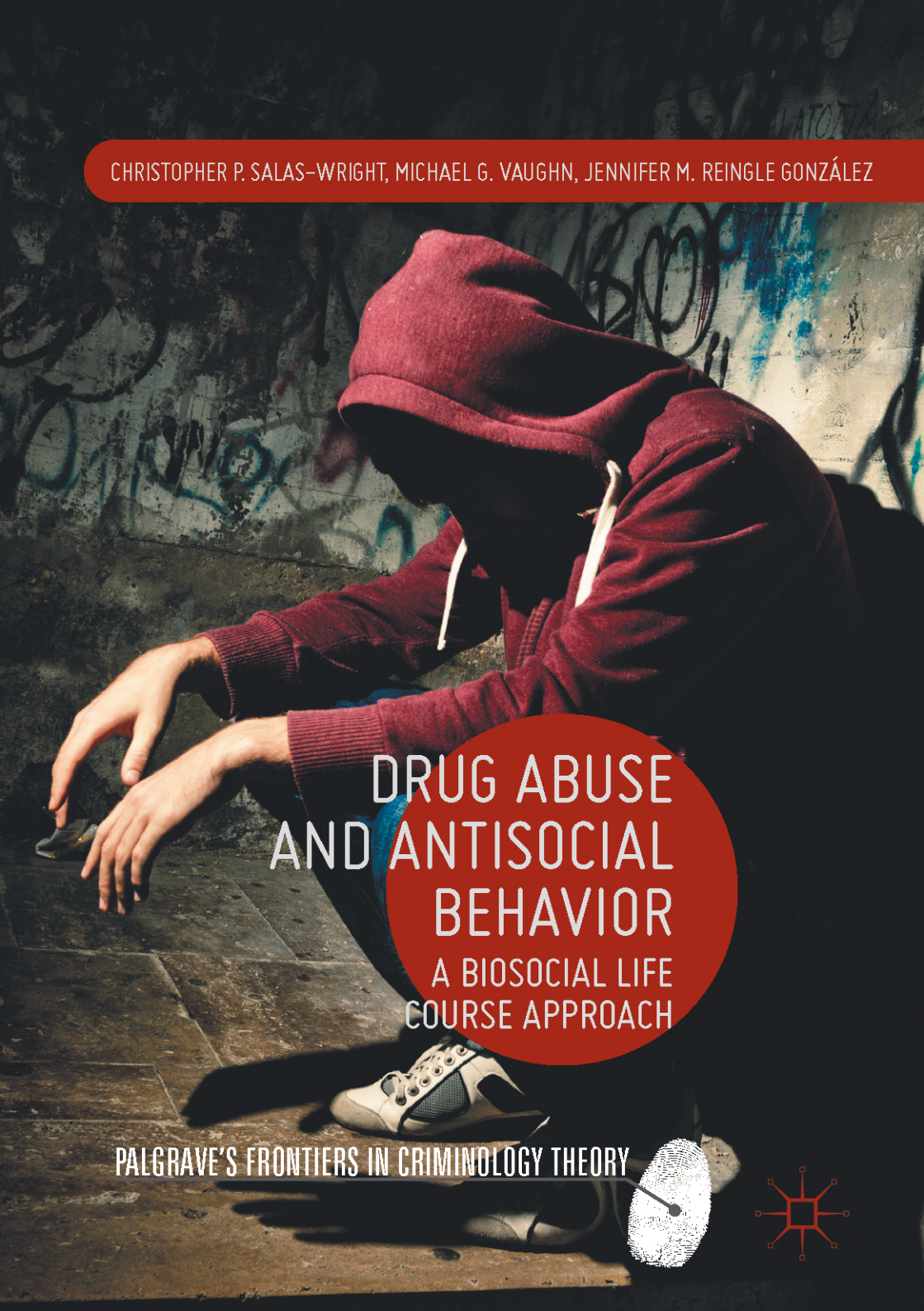


CHRISTOPHER P. SALAS-WRIGHT, MICHAEL G. VAUGHN, JENNIFER M. REINGLE GONZÁLEZ

A person wearing a red hoodie is crouching in front of a wall covered in graffiti. The person's face is obscured by the hood. They are wearing white sneakers with black accents. The scene is dimly lit, with strong shadows.

