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Special REPORT

Toward a Drugs and Crime Research Agenda for the 21st Century

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Toward a Drugs and Crime Research Agenda for the 21st Century

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Director

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Contents

Introduction

Henry H. Brownstein with Christine Crossland

For criminal justice practitioners who deal with drugs and crime day in and day out, the reality of the drugs-crime nexus is indisputable. In a manual designed to help police chiefs and sheriffs control drug abuse, the International Association of Chiefs of Police (IACP) stated unequivocally its belief in "a significant though complex" relationship between drug abusers and criminal offenders. Change one group, IACP proposed, and you change the other: "If there is a reduction in the number of people who abuse drugs in your community, there will be a reduction in the commission of certain types of crime in your community."[1]

When IACP released its manual more than a decade ago, researchers already were confirming what practitioners believed and documenting the relationship between drugs and crime.[2] Public policy and programs were and continue to be developed on the basis of this knowledge.[3] But although researchers and practitioners alike knew the relationship existed, the nature of that relationship eluded them then and continues to elude them today.[4]

To shed light on the drugs-crime link requires research, and the first step is to specify the research topics to be covered. Taking the lead, the National Institute of Justice (NIJ) and the National Institute on Drug Abuse (NIDA) brought together academics and other researchers and asked them to answer three questions: What do we know about drugs and crime, what do we not know, and, most important, what do we need to know? Both agencies see this knowledge not as an end in itself but as a means to accurately define the problem of drugs and crime and promote future research. The agenda for research was developed under NIJ and NIDA sponsorship at a forum held in Washington, D.C., in April 2001. The findings of the Drugs and Crime Research Forum are presented here.

In pursuit of the drugs-crime link

If we are going to make progress toward solving the problem of drugs and crime, we need to shed light on the nature of the drugs-crime link by designing effective responses. Developing a research agenda on drugs and crime means tackling the central issue of the drugs-crime link. Is the link a matter of cause and effect or is it something far more complex?

There is no lack of theories. The direct cause model of the drugs-crime relationship has attracted its share of supporters. It states simply that either drug use leads to crime or crime leads to drug use. The simplicity is appealing. Who would not find it tempting to believe that reducing drug use can lower the crime rate? In fact, some policies and programs have been developed on the basis of the direct cause model or the belief in a significant relationship between drugs and crime. As IACP recognized, the relationship is real enough. And NIJ's Arrestee Drug Abuse Monitoring program has demonstrated

year after year that among people apprehended and charged with a crime, a large percentage uses drugs.[5]

However, as sociologist Erich Goode has cautioned, "Even the fact that drugs and crime are frequently found together or *correlated* does not demonstrate their *causal* connection."[6] The consensus among researchers who study the issue confirms Goode's observation. The evidence for the direct cause model is just not there.[7]

We seem more willing today to accept the complexity of the drugs-crime relationship, more open to the notion that "[t]here is considerable uncertainty . . . about the degree to which drug use causes crime or the degree to which criminal involvement causes drug use."[8] In a recent review of the literature, sociologists Helene Raskin White and Dennis M. Gorman definitively dismissed the direct cause model. They concluded instead that the drugs-crime link is best explained by the common cause model, in which any association of drugs and crime has a cluster of causes.[9]

Those who subscribe to the common cause model believe that to adequately understand the relationship of drugs to crime requires attention to many issues, social, cultural, chemical, and biological among them. What the model means for policy and practice is that any response to drugs and crime that works in one set of circumstances may not work in another. For researchers, it means the research agenda is vast. Policy and practice can be informed by what we know up to this point, but progress in responding to the drugs-crime problem requires knowing more.

Building on the past: The Drugs and Crime Research Forum

NIDA and the National Institute of Law Enforcement and Criminal Justice, NIJ's predecessor organization, were asked by Congress in 1976 to find out what was known about drugs and crime. The product of the agencies' collaboration was *Drugs and Crime: A Survey and Analysis of the Literature.* Though not strictly a research agenda, the survey was a first step "to identify where the gaps in our knowledge lie and to direct research to fill those gaps."[10] It was intended to "set the stage for more focused future research."[11]

In 2000, NIJ's call for the development of a research agenda was another step toward meeting that need. The authors of *Drugs and Crime* noted at the time that "few if any [studies] directly address the drugs-crime nexus issue."[12] This report on the development of the research agenda will demonstrate that although much has been learned in the intervening years about drugs, drug use, drug abuse, drug markets, and drug law enforcement, much work is needed to shed light on the complexities of the drugs-crime link.

Three papers were commissioned for the research forum. Each addressed the questions of what we know, what we do not know, and what we need to know about the drugs-crime link. Prepared by experts in epidemiology, public policy, social work, and allied disciplines, the papers served as the focal point and framework for discussions by forum participants. (The forum summary, agenda, and a list of the participants are presented in appendixes A, B,

and C.) After the forum adjourned, NIDA created a listserv for participants to continue to exchange their thoughts.

The discussions did not all fit the same mold. Roundtables were generated from one-sentence statements by participants about drugs and crime. What we do *not* know about the drugs-crime relationship was treated at length. The many strands of thought, lines of discussion, and themes came together when Forum participants addressed the final question: What future research is most important, and what research is needed most urgently? Mindful that the next generation of researchers will be tackling the problem of drugs and crime, Forum participants recommended topics for research by their graduate students.

Probing drugs and crime: Three perspectives

"At the Intersection of Public Health and Criminal Justice Research on Drugs and Crime" was commissioned by NIDA from James C. Anthony with Valerie Forman. Anthony asked such questions as—

- Have we made effective and adequate use of recent developments in science and technology to advance the study (and hence the understanding) of the relationship between drugs and crime? Given the vast literature generated during past decades on this subject, have we adequately, appropriately, and effectively integrated research from both the public safety and public health perspectives?
- Are the tensions between the two perspectives greater than our ability to overcome them? Given what we know now and the current tension between researchers in public safety and public health, how can we conceptualize and organize our thinking and research to enhance our knowledge and understanding of the relationship in the most productive ways?
- What do we really know about the suspected causal connection between drugs and crime? In looking at drugs and crime, what is the intersection at which public health and public safety meet? How can we achieve the goals of greater understanding and definitive evidence and greater mastery in design and application in policy, programs, and techniques to prevent and reduce harmful health and safety consequences of drug use?
- What do we need to do to integrate molecular biology, genetics, and neuroscience into discussions of drugs and crime? What do we need to do to place discussions of the drugs-crime nexus in the context of history? How can we clarify the question of causal inference? How can we use the notions of scale and rubrics to help understand the relationship between drugs and crime?

"Research on Drugs-Crime Linkages: The Next Generation" was commissioned by NIJ from Robert MacCoun, Beau Kilmer, and Peter Reuter. Among the questions asked by MacCoun and his colleagues were—

- Are our conceptualizations of the relationship between drugs and crime adequate to move forward in our understanding of that nexus? How must we conceptualize the relationship to be able to address questions not only of concomitance and statistical correlation, but also of social significance and causality?
- To the extent that the drugs-crime relationship is causal, to what extent do we understand the nature of the causal influences? How can we use Paul Goldstein's tripartite taxonomy to build on work already done, and how can we move beyond the taxonomy? How

can we use notions such as Bruce Johnson's conduct norm analysis or Alfred Blumstein's drugs-gun diffusion hypothesis?[13]

- How does the considerable heterogeneity of users, substances, locations, and situations as well as differences in market dynamics affect what we need to have and to do to address the drugs-crime nexus? How do we address the question of causal influences? How will research in the coming decade deal with the heterogeneity of effects across users, substances, cities, neighborhoods, and situations?

"The Drugs-Crime Wars: Past, Present, and Future Directions in Theory, Policy, and Program Interventions" was commissioned by NIJ from Duane C. McBride, Curtis J. VanderWaal, and Yvonne M. Terry-McElrath. In this paper, McBride and his colleagues raised the following questions:

- In the past two or three decades, what progress has been made in our knowledge and understanding of the relationship between drugs and crime? Does knowledge of the statistical relationship help us understand the nature of the relationship? What do we know about the nature of the nexus and what do we need to do now to advance the state of our knowledge? In the past century, how have we used that knowledge to guide public policy? Could we do a better job of linking what we think and what we know about drugs and crime to what we do to address individual and social problems in the realms of public health and public safety? Do we know enough about what has been tried (for example, programs and program evaluations) to know what works?

- How is the idea of social capital important to our understanding of the drugs-crime nexus? What is the significance of the dynamic tension between drug policy as it shifts and the drugs-crime connection as policy changes? What is the value of interventions and treatment when dealing with drug-using offenders?

What do we need to learn?

It will come as no surprise that the question of what we know about drugs and crime was eclipsed by that of what we do not know and what we have yet to learn. The papers and accompanying discussions yielded an abundance of ideas on research topics for the coming decades. The major themes included the following:

- Drug-related crime.
- Drug enforcement.
- Drug markets.
- Drug offenders.
- Drug policy.
- Treatment and intervention.
- Drug use and abuse.
- Ethnographic studies.
- Health sciences perspectives.
- Minority research.
- Research methods.
- Victimization studies.

