrawal symptoms.⁴ These findings, along with others, underscore the notion that physical dependence isn't the primary reason for continued drug use.

I started to put these ideas together as I was trying to make my way in academia and dealing with a very unpredictable experience of reinforcers and punishers of my own. Although research careers are rarely presented this way when we are trying to attract youth to science, the reality is that the field is intensely competitive and many highly qualified people do not wind up with tenure-track jobs or even jobs in industry that take advantage of their skills. At UCSF and then even more so at Yale, I came face-to-face with the fierceness of this competition. It was extremely demoralizing at times.

This fight for status was worse than what I'd seen on the street or on the basketball court, where it was at least clear when people were competing and what territory was in dispute. In academia, no one said anything to your face: it was all sneaky stuff, all easily denied or explained away as a "misunderstanding" or "miscommunication." Men didn't fight like men; they stabbed you in the back instead. The rules were actually clearer and easier to follow in the hood. But one of the true advantages of my background was that it made me sensitive to social signals, no matter where I encountered them. I was able to learn those used in academia and use them to win, even on such a convoluted playing field.

Nonetheless, there were definitely times when I came close to giving up, when the low salary and grueling work hours with no guarantee of a definite payoff wore me down. The work at UCSF had been disillusioning: as James Baldwin had put it, when you learn a craft well, you get to see its ugly side, and that's what happened to me, starting there. I felt that the research we were doing on craving was poorly conducted and not productive, that the link between what we were measuring and what happened in real-world drug-using settings was not strong enough to matter. Dr. McCance-Katz was at UCSF on sabbatical at the time and I mentioned these concerns to her, which is how I got invited to do my second postdoc, at Yale. Even there, however, I still had no clear path to that elusive goal of a real job, a permanent tenure-track position. I wasn't sure I'd ever be able to support my family doing the work I loved. And now, I sometimes hated it. A job at Walmart started to look good by contrast.

To make matters worse, after only months, I learned that Dr. McCance-Katz was soon going to be leaving Yale, which meant my job there would end as well. The viciousness and underhandedness of the competition I experienced during this

postdoc was beyond anything I'd ever been faced with before. For example, when I learned that Dr. McCance-Katz was leaving Yale to accept a job elsewhere, I met with a senior member in the department who promised me a faculty position within the department. Later, when I attempted to follow up on the position, this person claimed to have no recollection of our previous conversation, saying that I must have misremembered.

Fortunately, it was at this point that I met Herb Kleber, who was then the director of the division on substance abuse in the department of psychiatry at Columbia. I had a friend who worked with him and said that his program at Columbia was going to be expanding. She introduced us at a scientific meeting and he tried to recruit me with the promise of a faculty position. I was especially excited about the idea of working at Columbia because his wife, Marian Fischman, studied crack cocaine administration in humans. She'd published a paper in the prestigious *Journal of the American Medical Association* showing that crack and powder cocaine were pharmacologically indistinguishable.⁵ I eagerly prepared to visit New York for my interview.

However, when I met with Marian, virtually the first thing she said was "I don't know what Herb told you, but we don't have a faculty position. We can only offer you another postdoc." Given the amnesia I was starting to see at Yale, I ultimately agreed to do a third postdoc at Columbia. I didn't know when this job limbo would end or for how long I could stand it. I certainly wasn't receiving the rewards of a scientific career that had been expected.

Marian, however, promised that she would do everything she could to help me get a permanent position. She was true to her word. It was at Columbia that I would ultimately get a tenure-track job and reach tenure itself. And in my research there I began finding, as I'd suspected, that humans do respond

to cocaine quite similarly to how they respond to other reinforcing experiences. Like the rest of us, people who are addicted to crack cocaine are sensitive not only to one type of pleasure but also to many. While severe addiction may narrow people's focus and reduce their ability to take pleasure in nondrug experiences, it does not turn them into people who cannot react to a variety of incentives. I began the work that illustrated this as a Columbia postdoc, a job I held from September 1998 through June 1999.