DRUG ABUSE AND ANTISOCIAL BEHAVIOR

A BIOSOCIAL LIFE
COURSE APPROACH

PALGRAVE'S FRONTIERS IN CRIMINOLOGY THEORY



Palgrave's Frontiers in Criminology Theory

Series Editors

Matt DeLisi
Criminal Justice Studies
Iowa State University
Ames, Iowa, USA

Alex R. Piquero
School of Economic, Political, and Policy Sciences
University of Texas at Dallas
Richardson, Texas, USA

Frontiers in Criminology Theory advances contemporary theory and research on two broad areas of criminological scholarship. The first focal area is on conceptual content areas that seek to explain the etiology and developmental course of antisocial behavior. The series conceptualizes antisocial behavior broadly to acknowledge and incorporate research from multiple disciplinary perspectives including criminology, developmental psychology, sociology, behavior genetics, social work, and related fields. Works in this focal area include book-length developments of extant theoretical ideas, edited volumes of leading research within a specific theoretical area (e.g., self-control theory, social learning theory, general strain theory, etc.), and, of course, new theoretical ideas on the causes and correlates of anti-social behavior. The second focal area encompasses the criminology theory of the juvenile justice system, criminal justice system, and allied social service providers. Like focal area one, the criminal justice system is conceptualized broadly to include multiple disciplinary perspectives that advance research on prevention, psychiatry, substance abuse treatment, correctional programming, and criminal justice policy. Works in this focal area include book-length developments of extant topics, edited volumes of leading topics in criminal justice, and, of course, new theoretical and conceptual approaches to the prevention, treatment, and management of criminal justice clients.

More information about this series at
<http://www.springer.com/series/14562>

Christopher P. Salas-Wright • Michael G. Vaughn •
Jennifer M. Reingle González

Drug Abuse and Antisocial Behavior

A Biosocial Life Course Approach

palgrave
macmillan

Christopher P. Salas-Wright
Boston University
Boston, USA

Michael G. Vaughn
Saint Louis University
Saint Louis, USA

Jennifer M. Reingle González
School of Public Health
University of Texas,
Texas, USA

Palgrave's Frontiers in Criminology Theory

ISBN 978-1-137-55816-9

ISBN 978-1-137-55817-6 (eBook)

DOI 10.1057/978-1-137-55817-6

Library of Congress Control Number: 2016951435

© The Editor(s) (if applicable) and The Author(s) 2016

This work is subject to copyright. All rights are solely and exclusively licensed by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, express or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Cover illustration: © zodebala/ Vetta/ Getty

Printed on acid-free paper

This Palgrave Macmillan imprint is published by Springer Nature

The registered company is Nature America Inc.

The registered company address is: 1 New York Plaza, New York, NY 10004, U.S.A.

“To Javier, Carina, Leighton, and Julio”

Foreword

This book is rooted in the conviction that human biology plays a critical role in understanding drug abuse and antisocial behavior. In the same breath, however, it fundamentally affirms the importance of the many social and environmental factors that influence our behavior across the life course. The book provides an overview of the scope of the problem of drug abuse and crime, as well as an in-depth examination of cutting-edge research on the genetics and neurobiology of addiction and antisocial behavior across the developmental periods of childhood, adolescence, and adulthood. It concludes by exploring the implications of a biosocial, life-course approach in terms of drug abuse prevention and by looking at what lies ahead for drug abuse and criminological research.

Preface

Drug abuse and antisocial behavior are major issues that impact the lives of millions of Americans and their communities on a daily basis. Many people struggle with alcohol and drug use and many others take part in (or are impacted by) behaviors that demonstrate a fundamental lack of concern for the welfare of others and the rules of society. And, as we repeatedly note throughout this text, a substantial proportion of the population is impacted by both of these behaviors at various points in their lives. We know this from our empirical research in the areas of drugs and crime, but it is also something that we understand on the basis of our own experiences working with individuals who struggle with drug abuse and those who have come into contact with the criminal justice system. We have come to appreciate the tremendous impact of drug abuse and antisocial behavior in our own lives as ordinary individuals, parents, family, and community members, and simply as people who open the newspaper on a regular basis. Fundamentally, we are troubled by the tremendous toll that drugs and crime take on our communities. These issues remain the driving force for why we chose to author this book.