Categorized more broadly, the topics proposed for research are the drugs-crime nexus, the social contexts of drug use and crime, and refining study methods and designs.

What explains the drugs-crime nexus?

We know that drugs and crime are related. We also know something about the different ways they might be related, and perhaps something about the ways they may be related in time and space. What we have yet to learn is *how* they are related. In other words, we need to probe the underlying dynamics of the relationship. We do not know, for example, why so many people who commit crime also use

drugs or why some people who use drugs commit crime but others who use drugs do not commit crime. Research in this broad area might take several directions.

Find new ways to conceptualize the drugs-crime nexus. Several years ago, Goldstein proposed a tripartite framework as a way to disentangle the relationship between drugs and crime, specifically violent crime. Violence could be the direct outcome of ingesting drugs, the result of a user's compulsion to obtain drugs or money for drugs, or a product of the disorganization and violence inherent in the social systems in which drugs are manufactured and exchanged.[14] Over the years, this framework has been useful for studying drugs and violent crime but of limited value for studying drugs and other types of crime. Beyond what has been learned from this model, how can researchers conceptualize the way or ways drugs and crime—not just violent crime—are related?

Combine research perspectives. Research on drug use illustrates how different disciplines can combine forces. Social science research is beginning to merge with biological research, particularly genetic research. Questions include the following:

- How can the study of genes, the social environment, and behavior help us better understand the link between drugs and crime?
- Are there physiological propensities for drug using? If so, what is the impact of the user's environment?
- Are alcohol and marijuana complements of or substitutes for other drugs?
- Do different drugs have different effects on groups of people who are genetically different?
- How can we address the ethical concerns of such research?

Give more attention to minorities. A disproportionate number of the people arrested, charged, and in custody for drug and other criminal offending are from minority groups. The reason is unknown but needs to be probed. What can we learn about the involvement of various ethnic and racial groups in the drugs-crime link? What can we learn about gender and the drugs-crime link? Some answers might be found in comparative, multisite studies of drug use and drug markets in different ethnic communities. What is the relationship of gender, age, race, and culture to drug involvement and crime? What is the effect of disparity (in income, for example), prejudice, and discrimination on the distribution of resources used for treatment and prevention? How can we explain racial and ethnic differences in drug use and involvement in crime? Do people view the drugs-crime link differently because of their race, gender, or age?

From these general research areas on racial and ethnic diversity, it is possible to derive many specific topics. What can we find out about the relationship between drugs, crime, and the increase in the number of women of color who are incarcerated? Have changes in the economy affected the involvement of disadvantaged black and Hispanic/Latino males in drugs and crime? If so, how? What is the impact of drug-related incarceration on families and children or on prospects for education and employment in minority communities?

What do we need to know about the social context of drugs and crime?

It is widely believed that drug use adversely affects users. But drug use and crime are affected by and in turn affect forces operating in society at large. Drug users interact with many people: sellers with buyers, buyers with sellers, criminal

offenders with their victims. There is a social context of drug use.

Social patterns in the drug world. There have been many studies of drug users and some studies of drug markets. But what do we need to learn about the social relations and interactions of the people whose lives are affected by drugs?

The commerce of drugs and crime: drug markets. Theories about and the operations and institutional arrangements of drug markets are plentiful, but not enough research has been done to test them. How stable are drug markets, and how do they change over time? For example, has the maturation of the crack cocaine market in some cities affected those cities' crime rates? What is the connection between local market activity and fluctuations in supply and demand at the national level? What influences the relationship between sellers and buyers? How and why do new markets emerge, and what impact do they have on existing markets? How are prices set in local drug markets, and how are wages set?

Patterns of use and abuse. We know something about the demographics of drug use, but what do we know about intergenerational patterns? How do use patterns vary with social or biological differences? How do patterns of alcohol use compare with patterns of use of other drugs? Can drug use help explain juvenile involvement in crime or violence? Are patterns of use of certain drugs, such as club drugs, designer drugs, or inhalants, different from patterns of use of other drugs? What can we find out about how and why people start or stop using drugs?

Criminal offending by drug users. There are some studies of drug offenders, but how much do we know about how or why drug offenders commit crime? Are some people genetically predisposed to drug use? Is there a relationship between drug use and social status, and if so, how might social status in turn be related to involvement in crime? Beyond using illicit drugs, to what extent are drug users and sellers involved in other crime? Can we realistically estimate how much other crime is committed by drug offenders? What risk do these people pose to their own health and safety?

Victims of drug users and drug use. Drug users are in some ways their own victims, but are there other victims? What do we know about other people with whom drug users relate? How can we define for research and policy purposes what we mean by "victims of drugs"? How do we define victimization in this context? Are there indirect victims, such as families and communities, as well as direct victims?

The public's response to drug use and drug-related crime. Society considers drug-related crime and illicit drug use as affronts and responds accordingly. Enforcement strategies are one example. To what extent are the responses based on a real understanding of these problems? Are the responses making a difference?

Enforcing drug laws. What is the effect of enforcement policies, programs, and practices on drug use, drug dealing, and drug-related crime? What is the relationship between street-level enforcement and street-level drug market activity, particularly violent activity? What impact do drug seizures, drug arrests, and asset forfeiture, among other interdictions, have on drug and drug-related crime? What is the impact of public concern about racial profiling and police corruption on the ability of law enforcement to respond to drugs and crime?

Treating drug use and abuse. With so many different drugs and so many different types of users, what can we say about the efficacy of drug treatment in addressing drugs and crime? What is the

nexus of drug treatment and criminal justice? For example, what are the results of treatment in correctional settings and what do evaluations reveal? Do incentives or disincentives help drug users to succeed in treatment? How do we define success? How important are aftercare programs and family interventions? What is the best way to treat drug users who are dually diagnosed (for example, those who are also mentally ill)? What are the dropout rates for treatment, and what does it matter? What treatments work best with what types of drug use? How do we distinguish users from abusers? What difference does that distinction make for treatment planning?

Intervening to prevent drug use or crime. Although relatively little is known about preventing drug use, the topic receives a great deal of attention. To what extent can media campaigns help prevent drug use? Is the impact of prevention programs the same for all social categories of users or irrespective of type of drug? How can we educate young people about the impact that drugs can have on their lives? Should more attention be paid to problem behavior, norm violations, and rule breaking than to drug prevention?

Public policy. When we think about public policy on drugs, we typically do not think about policy in general but rather about specific aspects, such as interdiction, enforcement, treatment, and prevention. But can we step back and think broadly and measure the impact of drug policy over the past decade, or even the past century? Can we learn from policy simulations that examine past and prospective views of drug use? Can we learn from comparative studies of different countries? What is the impact of different directions in drug policy? What policies have worked or not worked with adult and juvenile drug offenders? Can research examine drugs, crime, and public policy together? Can we find out from policymakers and practitioners what decisions they need to make and what questions they need to answer about drugs and crime? How can we move drug policy analysis beyond econometrics (supply and demand, for example) and begin to study drug use from the perspective of politics, criminal justice, public health, and social work?

Methods of studying drugs and crime

Research methods are dictated by the questions researchers ask. Some of the questions already explored indicate that certain methodological concerns might need to be addressed.

Attention to measurement and design. What are the best measures currently available to study drug use and involvement in drug markets and drug treatment? How can they be improved? How can we construct integrated data collection measures? What is the best way to design measures and procedures to evaluate drug control programs? What are the best measures for assessing drug treatment outcomes? What is the role of cost-benefit analysis in drug studies? What can we learn from longitudinal studies about the long-term effects of drug use and abuse? How can we introduce randomization to long-term studies of drug treatment? How can statistical techniques developed by other sciences be adopted by the social sciences? How can we encourage multidisciplinary teams of researchers to work together to study drugs and crime?

Ethnography. There is a long, distinguished tradition of ethnographic research in the field of drug studies. Ethnographic studies, however, are almost by definition limited to a single area or a small group of people. What might we learn by secondary analyses of ethnographic studies?

What might we learn by replicating ethnographic studies in other communities or among other groups of drug users? How useful might it be to link ethnographic studies of community structure with studies of drug users and dealers in their communities? What can we learn from studying communities of sellers and users? Would it be useful to establish prospective, qualitative field sites in various communities as a type of surveillance system to monitor changing drugs and drug-use patterns?

Using available data and studies. How can we make better use of available data to study drugs and crime? Are there obstacles to making better use of available data to learn from them what we can? What can we learn from meta-analyses of previously conducted research studies of drugs and crime?

What is in this report?

Following this introduction are the three papers commissioned for the forum and appendixes containing a summary of the forum proceedings, the agenda, and a list of the names and organizational affiliations of the participants.

Notes

1. International Association of Chiefs of Police, *Reducing Crime by Reducing Drug Abuse: A Manual for Police Chiefs and Sheriffs,* Gaithersburg, MD: International Association of Chiefs of Police, 1989:5.

2. See Tonry, M., and J.Q. Wilson, eds., *Drugs and Crime,* vol. 13 of *Crime and Justice: A Review of Research,* Chicago: University of Chicago Press, 1990; and R. Weisheit, ed., *Drugs, Crime and the Criminal Justice System,* Cincinnati: Anderson Publishing, 1990.