In the study I briefly described in the preface to this book, cocaine users were given a choice between various doses of cocaine and various amounts of vouchers for cash or merchan-



Marian Fischman's research group when I arrived at Columbia in 1998. From left, Marian is the fifth person standing. Herb Kleber is seated next to me.

dise.⁶ On average, on the street, our participants spent \$280 a week on cocaine. These were not casual or irregular users.

Our procedure worked like this. First, we recruited frequent crack users through ads in the *Village Voice* and from referrals by other users provided by those who replied to the ads. Then we screened the volunteers for health problems that would ethically preclude their participation in cocaine research (for example, heart disease). We also screened their urine to ensure that it was positive for cocaine, though we did not reveal that we were confirming their use in this fashion.

Those who were cleared to participate were paid to stay for two to three weeks in a ward at Columbia-Presbyterian Hospital in Harlem (now New York-Presbyterian). Before we did any of this, of course, we'd applied for and received special licenses to work with illegal drugs on human subjects and been cleared by an ethics committee called an institutional review board (IRB). Then we obtained the cocaine from a pharmaceutical company, keeping it locked in the pharmacy with other controlled substances, using careful procedures to account for all of it.

On days participants were scheduled to smoke cocaine, each one would sit in a small room with a computer at a desk, where we could observe them through a one-way mirror. A nurse was in a nearby room, monitoring her or his vital signs and lighting the crack pipe when cocaine was chosen. When they smoked crack, participants were blindfolded so that they couldn't see the size of the rock they were getting. We didn't want them to have visual cues that might amplify or diminish their expectations about the hit.

At the very start of each day, before having to make any choices, participants had a "sample" trial. That meant that they were allowed to try the dose of cocaine we were making available that day and to see and hold the cash or merchandise vouchers

on offer. Both the researchers and the participants were blinded as to whether actual cocaine or placebo was placed in the crack pipe. After the user had sampled the day's dose, he or she would participate in five "choice trials," spaced fifteen minutes apart. When a choice was available, an image of two squares would appear on the computer and the participant had to either click the left (crack) or right (voucher) side of the mouse to indicate their choice.

In order to actually get the drug or voucher, they then had to press the space bar on the keyboard two hundred times. During their first four choice sessions, the choice was between a voucher for five dollars in cash or the day's cocaine dose; during the last four, they had the choice of the dose or the five-dollar merchandise voucher.

Again, the results were similar to those seen comparing different rewards in the animal literature and in earlier human trials. When larger cocaine doses were available, users almost always chose cocaine over the cash or merchandise voucher. So far, this was congruent with the idea that addiction makes people place drugs first. But the rest of the data demolished that theory, showing that lower doses were often resisted. Despite the popular conception that addicted people will choose any dose of drug over any other experience—especially once they've already had a taste of it to kindle their craving—this is not what we find in the lab. Even around drugs, addicted people are not simply slaves to craving. They can make rational choices.

This was the case even though the alternative in each choice had only a maximum value of five dollars. In total, our participants could earn up to fifty dollars each day by participating in two complete sessions, which was a significant sum given their usual low income. But if the "first hit produces irresistible craving" theory were true, any dose should have had infinite value

during the moment of choice. The cocaine users shouldn't have been able to think beyond the five dollars to the fifty—or about the particular dose, if the idea that people with addiction are totally out of control once they start using drugs is true.

Nonetheless, on average, users in our studies smoked two fewer doses of cocaine when the alternative was cash as opposed to merchandise.⁷ This meant that cash money was 10 percent more effective than vouchers in suppressing cocaine use. The conventional wisdom about addictive behavior being completely irrational couldn't at all account for this result. If people addicted to cocaine always went for drugs no matter what, there should have been no difference.

Because our findings were so different from what most people have been taught about drugs, critics sometimes argued that they only really showed that these crack users were saving their money to buy more cocaine on the street later. That itself, however, doesn't even support the conventional view of addiction. Weren't addicted people supposed to be unable to resist drugs that were in front of them and be incapable of saving up for drugs or anything else later? And why would someone turn down pure pharmaceutical cocaine in a legal setting in favor of possibly being beat on the street and getting stepped-on (adulterated) drugs illegally in the future? *That* would truly be irrational under the logic of the idea of addiction as something that "hijacked" the brain and took control of the will in favor of immediate drug-seeking.