In this text, we aim to provide a unique contribution to the literature on drug abuse and antisocial behavior by rooting our analyses in a conjoined biosocial and life-course theoretical lens. At its core, biosocial logic affirms that an appreciation for the role of both biological and

social factors is essential in order to understand complex behavioral phenomena such as drug abuse and antisocial behavior. Indeed, drug use and crime are behaviors that are influenced by our genes and our brains, just as they are impacted by the familial, educational, community, and social environments in which we are embedded. Similarly, a life-course perspective is situated in the assertion that our behaviors are best understood by looking not at a narrow window of time, but rather by taking into account the twists and turns that play out over a lifetime. Without any doubt, our understanding of drug abuse and antisocial behavior is enhanced immeasurably by looking carefully at our early life experiences and by considering the long-term trajectories that can only be seen over the course of decades. Taken together, we feel confident that an analysis of drugs and crime that takes seriously the impact of biological and environmental factors across the life span sheds new light on often-explored questions.

We have done our best to put forth a coherent argument that builds upon itself in examining both the biosocial and the life-course elements of drug abuse and antisociality. In [Chap. 1](#), we begin by providing an overview of the scope of the problem of drug abuse and antisocial behavior, and examining the intersections between substance use and criminal behavior in the United States. In [Chap. 2](#), we provide critical background information related to the state-of-the-art understanding of drug abuse and addiction within the framework of chronic disease and as it related to the human brain. Next, in [Chaps. 3 and 4](#), we delve into cutting-edge research on the role of genetic and neurobiological factors in the etiology of both drug abuse and antisocial behavior. Having laid a solid biosocial foundation, in [Chaps. 5 through 7](#) we examine the role of biological and social factors in the development of drug abuse and antisocial behavior across the spectrum of childhood, adolescence, and adulthood. In [Chap. 8](#), we pull the text together by reflecting on the significance of a biosocial, life-course perspective with respect to the prevention and treatment of drug abuse and crime. And, finally, in [Chap. 9](#), we conclude with a look at what we have done as well as what lies ahead in the world of drug abuse and criminological research.

We want to make clear that this text is not intended to answer every question or to provide an exhaustive description of all that is known in

the world of drugs and crime. For example, we have focused relatively little on the policies and laws that influence the intersections of drug abuse and antisocial behavior. Rather, we have aimed to look at drug abuse and antisocial behavior in a way that breathes new life into these topics that have been so frequently examined. We affirm that human biology plays a critical role in understanding drugs and crime while—in the same breath—maintaining a consistent awareness and appreciation for the impact of social and environmental factors across the life course. Ours is a biosocial, life-course approach to understanding drug abuse and antisocial behavior, and we hope that it is an approach that can prompt new questions, provide fresh insight, and serve as one small step towards addressing the challenges of drugs and crime in our world today.

Contents

1	The Scope of the Problem	1
2	Prevailing Conceptions of Drug Abuse and Addiction	29
3	Genetic Underpinnings	53
4	Neurobiological Contributions	73
5	Childhood Antecedents of Drug Abuse and Antisocial Behavior	93
6	Adolescent Drug Abuse and Delinquency	129
7	Adulthood, Addiction, and Antisocial Behavior	157
8	Prevention and Treatment	181
9	The Road Ahead	197
	Index	211

About the Authors

Christopher P. Salas-Wright is Assistant Professor in the Boston University School of Social Work. His research on drug abuse and crime has resulted in more than 100 scholarly publications and has been featured in *The Washington Post*, *Los Angeles Times*, and *USA TODAY*.

Michael G. Vaughn is Professor and Director of the PhD program in the School of Social Work at Saint Louis University. He is an internationally recognized scholar in the areas of drug abuse and crime and has contributed more than 300 scholarly publications across a wide range of areas.