3. See, for example, Forcier, M.W., "Substance Abuse, Crime and Prison-Based Treatment," *Sociological Practice Review* 2 (1991): 123–131; Office of National Drug Control Policy, *National Drug Control Strategy—2000 Annual Report,* Washington, DC: The White House, 2000 (and earlier ONDCP annual reports); and Longshore, D., F. Taxman, S. Turner, A. Harrell, T. Fain, and J. Byrne, "Operation Drug TEST Evaluation," final report submitted to the National Institute of Justice, U.S. Department of Justice, 2000 (grant 97–IJ–CX–0041).

4. Examples of studies that explored the nature of the drugs-crime relationship in that period include Brownstein, H.H., and P.J. Goldstein, "A Typology of Drug Related Homicides," in Weisheit, ed., *Drugs, Crime and the Criminal Justice System:* 171–192; Chaiken, J.M., and M.R. Chaiken, "Drugs and Predatory Crime," in Tonry and Wilson, eds., *Drugs and Crime:* 203–239; Fagan, J., "Intoxication and Aggression," in Tonry and Wilson, eds., *Drugs and Crime:* 241–320; Goldstein, P.J., H.H. Brownstein, P.J. Ryan, and P.A. Bellucci, "Crack and Homicide in New York City, 1988: A Conceptually Based Event Analysis," *Contemporary Drug Problems* 16 (1989): 651–687; and Johnson, B.D., T. Williams, K.A. Dei, and H. Sanabria, "Drug Abuse in the Inner City: Impact on Hard-Drug Users and the Community," in Tonry and Wilson, eds., *Drugs and Crime:* 9–67.

5. Arrestee Drug Abuse Monitoring, *1999 Annual Report on Drug Use Among Adult and Juvenile Arrestees,* Washington, DC: U.S. Department of Justice, National Institute of Justice, June 2000 (NCJ 181426).

6. Goode, E., *Between Politics and Reason—The Drug Legalization Debate,* New York: St. Martin's Press, 1997: 119.

7. See, Brownstein, H.H., "What Does 'Drug-Related' Mean? Reflections on the Problem of Objectification," *The Criminologist* 18 (1993): 1, 5–7; Chaiken and Chaiken, "Drugs and Predatory Crime," in Tonry and Wilson, eds., *Drugs and Crime:* 203–239; Fagan, J., "Intoxication and Aggression," in Tonry and Wilson, eds., *Drugs and Crime:* 241–320; Goode, E., *Between Politics and Reason—The Drug Legalization Debate;* White, H.R., and D.M. Gorman, "Dynamics of the Drug-Crime Relationship," in G. LaFree, ed., *The Nature of Crime: Continuity and Change,* vol. 1 of *Criminal Justice 2000,* Washington, DC: U.S. Department of Justice, National Institute of Justice, July 2000 (NCJ 182408); and Wilson, J.Q., "Drugs and Crime," in Tonry and Wilson, eds., *Drugs and Crime:* 521–545.

8. Office of Justice Programs, *Office of Justice Programs Fiscal Year 2000 Program Plan: Resources for the Field,* Washington, DC: U.S. Department of Justice, Office of Justice Programs, 2000: 23 (NCJ 182238).

9. White and Gorman, "Dynamics of the Drug-Crime Relationship," in G. LaFree, ed., *The Nature of Crime: Continuity and Change:* 193.

10. Gandossy, R.P., J.R. Williams, J. Cohen, and H.J. Harwood, *Drugs and Crime: A Survey and Analysis of the Literature,* Washington, DC: U.S. Department of Justice, National Institute of Justice, 1980: xi (NCJ 159074).

11. Ibid.: 122. The survey covered five "crucial areas": patterns of drug use and criminal behavior; "life cycle" characteristics (age of onset of drug use and crime, for example); "economic issues" (price and supply/demand, for example); treatment; and methods (sampling, for example).

12. Ibid.: 122.

13. These works are discussed in this report.

14. Goldstein, P., "The Drugs/Violence Nexus: A Tripartite Conceptual Framework," *Journal of Drug Issues* 15 (1985): 493–506.

At the Intersection of Public Health and Criminal Justice Research on Drugs and Crime

James C. Anthony with Valerie Forman

Introduction

This paper discusses intersections of public health research and criminal justice research on the topic of drugs and crime. The drugs of interest mainly are marijuana, heroin, and other internationally regulated compounds of illegal origin, and such internationally regulated products of legal origin as pharmaceutical cocaine hydrochloride, codeine, and oxycodone, which also may be consumed on an extraordinary basis (i.e., outside the bounds of accepted medical practice). An important point of departure for this paper is a widely held assumption about two goals of research on this topic. The first goal is to achieve greater understanding and develop a body of definitive evidence on drugs and crime. The second goal is to achieve greater mastery of the design and application of policies, programs, and techniques to improve public health and public safety by preventing and reducing harmful consequences of drug use.

The outline for this paper corresponds with assignments delegated at a planning meeting held at the National Institute of Justice (NIJ) in January 2001. This introductory section provides some background notes on the literature reviewed for the paper and describes an organizing conceptual framework that can be used to assess gaps in the current evidence. The next section identifies some tensions that merit discussion as we try to forge a new research agenda on drugs and crime. We then address the central question posed in our planning meeting for the drugs-crime research forum: "What do we know about the drugs-crime interrelationship?" We cannot provide a comprehensive answer to this question in a relatively short paper, but we will offer a starting point for discussion, focusing on suspected causal relationships between drugs and crime. We also present a few concluding statements that were designed to facilitate discussion at the forum on drugs-crime research held at NIJ in April 2001.

A burgeoning literature on a variety of fronts

A scholar interested in the topic of drugs and crime has much to read. Some of the classics of the field include Terry and Pellens's *The Opium Problem* (1928); early papers on drug taking and sociopathy by Kolb and Pescor, who were two of the early clinical leaders in research at the facility that ultimately became the National Institute on Drug Abuse's (NIDA's) Intramural Research Program and Addiction Research Center; and work by Dunham and Lindesmith, whose surprisingly contemporary remarks and observations started to systematize some of the field's research questions on the social psychology of the drugs-crime relationship. Many of the issues that confront the drugs-crime researcher today were articulated by Terry and Pellens (1928), Kolb (1925), Pescor (1939), Dunham (Faris and Dunham, 1939), Lindesmith (1938), and their contemporaries in the first half of the 20th century.

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The tripartite framework clarifies three separate types of drugs-crime relationships, none of which is simple.

These issues were re-articulated and a new set of themes was clarified in subsequent research, such as *The Road to H* investigations led by Chein (1964), the work of Preble and Casey as described in "Taking Care of Business—The Heroin User's Life on the Street" (1969), Cohen's *Delinquent Boys* (1955), and Robins' *Deviant Children Grown Up* (1966). Two of the most important emerging themes from this research offer a challenge to conventional thinking about the drugs-crime relationship:

- There is no single drugs-crime relationship. Rather, there are drugs-crime relationships, most of which are complex rather than simple.
- There is no simple solution to the complex challenges faced when drugs-crime relationships come into play.

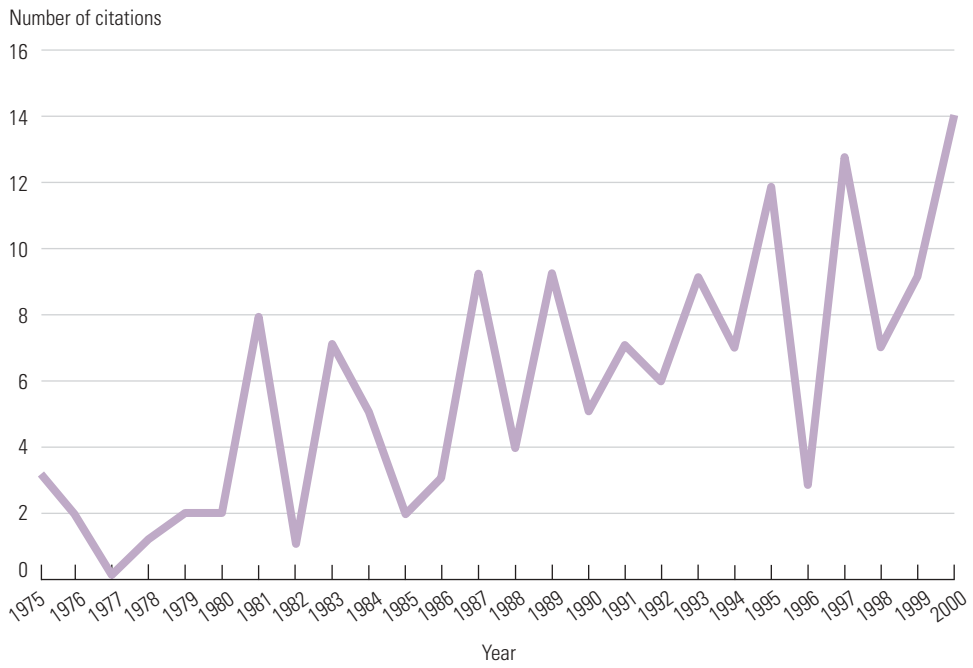
By way of illustration, Brownstein and Goldstein offered and refined a tripartite conceptualization of drugs-crime relationships, which serves as a useful guide to some of the surrounding issues. Within this tripartite framework, one set of criminal offenses is described as psychopharmacologically induced (e.g., responses to intoxication states after drug taking). A second set of offenses is described as economic-compulsive in nature (e.g., instrumental income-producing criminal acts as needed to stave off symptoms of withdrawal states that appear once drug use has stopped). A third set of offenses is described as "systemic" and might be understood best as a consequence of a drug user entering or living within a social context in which extraordinary drug use is just one of a set of often intercorrelated criminal behaviors. That is, we do not need an appeal to drug intoxication, drug withdrawal states, or drug-induced compulsive behavior to account for offenses observed in this third category (Goldstein, 1985; Brownstein and Goldstein, 1990).