Alternatively, some folks predictably claimed that the users we recruited "weren't really addicted." People who were genuinely addicted would never have turned down free crack cocaine, they said. If we'd studied participants with genuine drug problems, they argued, we would have had very different results. Our participants, however, clearly had arranged their

lives around crack. They weren't rich folks who had an extra few hundred bucks a month to spend on cocaine: they typically had unstable living arrangements and few or nonexistent family ties. Many had been convicted of crack-cocaine-related crimes and all had tested positive for cocaine on multiple occasions during the screening process. Most could tell you where to get the best and most inexpensive cocaine in the city. If this wasn't "real" addiction, what was?

The more I studied actual drug use in human beings, the more I became convinced that it was a behavior that was amenable to change like any other. So why did it seem so intractable in neighborhoods like the one where I'd grown up—and why did people there rarely even question their beliefs about drugs? A key problem is that poor people actually have few "competing reinforcers." Crack isn't really all that overwhelmingly good or superpowerfully reinforcing: it gained the popularity that it achieved in the hood (again, far less than advertised) because there weren't that many other affordable sources of pleasure and purpose and because many of the people at the highest risk had other preexisting mental illnesses that affected their choices.

And that was why, despite years of media-hyped predictions that crack's expansion across classes was imminent, it never "ravaged" the suburbs or took down significant percentages of middle- or upper-class youth. Though the real proportion of people who became addicted to crack in the inner city was low, it was definitely higher than it was among the middle classes, just as is true for other addictions, including alcohol. Money has a way of insulating people from consequences. In addition, it carries with it more reasons for abstaining—there are things a high-socioeconomic-status person *has* to do that are incompatible with being intoxicated. Becoming an addict is tantamount to disavowing one's social niche.

High socioeconomic status provides more access to employment, and alternative sources of meaning, purpose, power, and pleasure, as well as better access to mental health care. The differences in the prevalence of crack problems are mainly related to economic opportunity, not special properties of cocaine. While drug use rates are pretty similar across classes (and often, actually lower among the poor), addiction—like most other illnesses—is not an equal-opportunity disorder. Like cancer and heart disease, it is concentrated in the poor, who have far less access to healthy diets and consistent medical care.

Moreover, research on alternative reinforcers has now shown repeatedly that they can be effective in changing addictive behavior. This kind of treatment is called contingency management (CM). The idea comes from basic behaviorism: our actions are governed to a large extent by what we are rewarded for in our environment. These cause-and-effect relationships where a reward is dependent (contingent) upon the person either doing or (in the case of drugs) not doing a particular behavior can be used to help change all types of habits.

In fact, part of the reason we wanted to compare the responses of crack users to vouchers for cash in our study, as opposed to vouchers for merchandise, was ultimately to understand what types of reinforcement would work best to aid recovery. There is now a whole body of literature showing that providing alternative reinforcers improves addiction treatment outcomes. It is far more effective than using punitive measures like incarceration, which often is less useful in the long run. Although while incarcerated many people stop or at least reduce their drug use, jail and prison themselves don't provide positive alternatives to replace drug habits. When heavy drug users return to their communities, they are not better equipped to find work and support themselves and their families; instead, having a

criminal record and a gap in their résumé makes finding work even harder.

Reward-based CM treatments are sometimes controversial because they can be portrayed in the media as “paying addicts to stop using.” Many people think it’s unfair to those who “do the right thing” by not taking drugs to see drug users getting paid to behave the way they should behave anyway. Cash rewards are especially touchy, since the users could presumably simply buy drugs with the money.

But I see it differently, and here’s why. Indeed, we’ve all probably observed how people respond to rewards in multiple areas of life. It’s often seen most clearly in parenting: for example, if my sons want a new computer, I expect them to maintain a certain GPA. In most workplaces, if the boss offers a raise for achieving certain goals, employees will do their best to hit those targets. Because drug use is governed by the same principles that govern other behaviors, contingency management treatment uses these ideas to change addictive behavior.