Jennifer Reingle Gonzalez is Assistant Professor of Epidemiology at the University of Texas School of Public Health in Dallas. She has published more than 75 manuscripts on drug abuse and crime, and has authored a leading textbook on criminology research methods.

List of Figures

Fig. 1.1	Positive urinalysis screens from The Arrestee Drug Abuse Monitoring (ADAM) survey	9
Fig. 3.1	The rise of addiction based on genetic vulnerability	59
Fig. 3.2	Role of genetic vulnerability in addiction and antisocial behavior	69
Fig. 4.1	Key executive functions related to addiction	75
Fig. 4.2	Risk categories based on the neural “go” and “stop” systems	80
Fig. 7.1	Prevalence of past year alcohol and drug use/DSM substance use disorders by age categories in the National Survey on Drug Use and Health, 2002–2013	161
Fig. 7.2	Prevalence of past year antisocial behavior by age categories in the National Survey on Drug Use and Health, 2002–2013	164
Fig. 7.3	Prevalence of past year antisocial behavior by age categories in the “National Epidemiologic Survey on Alcohol and Related Conditions” Survey on Drug Use and Health, 2002–2013	166
Fig. 8.1	Depiction of intervention approaches designed to maximize the likelihood of abstinence through multi-dimensional treatment	182

1

The Scope of the Problem

Introduction

The use and abuse of illicit drugs and alcohol are widespread and constitute an important social and public health problem in United States (Danaei et al. 2009) and beyond (Rehm et al. 2006). More than half of arrestees have one or more drugs in their system at the time of arrest, and drug users have some of the highest recidivism, or re-arrest, rates for violent and non-violent crime. In the 1980s, the already well-documented relationship between drugs and crime was thought to be causal and uni-directional (Gropper 1985), with some drugs in particular (e.g., “street heroin”) being directly associated with criminal behavior. Results from this body of research implied that if treatment and education to reduce drug use among *the most frequent users* was provided, drug-related crime would decline (Gropper 1985). Forty years later, there no doubt that drug use, and drug addiction, is more common among offenders when compared to the general public [for a recent text on this subject, see *The Handbook of Drugs and Society* (Brownstein 2015)].

Despite the breadth of literature now available on the drug–crime nexus, we have made little progress towards our understanding of the causal processes associated with the link. Emerging conceptualizations of the “addiction” process may be instrumental in expanding our understanding of how the cycle of drugs–crime begins (and, correspondingly, how it can end). Rather than conceptualizing drug use and dependency as a rational choice (Becker and Murphy 1988), the term addiction is now being used to refer to chronic, relapsing brain disease caused by repeated exposures to drugs (Kalivas and Volkow 2005). Under this addiction model—one that has is widely accepted across an interdisciplinary field of researchers—drugs modify the cellular structure of the brain. As stated by the pioneers in this domain, Kalivas and Volkow (2005), these cellular modifications, “[P]romote the compulsive character of drug seeking in addicts by decreasing the value of natural rewards, diminishing cognitive control (choice), and enhancing glutamatergic drive in response to drug-associated stimuli (1403).”

As a result of this research in neuroscience, drug addiction is now being viewed increasingly as a disease, and crime may be conceptualized as a side effect. This indicates a need for lifelong support for people suffering from addiction, which should indirectly prevent a great deal of drug-related crime. However, despite this advancing knowledge that addiction is less a conscious choice and more a chronic disease, persons suffering from addiction are stigmatized and discriminated against even more so than those suffering from severe mental illnesses (Barry et al. 2014). The public remains skeptical of drug treatment and its effectiveness, thus opposing policies and resource allocation towards treatment for persons suffering from addiction (Barry et al. 2014).

This ongoing public sentiment could indicate that dissemination of recent findings in support of addiction as a chronic disease has been limited. This book represents an attempt to aggregate and disseminate the most recent research on drugs and crime; particularly, how the intersections of biology and social behavior can converge to enhance our understanding of the causal processes associated with addiction and criminal behavior.