The tripartite framework clarifies three separate types of drugs-crime relationships, none of which is simple. As for analysis of simple solutions for these complex problems, a therapeutically oriented drug maintenance program might reduce the economic-compulsive type of offending without influencing the occurrence of crimes determined by poor judgment or other manifestations of intoxication states. A successful supply-side drug eradication program might reduce both pharmacological and economic-compulsive types of offending, but not offending of the systemic variety. Imprisonment of the drug user within a drug-free prison environment might extinguish today's crimes but might not influence tomorrow's offending when the prisoner is released back to the home community. Even if the prisoner remains drug free during the immediate postrelease period, the history of incarceration and a criminal record might constrain job opportunities and economic success to the point of inducing crimes that otherwise would not have been committed if the drug user never had been incarcerated in the first place.

Illuminated in this manner, the facets of multiple drugs-crime relationships become more clear; new opportunities for research open up. As these opportunities have been recognized, there has been a tremendous growth in scholarship and research activity on the topic of drugs and crime (see exhibit 1).

Scholars may benefit from an assembled listing or bibliography of this literature, now available in electronic form as a technical report from the Electronic Collaboratory for Investigations about Drugs at Johns Hopkins University (Forman, 2001). Readers interested in a recent comprehensive review of these publications can turn to the Harrison and Backenheimer-edited issue of *Substance Use & Misuse* on the drugs-crime nexus in the United

Exhibit 1. Number of Medline citations for "drugs & crime" as of March 2001



States, which was published by Stanley Einstein and Marcel Decker, Inc., in 1998.

A conceptual framework for drugs-crime research

Confronting the accumulated body of evidence and new literature, we have attempted to sort each element of evidence in relation to a conceptual framework originally devised for the field of psychiatric epidemiology and epidemiological research in general (Anthony and Van Etten, 1998). This conceptual framework is used as we train public health scientists for advanced research on drug dependence and related conditions. The framework may prove to be useful in the domain of criminal justice research as well, perhaps with suitable amendments by interested teachers and scholars.

The rubrics. Early in their public health research training, we ask our predoctoral and postdoctoral fellows to master the epidemiology of drug dependence. Here, drug dependence is defined as a syndrome or "running together" of clinical features, and sometimes is called drug addiction, especially when the focus is on such clinical features as obsession-like cravings and compulsion-like repetitive behaviors in which drug taking is central. The clinical features of the drug dependence syndrome include pharmacological tolerance, characteristic withdrawal signs and symptoms, almost obsessional thinking about drugs and drug-related behavior, and other observable mental, behavioral, and social adaptational manifestations of neuroadaptational processes that get started and progress with repeated drug taking.

This epidemiology of drug dependence is a subject matter to be mastered by the public health research fellows, just as they master the concepts, principles, and techniques used as methodological tools in the public health sciences. Mastery of this subject matter begins with study of the just-mentioned clinical features, the history of diagnostic criteria or case definitions used in public health research on drug dependence, and what has been learned about its neuroadaptational and genetic substrates. In the process, research fellows learn of patterned variation in drug dependence syndromes, some of which can be understood in relation to the pharmacology and pharmacokinetics of different drugs, such as cocaine versus heroin or methamphetamine versus oxycodone. Research fellows also learn about different measurement techniques used in laboratory, clinical, and field studies of the drug dependence syndromes. For example, under certain conditions, an appropriate dose of a narcotic antagonist can be used as a bioassay to check for the presence of dependence on heroin or other opioid drugs (e.g., via precipitated withdrawal). Nonetheless, in general, the measurements of drug dependence rely heavily on self-report information obtained under specially protected confidential circumstances. To the extent that subjectively felt experiences such as "craving" and obsessional thinking about drugs are central clinical features for drug dependence, we cannot substitute human urine, saliva, or sweat samples for self-reports (Anthony, Neumark, and Van Etten, 2000).

Once issues of definition and measurement have been mastered, research fellows move on to what we call the "rubrics" of epidemiology—its main subheadings and associated research questions. These main rubrics and primary associated research questions are displayed in exhibit 2.

Successful research fellows learn these rubrics and use them to master not only the state of currently available evidence on each form of the drug dependence syndrome, but also the current gaps in evidence and the research concepts and tools needed to fill the gaps in evidence.

The relationship of each rubric to an associated set of research concepts and tools sometimes helps to clarify and differentiate the rubrics. Links between each rubric and corresponding research concepts and tools are presented in exhibit 3.

Exhibit 2. The rubrics of epidemiology

Main rubrics	Primary associated research questions
Quantity	How many in the population are becoming affected, have become affected, and are now affected?
Location	Where in the population are affected individuals more or less likely to be found, with variation in occurrence and frequency differentiated by characteristics of time, place, and person?
Causes	What accounts for some individuals becoming becoming affected whereas others are not?
Mechanisms	What are the underlying liked sequences of events and processes that account for the occurrence and for the persistence of the condition?
Prevention and control	What can be done to prevent occurrence of the condition, shorten its duration, or ameliorate its circumstances?

Exhibit 3. Main concepts, research designs, and statistical tools associated with each rubric of epidemiology

Main rubrics	Illustrative concepts	Main associated research designs and statistical tools
Quantity	Point prevalence, interval prevalence, lifetime prevalence, and variance	Population census, observational ambidirectional or cross-sectional field survey, and variance estimation under complex designs
	Cumulative incidence and incidence	Cohort and prospective study designs and multiwave density panel study design
	Event rate, probability distributions, and density functions expectation	Vital statistics registration methods (birth, death), and rapid and continuing surveillance
Location	Prevalence correlate, factor, difference, ratio, odds ratio, and prev. = f (incidence, average duration); null hypothesis; statistical precision; likelihood principle; and tests of significance (*p*-values statistical power)	Cross-sectional field studies, clinic-based and population-based case-control and case-base studies with prevalent (prevailing) cases; statistical measures of correlation and association; and univariate response regression models for description and prediction
	Incidence or risk correlate, risk factor, inverse risk factor, incidence difference, incidence rate ratio, cumulative incidence ratio, and incidence density ratio	All of the above, plus clinic-based and population-based case-control and case-cohort studies with incident (dynamically occurring) cases
Causes	Causal and preventive factors, Koch's postulates, criteria for evaluating causal significance of observed associations (e.g., dose-response relationships), counterfactuals, reciprocities, and effect-modification and interaction	All of the above, plus fine-grained and coarse-grained matching and stratification, direct and indirect adjustments, modeling with statistical adjustments, marginal and random effects models, hierarchical models (e.g., alternating logistic regressions), randomized trials, family history and twin studies, and instrumental variable models
Mechanisms	"Natural history" versus "clinical course" and mediation	All of the above, plus marginal and random effects longitudinal analysis models
Prevention and control	Efficacy versus effectiveness, preventive fraction, and attributable risk	Randomized controlled trial, and operations and systems research

Quantity. Under the rubric of quantity, the main associated research question is How many in the population are becoming affected, have become affected, and are now affected?" In this context, "becoming affected" can refer to becoming a drug user, developing drug dependence, initiating criminal behavior, or some combination thereof (e.g., see Gfroerer and Brodsky, 1992; Kosterman et al., 2000; Golub and Johnson, 2001a).

As reflected in the published scientific literature and technical reports made available by NIJ, the Substance Abuse and Mental Health Services Administration, and other Federal agencies, a substantial fraction of the Nation's research expenditures on drugs and crime is directed toward the "report card" function of public health and criminal justice research under the rubric of quantity. A recent National Research Council report (Manski et al., 2001) tallied more than 60 Federal agencies with data systems designed to keep track of estimates on the number of drug users in households, among school-attending youths, among arrestees, among patients seen in emergency rooms, and in various other segments of American life.

On the U.S. Department of Health and Human Services (HHS) side, we have the National Household Survey on Drug Abuse (NHSDA) with growing national probability samples of adolescents and adults (now with a sample size of more than 70,000 subjects per year); the Monitoring the Future (MTF) study, which started as a way to track drug use among graduating high school seniors through a national probability sample each year and now encompasses 8th and 10th graders; and a less intensive but more massive Centers for Disease Control and Prevention (CDC) surveillance of drug use and other health risk behaviors of teenagers in school. On the U.S. Department of Justice side, we have other ambitious survey operations, such as the Arrestee Drug Abuse Monitoring (ADAM) program (formerly Drug Use Forecasting [DUF]), which monitors drug taking among arrestees through both self-reports and bioassay techniques, and the National Crime Victimization Survey.