Importantly, using alternative reinforcers in treatment doesn’t make it more expensive, in part because it makes it more effective. When contingency management techniques are specifically applied not only to supporting recovery but also to developing skills that are in demand by employers, the costs are cut even further because the work itself produces value, not to mention reducing people’s need for government benefits.

One study randomly assigned treatment-seeking cocaine users to either contingency management plus behavioral counseling or to a traditional twelve-step focused counseling treatment, which involves referring people to meetings of twelve-step groups like Alcoholics Anonymous and teaching them about the steps involved. Patients in the contingency management arm of the study received vouchers for merchandise whenever they had

drug-free urines. Fifty-eight percent of participants in the contingency management group completed the twenty-four-week outpatient treatment—compared to just 11 percent in the twelve-step group. In terms of abstinence, 68 percent achieved at least eight weeks cocaine-free, versus just 11 percent in the twelve-step condition.⁸ And after the rewards are stopped, people in CM are no more likely to relapse than other treatment graduates. Since more people complete treatment with CM, this makes for an overall reduction in relapse.

More than three dozen studies have now been conducted on contingency management, used in the treatment of opioid, cocaine, alcohol, and multiple-drug addiction.⁹ They show that contingency management typically does better than treatment that does not use it—and that larger, faster rewards are more effective than smaller and less quickly received incentives. This, again, is exactly what research on other types of behavior would predict. Cash, as we showed, is more effective than merchandise as a reinforcer.

The most exciting CM research currently being conducted is work by Ken Silverman and his colleagues at Johns Hopkins University. They have developed what they call a “therapeutic workplace” in which CM is used to help train drug users for jobs in data entry. One study, for example, found that the therapeutic workplace nearly doubled abstinence rates from opioids and cocaine among pregnant and postpartum addicted women, from 33 percent to 59 percent in urine samples taken three times a week.¹⁰ And Silverman’s group has replicated these findings several times, in different populations of people with addictions.

While there are multiple benefits to this line of research, one of the most important is that participants’ drug-taking behaviors are being replaced with real-world job skills. In this way, these programs ultimately pay for themselves by helping those

who were formerly unemployable become productive workers. When alternative reinforcers are made available to those who formerly lacked them, drug problems can be overcome.

And in my own case, at Columbia in the summer of 1999 I finally reaped the reward I'd been seeking for so long: a faculty position job at an Ivy League university. I'd continued putting in long hours, studying my human participants as intently as I'd once watched my rats (though, thankfully, I didn't have to operate on the people). At the New York State Psychiatric Institute, in upper Manhattan, I would hole up in my office, analyzing data and thinking about my research. Although the cubicle-sized room had a window with a breathtaking view of the Hudson River, I kept the shade down: the only thing I wanted to see was my data or the research papers I was reading. By this point, I was studying the effects of marijuana and methamphetamine as well as crack cocaine, so I needed to familiarize myself with the literature on those drugs.

And since our participants lived on-site 24-7, that's pretty much when I was there, too, overseeing the lab assistants and making sure everything was going as it should. I liked getting to know the participants: it not only helped the experiments run more smoothly but also gave me insight into their world, which allowed me to do better science. I now try to minimize the extent to which theories or stereotypes influence my view of drug users, especially if they are standing before me and I can collect my own data.

My mentor, Marian, was intensely supportive, always letting me know how much progress I was making and keeping me abreast of where I stood in terms of getting a faculty position. She told me late in 1998 that after I'd finished the year, I'd be

getting a letter offering me a job, which would start on July 1. I felt immense pride when she told me—and even more so when the letter actually arrived, bearing Columbia's official letterhead and saying, "We want you to join the faculty as an assistant professor of clinical neuroscience." Indeed, that was probably the proudest moment of my life, the moment when I knew that I might be able to make a career of this science thing.

I didn't know that less than a year later, my world would be thrown into turmoil again, when I discovered that I had fathered a son, who was now sixteen, when I myself had been sixteen, back home.