The arguments presented in this book are built upon seven guiding principles related to addiction and criminal behavior. Below is a

brief description of each principle to provide context for this chapter and the remaining text.

1. There is no gene for drug use and crime, but there is a genetic vulnerability that underlies both substance use disorders and antisocial behavior. A number of genes, such as GABRA2, CHRM2, and MAOA (among several others) have been implicated as playing an important role in addiction. Many of these genes overlap with externalizing and antisocial behavior.
2. Drugs of abuse hijack the brain's reward pathways. This leads to compulsive drug-seeking and, in turn, crime. As discussed by Kalivas and Volkow (2005), acute drug use triggers a dopaminergic response, even despite long-term use.
3. Addiction alters brain function long-term. These cognitive modifications could explain ongoing criminal behavior. Addiction alters the prefrontal cortex, the brain center responsible for behavioral regulation and decision-making abilities, to over-activate when presented with drug-related stimuli. Rational decision-making becomes limited in the presence of long-term drug-seeking motivation and craving.
4. Early manifestation of childhood behavior problems that persist into adulthood could result from a combination of biologic susceptibility and social conditioning. There is no inherent gene that causes delinquent or criminal behavior. However, alleles linked to deficits in neurocognition and antisocial behavior have been identified (Beaver et al. 2009; Vaughn et al. 2009). In the presence of environmental risk factors (e.g., limited parental supervision or peer drug use), life-course-persistent criminal behavior may occur.
5. Delayed onset of drug use is critical, as developmental neuroplasticity among adolescents and young adults is easily disrupted by substance use. This could result in long-term harm. If normal development of impulse control and reasoning is impaired, long-term deficiencies in executive function, and corresponding criminogenic impulsive behavior, may persist throughout the life course (Crews et al. 2007).
6. Crime and antisocial behavior are asymmetrical. That is, a small subset (approximately 5 %) of individuals account for the lion's share of offending. Further, many of these chronic offenders have

had troublesome histories with psychoactive drugs and, at various points in their criminal careers, possess diagnosable substance-use disorders.

7. All substance use and crime-prevention or treatment strategies are inherently overlapping and biosocial. Not all persons suffering from addiction will criminally offend; however, an exceedingly large proportion do. Principles 1 and 2 tell us that prevention and treatment strategies will be unsuccessful if they ignore the biology of addiction or the social context of the person suffering from addiction. Treatment strategies that ignore family, friends, significant others, and pharmacological (or behavioral) treatment of brain disease will be ineffective and result in relapse of either drug use or crime (or, commonly, both).

Drug Abuse, Dependence, Use Disorders, and Addiction

What is the Difference?

Before we can begin to understand how each of these principles relates to crime, a historical review of the terminology surrounding substance use, abuse, dependence and addiction is needed. The (recorded) origins of modern addiction date back to 1641 (Wassenberg 2007), when Calvinist theologians made the first attempts to explain “compulsive” alcohol use as “sinful” behavior. In the 16th century, “addict” was defined by the *Oxford English Dictionary* as “attached by one’s own inclination, self-addicted to a practice; devoted, given, inclined to.” No reference to drug addiction as a psychiatric condition appeared in the *Diagnostic and Statistical Manual of Mental Disorders*, 2nd edition; however, “nicotine dependence” emerged in the 3rd edition of the Manual (DSM-III-R). Arguably, inclusion of nicotine dependence in a manual of psychiatric diagnoses was the turning point in recognition of addiction as a disease. On successive iterations of the DSM, the American Psychiatric Association (APA) disagreed on terminology related to addiction. For example, in the DSM-IV (SAMHSA 2004), drug dependence was defined as, “a maladaptive pattern of substance use, leading

to clinically significant impairment or distress, as manifested by three (or more) [criteria] occurring at any time in the same 12-month period.” These criteria included tolerance, withdrawal, taking larger amounts [of the drug] or over a longer period than intended, persistent desire or unsuccessful efforts to cut down or control drug use, time spent on activities needed to obtain the drug, giving up recreational, social, or occupational activities because of the substance, and continued use of drug despite knowledge of consequences. If any three of these subjective criteria were met, dependence was diagnosed.