Evaluated as part of the public health and criminal justice research enterprise, these substantial efforts may be understood best as examples of surveillance operations. The label "surveillance" does not trivialize the important work of the professionals and scientists whose daily labors, year in and year out, yield the hard-won surveillance data. In fact, many of our country's surveillance operations in this domain of inquiry truly are gems and tend to be regarded as the best of the best in the world. In some respects, they are the envy of the world. Nonetheless, by definition, surveillance activities are designed with timeliness and practicality in mind, sometimes with deliberate decisions to sacrifice validity of measurement in favor of enhanced survey response rates.

For example, NHSDA, MTF, and the CDC survey all use self-report methods to measure drug-taking and crime-related behavior (e.g., weapon carrying). The option of bioassays to confirm self-report data now is regarded as impractical or too costly for surveys on a mass population scale, and there has been concern expressed that bioassays might reduce survey participation rates below acceptable values. NIDA is engaging in survey research experimentation with bioassays to complement self-report data to assess practical questions of this type. In the meantime, serious concerns have been expressed about the capacities of these data systems to provide evidence for policy evaluation (see, e.g., Manski et al., 2001). Nevertheless, evaluated from the standpoint of original plans for the data, these criticisms are somewhat impertinent as surveillance indicators. The criticisms are asking the surveillance operations to do far more than they originally were designed to offer.

The first rubric of epidemiology also encompasses studies of birth cohorts that are intended to estimate risks of adversity, plot trajectories of normative development, or quantify important population characteristics such as rates of officially recognized offending. The concept of a cohort study is familiar to criminal justice researchers and public health scientists alike. Prominent examples in the criminal justice research arena include Robins' classic nonconcurrent cohort study of children seen by child guidance workers in the early 20th century (1966), and the work of Tracy, Wolfgang, and Figlio entitled *Delinquency Careers in Two Birth Cohorts* (1990).

The fact that the rubric of quantity is mentioned first does not mean that research under this rubric is easy or a methodological snap. Not at all. From the standpoint of data gathering, those of us who have recruited, trained, and supervised teams of 60 or more field worker-interviewers and quality control staff for data entry, documentation, and management can appreciate the operational challenges in surveillance work. From a statistical

vantage point, the nature of the surveillance operations often includes interdependent observations within samples (e.g., sampled students within samples of schools; sampled household residents within neighborhoods; multiple respondents within sampled households, emergency rooms, or criminal justice facilities). These interdependencies motivate solutions that call on the calculus (e.g., in Taylor series linearization for variance estimation). In some estimation applications, there is a need for Bayesian statistics not yet taught widely in graduate research training programs.

As to the importance of these "counting" operations, we may turn to a recent research contribution by Cohen, who incorporated values from these surveillance operations in his attempt to estimate the monetary value of rescuing a high-risk youth from a life of delinquency, crime, and other socially maladaptive behavior (1998). To complete this work, Cohen had to turn to an array of previous results from counting operations that ranged from the National Institute of Mental Health Epidemiologic Catchment Area surveys we conducted in Baltimore during the early 1980s with colleagues at four other university-based sites to work that Blumstein and his group completed to estimate basic parameters of criminal justice research, e.g., an estimated 6 percent of all boys account for more than half of all arrests (Blumstein et al., 1986).

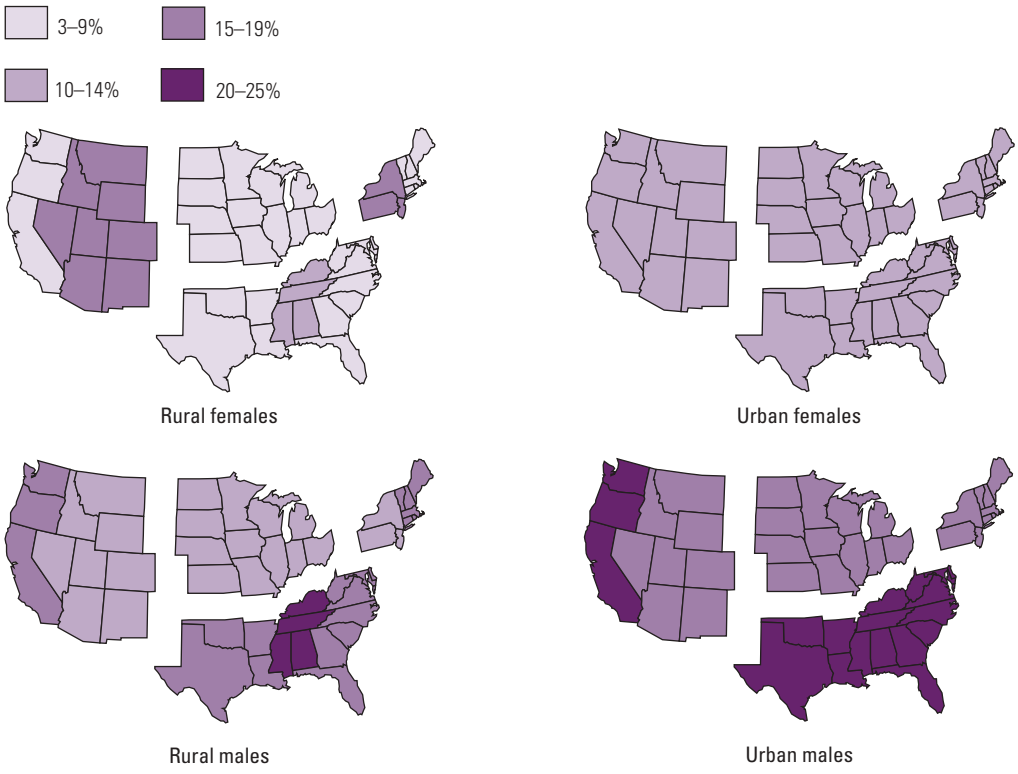
There can be little doubt that investigators in the drugs-crime arena should be interested in Cohen's conclusions about varying programmatic investments and the monetary returns from programs to intervene with high-risk youths. Nevertheless, it is somewhat startling to know that Cohen had to turn back to counting evidence gathered in the early 1980s and before to produce estimates to be used for policy and programmatic decisions almost two decades later. These quantitative estimates are not Avogadro's number; rather, they are values expected to change over time, if not from place to place. If we value probing quantitative criminological research exemplified by Cohen's work, then we must ensure that the drugs-crime research agenda includes periodic repetition of surveys to yield the required estimates.

Studying the accumulated evidence on the drugs-crime relationship, we have been able to sort much of it into the rubric of quantity. Quite clearly, NIJ and NIDA now make a considerable investment in the basic counting tasks required to estimate and quantify such parameters as how many adult arrestees and juvenile offenders are taking drugs each year. Each repetition of these surveillance operations provides evidence on variation in the estimates from time to time and from place to place. The study of this type of variation falls under the second rubric, which is called location.

Location. Our second rubric is location, and the main associated research question is "Where in the population are affected individuals more or less likely to be found, with variation in occurrence and frequency differentiated by characteristics of time, place, and person?" On occasion, work under this rubric is guided by theory, but more often the research has a more descriptive character.

James et al. (2002) provide an illustration of the nature of research and evidence about location. The research team set out to plot geographic variation in the occurrence of drug purchase opportunities experienced by young adults in the United States. In this figure, a "drug purchase opportunity," a special form of drug-related crime opportunity, is measured by a survey response to a standardized assessment in interviews conducted for NHSDA. As depicted in exhibit 4, and substantiated with a univariate response regression model for description, there is

Exhibit 4. Prevalence of drug purchase opportunity among youths 12–24 years old, in percent



Source: Substance Abuse and Mental Health Services Administration, 1996 and 1997, *National Household Survey on Drug Abuse,* Rockville, MD: U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration

variation in the occurrence of these drug purchase opportunities across locational regions of the country and for young men versus young women. In this context, the statistical methods are not intended to probe the causes of the observed variation from place to place, nor the observed male-female differences. Rather, the methods are used simply to help quantify the uncertainty in the survey-based estimates and substantiate the presence of variation from place to place and the male-female differences (James et al., 2002).

This illustration is useful because it reminds us that location refers not only to geographic variation but also to variation in relation to individual-level characteristics (e.g., sex, age, socioeconomic status, ethnicity). For example, Fendrich et al. (1995) studied juvenile and older murderers to understand varying degrees of drug involvement in murder. Locational research also plots temporal changes, as illustrated in a recent NIJ report on the possibility of new marijuana epidemics, to be described below (Golub and Johnson, 2001b).

Estimates of the consistency of association between drug use and various arrest and criminal behavior types also serve to illustrate analyses focused on location within population experience: Crime was found to be more common among drug

users than among nondrug users. As Harrison and Gfroerer (1992) make clear in their NHSDA analyses on this topic, the research questions they were trying to answer concerned the number of drug users, the number of individuals engaged in criminal behavior, and the overlap in these numbers. With respect to location, their work clarified the proportion of drug users who were engaged in criminal behavior and the prevalence of criminal behavior in relation to drug use. As is true in the work of James et al., these investigators did not draw on the apparatus of causal inference, matching, or other scientific maneuvers to disentangle whether the criminal behavior was a response to the drug use or vice versa. Nonetheless, taking a step beyond studies of officially recognized crimes, arrestees, and convicted criminals, Harrison and Gfroerer helped confirm links between drugs and criminal behavior, but they did not seek to produce definitive evidence about the causes of drug use or criminal behavior.

Much of our current research enterprise at the interface of drugs and crime has this type of descriptive character. Substantial HHS investments in the MTF study and NHSDA already have been mentioned. On the NIJ side, we call on ADAM to help clarify variation in the occurrence of drug use among arrestees across multiple jurisdictions, not only in the United States but also overseas. For the most part, we do not require these investments to yield definitive evidence that might be central in causal inference. Nonetheless, the evidence from these studies helps to describe the location of drug taking, criminal behavior, and the intersections of these behaviors, and sometimes to describe or predict the co-occurring and separate patterns of drug use and criminal behavior.

Analyses conducted under this rubric without a special push toward causal inference can be especially important in identifying hot spots within geocoded areas as well as health disparities that might differentially fall on one or another racial or ethnic minority group. Here, it is a predictive as well as a descriptive purpose that can be achieved. However, when the task is to predict and not to explain, there is no special calling for the methods required for firm causal inferences, as depicted in exhibit 3.

Within the drugs-crime arena, there are many different examples of surveillance operations under the rubric of location, such as we can see in recent work by Golub and Johnson (2001b) in which they used DUF/ADAM data as evidence to advance their claims about a new and possibly expanding epidemic of marijuana use in the United States. True to the descriptive character of locational research, Golub and Johnson present evidence of the new and possibly expanding epidemic among offenders in some areas (e.g., Atlanta) and evidence of no epidemic in other areas (e.g., Miami), but they do not seek to explain why there should be an epidemic in one place but not in another. Because these data are from incarcerated individuals, an important set of complications arises in their interpretation. One suspects that the observed time trends and variation from place to place might reflect operations of local police departments as much or more than it reflects any underlying change in the dynamics of marijuana epidemiology.

This rubric of location also encompasses studies in which the investigators may be striving toward causal explanation, but they fall short, often demonstrated in a shift toward the language of "prediction" and away from the language of "explanation." Two different hypothetical concluding statements can illustrate this point. When the research team falls short of its goal, the researchers may summarize their work by saying something like "Based on this study's evidence, the level of drug use in early adolescence predicted later

delinquency and criminal behavior in the young adult years." A different verb is selected for the alternative, stronger form of concluding statement: "Based on this study's evidence, the levels of delinquency and criminal behavior in the young adult years depend on levels of drug use in early adolescence."

As the focus shifts from description or prediction toward explanation and causal inference, we move from the rubric of location to the third rubric of causes. The shift in focus calls into play a new set of research concepts, principles, and tools, as outlined in exhibit 3.

The yield of a study often is not clear at the outset or in the stages of study planning.

Many scholars will appreciate that a single study may contribute evidence under several rubrics at once. For example, the periodic reports of NHSDA, MTF, and ADAM routinely present evidence that falls under the rubric of quantity as well as the rubric of location. Rarely, the authors of these reports seek to make causal inferences from their surveillance data.

The yield of a study often is not clear at the outset or in the stages of study planning, and the study orientation to theory is not always a discriminating feature. Some theory-based studies have started as investigations of causes but have ended up making contributions solely in the domains of prediction and description. Other atheoretic studies end up making useful contributions in our studies of cause. Consider the first conclusive study on the topic of age-related risk of Down syndrome (DS) and associated mental retardation, completed some 50 years ago. The investigators sought to plot the risk of DS by the age of the mother at the time of delivery. An exponential increase in risk after age 40 was clear in the first graphs. We still do not know what causes the chromosomal trisomies that give rise to DS, nor do we know why these trisomies and DS are more common when older mothers give birth. But even in the absence of firm causal theory and evidence, it has been possible to reduce the occurrence of DS in human populations by encouraging mothers to bear their children before age 40. Hence, a strictly descriptive study provoked an effective intervention to reduce the occurrence of an important genetic condition.

It is regrettable that our studies of disparities affecting racially and ethnically defined subgroups of the American population generally fall under the rubric of location, as do our studies of the changing dynamics of household and family composition in the United States. For example, we now can say with some certainty that African-American males experience rates of arrest, prosecution, and incarceration for drug possession offenses that cannot be explained by their rates of drug taking, but we do not have good evidence on the causes of this racial disparity. Initial inquiries suggest differential law enforcement and judicial practices, which sometimes encompass racial profiling, but rigorous scientific evidence on these practices is scarce.

With respect to the dynamics of household and family composition, the phenomena of youthful drug taking and related criminal offending have links back to the families of origin, now often characterized by absence or infrequent appearance of the father in many of our population groups. This is not to say that female-headed households are homogeneous or uniformly deleterious with respect to socially maladaptive behavior of young people. It would be a mistake to presume that the traditional mother-father household always and in all contexts is more protective than a female-headed household with respect to the risk of youthful drug taking or delinquent behavior (e.g., see Chilcoat, 1992). Mothers often mobilize family resources or draw on assets that in some measure may help compensate for absent fathers (e.g., by

involving grandparents, neighbors, church groups), as described by Kellam, Ensminger, and Turner (1977), Pearson et al. (1990), and others.

A research agenda on race, ethnicity, and family or household composition can be motivated by an awareness that the drugs-crime relationships will depend to some extent on demographic trends. Against the backdrop of demographic trends such as these, including an increased prominence of Hispanic children and families in the United States, it will be important to sustain the research agenda in the domain of locational variations of this type. Important steps in this direction have been taken in the Federal agencies responsible for surveillance of drug-related behaviors, including increased attention to measurement of ethnic self-identification (e.g., with respect to Cuban origin, Puerto Rican origin, and other subgroups of the Hispanic population; with respect to Chinese origin, Samoan origin, and other subgroups within the Asian-Pacific Islander category). Similar attention is required in criminal justice research such as ADAM and I–ADAM (International ADAM) and in administrative statistics compiled on operations of the criminal justice system in this country.

Whereas the human genome project is challenging conventional views about "race" as a scientific concept, studies on self-identified race-ethnicity will have a sustained importance in the NIJ-NIDA research agenda on the topic of drugs and crime.

This evaluation of importance can be grounded in an awareness of the demographic trends described above, but it also draws on an appreciation of what studies of self-identified race-ethnicity may teach us about the influence of cultural contexts and socially learned behaviors with respect to drug taking and criminal behavior.

Finally, a note on ethnographic studies should be added here. In general, the sample size and "sample space" characteristics of these studies do not make ethnography an especially fertile discipline with respect to the first rubric of quantity, except when the characteristic under study has extremely limited dispersion. For anyone who looks to ethnographic studies for quantitative values, there often are some unanswerable questions about generalizability and precision of the study estimates. In some respects, ethnography might be characterized as a search for the boundaries of no variation in a socially shared human characteristic.

This is not to say that ethnography is barren when it comes to quantitative data. To the contrary, the small scale of ethnographic research makes it possible for ethnographers to shift directions more quickly than is possible in ordinary surveillance operations. As a result, ethnographic field workers helped in the early identification of crack cocaine, methamphetamine, and oxycodone outbreaks—years before these outbreaks could be identified in large-sample surveillance data.

Under the rubric of location, ethnographic field workers were among the first to note inner-city adolescents whose drug taking started with marijuana rather than with the more normative experiences with alcohol and tobacco. They also were the first to characterize a growing use of "blunts"—tobacco cigars hollowed out and filled with marijuana for a combined tobacco-marijuana intoxication (Golub and Johnson, 1999). In a recent round of observations, there is a suggestion that for some youths, the typical "gateway" drugs have been skipped—an example of subgroup variation in the more typical developmental sequences running through alcohol, tobacco, and marijuana to drugs such as heroin, stimulants, and hallucinogens. Large-sample epidemiological surveillance data now seem to

confirm the initial ethnographic observations on this topic (e.g., see Golub and Johnson, 1999; Golub and Johnson, 2001a).

One of the reasons ethnographic research is important under the rubric of location is that it can open our eyes to new conceptions of time, place, and personal characteristics that impinge on the drugs-crime relationship. These ethnographic studies are especially useful in descriptions of the cultural context and socially learned behaviors described above. Their evidence can add depth and insight to otherwise superficially understood intersections of drug taking and criminal behavior.

To date, most ethnographic research on drugs and crime has been descriptive in character.