Drug abuse, on the other hand, required meeting only one criterion over a 12-month period. The four manifestations of abuse include: recurrent substance use resulting in a failure to fulfill major obligations, recurrent substance use in hazardous situations, recurrent substance-related legal problems, and continued drug use despite recurrent problems. In other words, drug abuse required a lower threshold of drug-related problems for diagnosis compared to dependency.

In the DSM-5, substance abuse and dependence were combined into “substance use disorders” with variable levels of severity. A list of 11 symptoms (similar to those used for abuse and dependence) is used to distinguish between mild, moderate, or severe disorders. No criteria for drug “addiction” are present in any edition of the DSM. Addiction has been broadly defined as, “a chronic, relapsing brain disease that is characterized by compulsive drug seeking and use, despite harmful consequences” (National Institute on Drug Abuse 2014). Although this definition loosely corresponds to the APA’s definition of substance use disorder, addiction is a broad concept that incorporates multiple levels of disease from the brain to a person’s lived environment.

The distinction between drug use and drug addiction is akin to the distinction between an acute and chronic disease. To illustrate this point, let us consider the case of a ten-year veteran construction worker, Joe. While working on a roofing job, Joe fell from a ten-foot ladder and acutely injured his back. After filing a workers’ compensation claim, Joe went to an approved urgent care center for assessment and treatment. After a brief examination and x-ray, Joe was prescribed two weeks of bed rest and pain medication. Joe cannot afford to take unpaid sick time and no light duty assignments are available from his employer. As a result, he continues to work each day, relying on the prescribed painkillers to manage his back

pain. Six months later, Joe has not sought treatment and his back pain has gradually worsened. He feels pain even when he has taken his medication. At this point, Joe's back pain has transitioned from acute to chronic. Had Joe followed his doctor's orders and terminated the activity that led to his pain (e.g., work), the acute pain would likely have resolved.

Although Joe is a fictional character, Joe's case is not unusual. In fact, a study published in the journal *Spine* found that 24 % of people who filed workers' compensation claims for lower-back pain were still receiving compensation payments three months later (Fransen et al. 2002). Although this case study is about back pain, the transition from acute drug use to chronic use (or addiction) follows a similar trajectory. In Joe's situation, he continued to work despite his pain, leading to development of further back problems and chronic pain. For a drug user, repeated exposure to substance(s) can alter brain chemistry to result in addiction, a phenomenon now conceptualized as a chronic disease (Volkow and Li 2004; Volkow et al. 2013).

Our treatments for lower back pain and addiction are fairly limited and often, they have a very small long-term effect. Similarly, behavioral programs for addiction, such as Alcoholics Anonymous (AA), have not been updated since they became broadly implemented in the 1980s (McKellar et al. 2003; Tonigan et al. 1996). Although some studies suggest that AA and related 12-step programs effectively elicit long-term change in substance use (Morgenstern et al. 1997), a debate remains in the literature on the effectiveness of these programs (Tonigan et al. 1996). Results from a meta-analysis of experimental studies even suggested that AA meeting attendance resulted in *worse* outcomes than no treatment at all (Kownacki and Shadish 1999). Given the scientific advances in the neurology of addiction, promising treatments in addiction pharmacotherapy are emerging that may have a long-term impact on addiction directly and criminal behavior indirectly.

How Prevalent is Drug Use?

Alcohol is by far the most prevalent, normative, and commonly used substance across the US, and only a small proportion of American adults have *never* used alcohol (lifetime abstainers; 11.1 % according to the NESARC III (Dawson et al. 2015), 17.9 % according the NSDUH)

and about two-thirds (67–73 %) reported drinking alcohol at some point during the previous year. A quarter (23 %) report recent binge drinking and an additional 6.2 % report binge drinking frequently (Center for Behavioral Health Statistics and Quality 2015). Nearly half of all Americans (49.2 %) report having tried an illicit substance at least one time in their lifetime, with an average age of drug use initiation of just was 20 years in 2014 (Center for Behavioral Health Statistics and Quality 2015).