Causes. The third rubric of epidemiology pertains to the study of causes and draws on the research apparatus required for causal inference (exhibit 2). On occasion, this research apparatus can be quite simple in concept. For example, a relatively small sample of monozygotic (MZ) twins discordant for an important outcome is sufficient to provide definitive evidence about environment with respect to the causes of that outcome. These MZ twins are genetically matched: If they are discordant for outcome, one may look for gene-environment interactions, but more often one looks for differences in environmental conditions in utero (e.g., dichorionic versus monochorionic sacs), perinatally (e.g., insults at the time of delivery), or in later development (e.g., head trauma for one twin but not the other during infancy or childhood). The National Institutes of Health (NIH) investment in recent twin research to estimate heritability of different forms of drug use now generally is paying off in two ways:

- Each study is indicating at least some degree of heritability of drug dependence, and sometimes heritability of drug use, especially legal drug use (e.g., tobacco).
- Each study is indicating ample room for gene-environment interaction or for influence of environmental conditions and processes.

These results from causal research help substantiate a case for a future research agenda on the genetic sources of variation and on environmental modulation of these genetic sources of variation.

Randomized trials with relatively simple structure also can be used to probe causal hypotheses with definitive results. For example, these trials may offer our best avenues toward definitive evidence on whether cessation of illegal drug use is followed by reductions or elimination in criminal behavior. An alternative is to nest the study of causes within a more expanded agenda of systems research on drugs-crime relationships (Manski et al., 2001). To the extent that systems research entails a finely detailed specification of mechanisms that link events and processes within a system, this type of research falls more clearly under the rubric of mechanisms, as described below.

Outside of the simplicity of research on discordant MZ twins and randomized controlled trials, a complex apparatus of study design and statistical method is required to extract definitive evidence in research on drugs-crime relationships. Given the importance of inferences about causes in the drugs-crime relationship, it may be understandable that graduate research training programs have become increasingly methodological in their orientations.

It may be appropriate to discuss the potential contribution of ethnographic research in relation to the causes of the drugs-crime relationship. To date, most ethnographic research on drugs and crime has been descriptive in character. It has provided leads for more probing causal investigations, but it has not produced definitive evidence on the links between

drugs and crime. In this respect, ethnography's contribution may be most important under the rubric of location. Before anyone could mobilize large-sample surveillance operations to study the new drugs-crime phenomena connected with crack cocaine (e.g., crack and prostitution), it was possible for ethnographers to move in and make headway. To some extent, ethnographers have been pioneers in research on methamphetamine and club drugs such as MDMA (Ecstasy), and we can expect more of the same in relation to our first new drugs-crime outbreaks of the 21st century, which involve sustained release oxycodone.

An NIJ-NIDA investment in ethnographic research on drugs-crime relationships of this type will continue to be important—if only to help us begin to understand the unusually circumscribed geographic distributions of methamphetamine and oxycodone use in the United States and the patterns of criminal behavior associated with use of these drugs. Ethnography can be used to produce a catalog of causal explanations for methamphetamine's emergence as a threat to public health and public safety in rural sectors of the American Midwest and for oxycodone's emergence in small cities and towns of the Appalachian mountain range, especially from West Virginia southward. It is not clear that ethnography or any other scientific field will be capable of producing definitive evidence about specific explanations in this catalog of causes. Nonetheless, there is value and importance in the attempt to do so, and ethnographers can bring rigor and scientific discipline to this process of investigating these causes. The alternative seems to be to leave these investigations to the field of journalism.

Mechanisms. Within epidemiology generally, mechanisms refer to linkages of states and processes that lead toward expressions in clinical features of health and illness or disease. As applied to the drugs-crime relationship, one might ask about the mechanisms of linked states and processes leading to or away from an association between illegal drug use and criminal behavior.

For an illustration of these mechanisms, one may turn to the coercive process and deviancy training models introduced in the work of Patterson and Dishion. Their Oregon Boys study has provided longitudinal evidence on what surely must be central linkages in the mechanisms underlying drugs-crime relationships (e.g., see Patterson, Dishion, and Yoerger 2000). For example, studying these school-based samples of boys through ages 17–18, and using standardized coding of a 30-minute free discussion-interaction between best friends, they found substantial over-time correlation of deviant friendship process (e.g., duration of rule-breaking talk bouts as coded from videotape). Dishion also has reported on a link from initial drug use to increased affiliation with deviant peers and onward to initiation of criminal behavior that is more consistent with the delinquency-to-drugs link that emerged in the longitudinal research of Johnston and colleagues based on MTF analyses published more than 20 years ago (Dishion et al., 1996; Johnston, O'Malley, and Eveland, 1978), as well as on more recent studies (e.g., Elliott and Huizinga, 1989).

The use of multiwave longitudinal study designs to probe into suspected causal mechanisms is well known in both public health and criminal justice research circles. The Alcohol, Drug Abuse, and Mental Health Administration (the precursor to SAMHSA), and more recently NIH and OJJDP have maintained support for a series of important longitudinal studies over the years (e.g., see the work of Jessor and Jessor, Kellam and Ensminger, Block and Block, McCord, Bachman, Kandel, Robins, Elliott and Huizinga, Hawkins and Catalano, and many other studies of this type, as listed in compendiums such as

Verdonik and Sherrod, 1984). Advantages of long-term investment in these longitudinal studies can be seen in the research articles from many of the research projects with multiwave assessments, for example, the Pittsburgh Youth Study (e.g., Loeber et al., 1998), the Denver Youth Study, and the Rochester Youth Development Study (Loeber et al., 1999); and the research groups led by the Brooks, Newcomb, and Bentler (e.g., see Brook et al., 1996, Brook et al., 2000; Newcomb and Bentler, 1988; Newcomb 1992).

One of the questions in the design of an agenda for future research on drugs and crime is how the evidence from large- and medium-sized samples from longitudinal studies of this type might be linked with evidence from the generally much smaller intensive studies of cases. Until there is consensus about effective interventions to disrupt the drugs-crime relationship, possibilities for a linkage exist through the concept of natural history.

In the history of medicine and medical research, the first natural historians of disease were clinicians and clinically oriented observers who made careful observations at the bedside of patients, in the absence of effective interventions. They watched, measured as best they could (e.g., body temperature), and described change in relation to the passage of time from the first recognition of clinical features. Within the realm of drugs and crime research, ethnographers and social scientists generally have taken over the responsibilities of careful clinical observers in relation to illegal drug use and criminal behavior. During the last 50 years, thanks to the work of Robins (1966), Winick (1962), Preble and Casey (1969), Agar (1973), Waldorf (1998), Nurco (Nurco et al., 1975, 1996; Nurco, 1998), and their successors, we have learned much about the natural history of drug use, drug dependence, and associated criminal behavior through ethnographic and social science research.

The natural history of a disease proves to be an important element under the rubric of mechanisms. In the past, a careful description of a disease's natural history often has guided investigators toward underlying causal mechanisms.

In the years before effective drug treatments, Winick and others drew attention to the maturing out process for drug addicts, and there is a parallel literature on maturing out with respect to criminal behavior in general (Winick, 1963). The maturing out process continues to be an important locus for new research on the drugs-crime relationship.

Other clues about causal mechanisms are being produced in observational and longitudinal studies of individual cases or families characterized by some feature of the drugs-crime relationship. For example, we have Dunlap's intensive studies of families in which one of the members is a crack cocaine dealer (Dunlap and Johnson, 1996; Dunlap, Johnson, and Manwar, 1994); research such as Spunt's study of adolescent offenders with a history of violent crime (Spunt et al., 1990), Longshore's linkage of DUF and California Bureau of Criminal Statistics data (Longshore 2000), and the earlier related studies started by Hser, Anglin, and McGlothlin (1987); and investigations led by Inciardi, Johnson, and Goldstein or members of their research groups (e.g., see Inciardi and Russe, 1977; Inciardi 1990; Inciardi and Pottieger, 1998; Johnson, Dunlap, and Maher, 1998; Goldstein 1998; Spunt et al., 1990, 1994, 1995).

Several interesting elaborations of these intensive case studies have developed in the realm of criminal justice research. For example, Logan (2001) has added bioassays for metabolites of the neurotransmitter serotonin as well as testosterone assays as part of his intensive followup studies of crack users. This example serves to illustrate a potential

intersection of public health and criminal justice research that should be explored in more depth as we work through a future agenda for research on drugs and crime.