The second most commonly used illicit drug category—including 2.5 % of the population aged 12 years and older or an estimated 6.5 million Americans—is the non-medical use of prescription drugs, such as opioid medications, sedatives, tranquilizers, and stimulants (Center for Behavioral Health Statistics and Quality 2015; McCabe et al. 2008). Of these psychotherapeutics, opiates are most commonly used (4 % used opiates non-medically in their lifetime; 1.3 % in the past month) (Center for Behavioral Health Statistics and Quality 2015). Although the usage rates of prescription medications appear to have been in decline in recent years (Vaughn et al. 2016), the proportion of adolescents using prescription drugs non-medically increased from 2.2 % to 2.6 % between 2013 and 2014—a significantly higher usage rate (Center for Behavioral Health Statistics and Quality 2015).

Among adolescents, substance use is even more common. Data from the National Survey on Drug Use and Health (NSDUH) suggest that roughly 27 million Americans, or approximately 10 % of the total US population age 12 years or older, currently use illicit drugs (Center for Behavioral Health Statistics and Quality 2015). Compared to usage rates documented in 2012, this represents an increase of 4 to 5 million adolescents and adults reporting past-month illicit drug use. As expected, this estimate was driven largely by use of marijuana (22.2 million or 82 % of illicit drug users). Among alcohol users, earlier onset ages have been consistently associated with deviant, criminal, and violent behavior (Zhang et al. 1997).

Although drugs like marijuana have been used consistently for decades, prescription drug use is an emerging problem of public health and criminological importance. To illustrate the problem, prescription drug theft was largely blamed for the increase in crime (specifically, homicides) in

Baltimore, Maryland, after the 2015 civil unrest (Schaffer 2015). This purported relationship lacked empirical support, and homicide rates in Baltimore continued to exceed expected rates long after prescription drug circulation returned to baseline levels. Although studies in other settings support the notion that non-medical use of prescription drugs (e.g., use without a physician's prescription) is associated with crime and delinquency, non-prescription drugs are more strongly predictive of criminal behavior (Ford 2008; MacCoun et al. 2003).

Drug Use and Antisocial Behavior

An Introductory Illustration

As an illustration, let us consider a study of the intersections between alcohol use, illicit drug use, and criminal behavior among young adults in the London area (Richardson and Budd 2003). Almost all participants (97 %) used alcohol at some point in their lifetime, and 95 % used alcohol in the year prior to being interviewed. Two-thirds drank alcohol at least once in the last week, and 39 % were binge drinkers. Therefore, alcohol use in this sample largely exceeds the volume consumed among similarly aged populations in the US. Among binge drinkers, 59 % reported taking illegal drugs, and alcohol use while under the influence of illicit drugs was common. These binge drinkers were four times as likely to fight and five times as likely to have caused property damage compared to (non-binge) drinkers. This strong relationship between substance use and criminal behavior is not limited to London or even Europe, in fact, some studies have found evidence a similarly strong relationship between drug use and criminal behavior in the United States.

The Prevalence of Drug-Related Arrests

The magnitude of the drug problem in the United States is reflected in our arrest rates. According to the Federal Bureau of Investigation's Uniform Crime Reports (UCR), 11.2 million arrests were made in

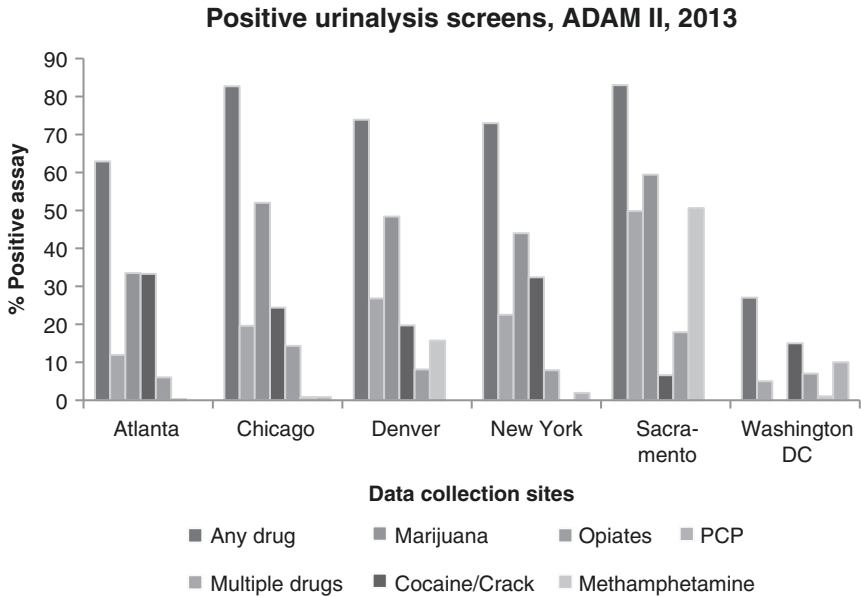


Fig. 1.1 Positive urinalysis screens from The Arrestee Drug Abuse Monitoring (ADAM) survey

2014 (US Department of Justice, 2015). Of these, 1.56 million were for drug-use violations. As expected, the vast majority of these arrests were for marijuana possession (40 %), followed by “other dangerous nonnarcotic drug” possession (18.7 % of total arrests, US Department of Justice, 2015). Possession of illicit drugs drove greatest proportion of drug arrests in 2012 (22 %). Interestingly, more arrests were made for heroin and cocaine sale or manufacturing (5.8 % of all drug arrests) than marijuana (5.2 %). These findings that heroin drives a large proportion of arrests supports historical research that some drugs, like “street” heroin, are more strongly associated with criminal behavior than drugs such as marijuana (Groppe 1985).

To further illustrate how pervasive substance use is among those involved in the criminal justice system, let’s consider data from the Arrestee Drug Abuse Monitoring (ADAM II) survey (see Fig. 1.1). ADAM includes urinalysis results collected from males within 48 hours

of arrest, thus shedding light on the prevalence of recent drug use among arrestees (Office of National Drug Control Policy 2014). These data suggest that drug use is pervasive among arrestees: as many as 83 % tested positive for at least one drug, and 50 % tested positive for more than one drug (Office of National Drug Control Policy 2014). Given the high usage rate of marijuana discussed earlier, it is less than surprising to find that marijuana was the most common drug present in positive screens (34–59 % of arrestees tested positive for marijuana). The average age of arrestees is higher than ever, and analysts suggest that this trend may be attributable to the aging population of cocaine and crack users. Between 2000 and 2003, the mean age of arrest centered around 35 years, but in 2010–2013, the mean age exceeds 40 years in many cities.

ADAM II data also tell us that cocaine (and crack) use has been declining, but use of heroin and other opiates has been on the rise. Given the recent upswing in heroin and other opiate use, it is not surprising that the rate of positive drug screens for heroin and opiates generally has increased in the arrestee population. At most study sites, the rate of positive heroin and opiate screens doubled between 2007 and 2013. For instance, in Sacramento, only 3 % of arrestees tested positive for opiates in 2000; but by 2007, this rate doubled to 6 %. In 2013, 18 % of arrestees tested positive for heroin or other opiates. Similarly, in Denver, 8 % tested positive in 2013—doubling since 2000 (4 %). In Chicago and New York, however, the trend in opiate use is in rapid decline (New York: 20 % in 2000 to 8 % in 2013; Chicago: 36 % in 2000 to 14 % in 2013). These discordant trends suggest tremendous regional differences in opiate use and possible ceiling effects observed in some large cities (e.g., New York and Chicago) in the early 2000s. Interestingly, non-medical use of opiate painkillers in the past three days ranged from 4 % to 9 % across ADAM data-collection sites. In comparison, use of amphetamines, such as Adderall, without a prescription ranged from less than 1 % in some cities to a high of 14 % in Atlanta. Given recent policy restrictions targeting pain clinics, physicians and pharmacies (Keast et al. 2015), it is possible that opiates like heroin are more easily accessible in 2016 than prescription drugs like oxycodone.

In some cities, particularly, Sacramento, polysubstance use (or the use of multiple drugs at the same time) is common. In Sacramento, 51 % of men