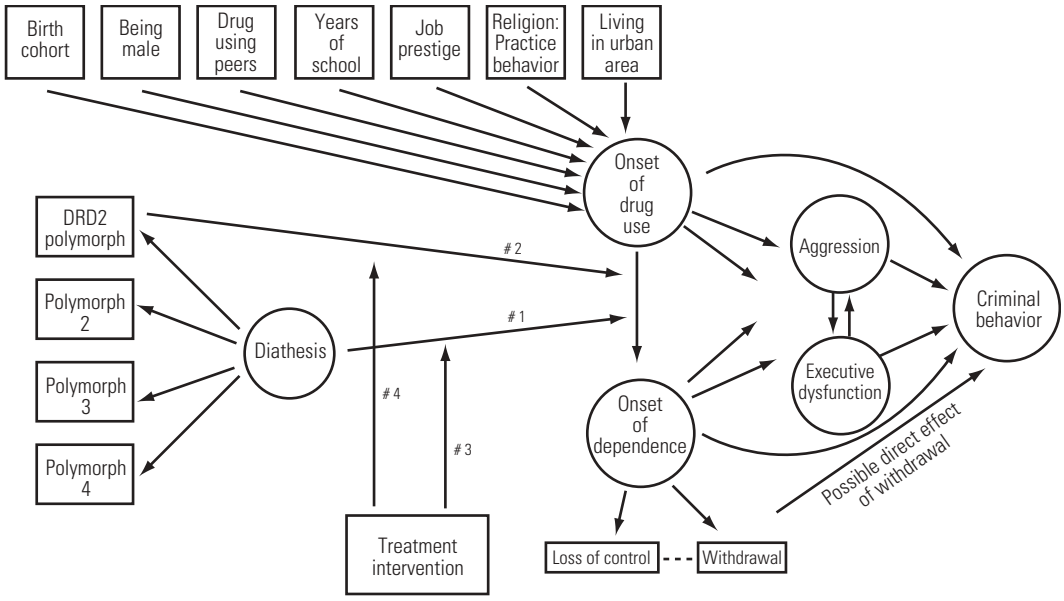
A conceptual shuttling back and forth between these intensive smaller sample studies and the generally larger sample longitudinal studies would seem to have advantages for investigators who work in one or another of these arenas, and there are a few investigators who conduct both types of studies (e.g., see Dishion and Loeber, 1985; Dishion, Patterson, and Reid, 1988; Dishion et al., 1996). This type of bridgework between the microsocial and ethnographic research traditions and large-scale longitudinal sample research deserves to be a deliberate focal point on the future drugs-crime research agenda. This focal point is important because the study of causal mechanisms and processes can draw attention to potentially vulnerable links where new interventions might be directed.

In epidemiology generally, the focus of research on causal mechanisms is shifting to genes and encoded gene products, as displayed in our most recently emerging subspecialties of genetic epidemiology and molecular epidemiology. To some extent, Elliott has a head start in a potential cross-fertilization between criminal justice research, genetic epidemiology, and molecular epidemiology. He already has introduced harvesting of DNA samples in the context of his national longitudinal study (Elliott, 2001). Opportunities for case-control studies and other genetically informative designs, including whole genome scans nested in a case-cohort study design, will become possible as this research evolves. Eventually, this type of work should lead us toward more definitive evidence on causal mechanisms underlying the drugs-crime relationship, including gene-environment interactions.

It is possible to make a forecast of likely integrations of genetic research, cognitive sciences, and the more traditional disciplines of behavioral and social sciences for a future agenda for NIJ and NIDA research on drugs-crime relationships. For example, exhibits 5–7 represent an elaboration of conceptual models our research group has developed as an aid to our study of transitions from drug use to drug dependence. Exhibit 5 expresses a suspected causal influence of drug use on criminal behavior. It also expresses a separate influence of drug dependence on criminal behavior. These two specifications are consistent with the Goldstein-Brownstein distinctions between drug-related crimes that might arise from acute drug intoxication states versus crimes that are rooted in the economic-compulsive behavior of an individual who suffers withdrawal states as a result of sustained drug use and neuroadaptation. There are many law-abiding drug dependent individuals who do not commit crimes, even when they are suffering from withdrawal pains. Hence, exhibit 5 includes a speculative causal pathway that runs directly from withdrawal to the occurrence of criminal behavior, over and above the separately specified role of the drug dependence syndrome for which withdrawal serves as a manifest indicator.

We speculate that an individual's genome can contribute to the drugs-crime relationship in different ways. Exhibit 5 concentrates on a possibility that some genetic polymorphisms or mutations may be intercorrelated manifestations of an underlying diathesis or vulnerability to make the transition into drug dependence from a state of nondependent drug taking, as reflected in pathway 1. It also specifies a possibility that a specific polymorphism (or mutation) has an additional influence on this transition, as reflected in pathway 2. As indicated by pathway 3, we may hope for development of effective intervention

Exhibit 5. Conceptual model of the influence of drug use and drug dependence on criminal behavior



Note: Depiction of a mediational model linking a generic susceptibility trait (diathesis, path 1) with risk of making a transition from onset of drug use to onset of drug dependence and subsequent links to criminal behavior, directly and indirectly through drug-induced aggression and drug-induced disturbances in executive functions. Via path 3, treatment intervention might modify the expression of the generic diathesis (as manifest in covariation of multiple discrete polymorphisms) or might target a specific gene product or gene effect, with path 2 showing the putative gene effect and path 4 depicting the possibly specific effect of treatment intervention, over and above the intervention effect on the generic susceptibility trait.

techniques that can disrupt what otherwise might be an expression of the diathesis. If effective, these interventions will slow or disrupt the natural history of drug dependence at a step in the process that links nondependent drug taking and the subsequent transition into drug dependence. This effect of intervention, by itself, may be sufficient to alter the drugs-crime relationships depicted to the right of the exhibit.

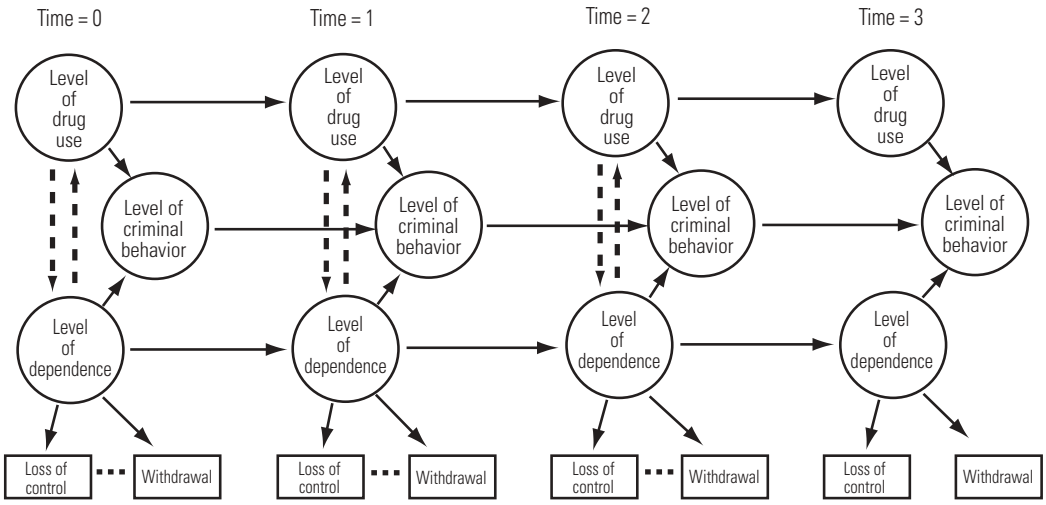
The potential role of the cognitive sciences is expressed in the intermediate pathways that link nondependent drug taking and drug dependence to later criminal behavior. Here, aggression may be conceptualized in a generic sense as rowdy misbehavior or social maladaptation secondary to drug taking, which can occur with or without criminal behavior. Executive dysfunction refers to impairments in the cognitive processes that subserve human capacity to plan, direct, and control one's future behavior within adaptational boundaries and may encompass more generalized planning behavior (e.g., see Tolman, Edleson, and Fendrich, 1996).

As depicted in exhibit 5, during states of acute drug intoxication, there may be a release of aggressive behavior and a disruption of regulatory executive functions. As levels of drug dependence increase, levels of aggressive behavior can change in an upward or downward

direction and executive dysfunctions can occur. The complexity of interrelationships between aggression and executive dysfunction is reflected in the reciprocal causal paths between these two constructs. Increased executive dysfunction translates as inept decisionmaking about aggression and the subjective utility functions that govern decisions about whether to commit a crime. As part of generally adaptive fight-flight responses and modulation of monoamine neurotransmitter signaling pathways during bouts of aggression, there can be a cascade of executive dysfunctions: Mere rowdiness can be transformed into aggravated assault.

To be sure, exhibit 5 is only a model that represents little more than an oversimplified representation of the complexities that link an individual's genome with cognition and behavior. Models by definition are oversimplified representations. It is fair to ask whether the model requires additional specifications, such as the possibility that religious convictions might tend to modulate the relationship between drug taking and aggression or criminal behavior. In this oversimplification, exhibit 5 does not convey all such possibilities. These possibilities for elaboration of the longitudinal model should help the reader understand some of the complexities faced in

Exhibit 6. Conceptual model of the drugs-crime relationship



Notes: Depiction of a simplified longitudinal mediational model that links earlier levels of drug use and dependence to later levels of criminal behavior. For example, the level of drug use might produce intoxicating states that give rise to violent criminal behavior, even when the level of drug dependence is held constant (or kept at zero levels). Here, the level of drug dependence is tapped via a measurement model with clinical features of drug dependence, such as loss of control and withdrawal as the manifest indicators for levels of dependence. In this simplification, analogous measurement models for the level of drug use and the level of criminal behavior are not drawn but may be presumed.

In this depiction of the drugs-crime relationship, there is an allowance for reciprocity between levels of drug use and levels of drug dependence, once dependence begins. That is, there is not an acyclic dose-response relationship that links drug use to drug dependence. Rather, once the drug dependence process begins after first drug taking, the dependence process becomes a determinant of later levels of drug use. Most current conceptual models do not provide for this reciprocity.

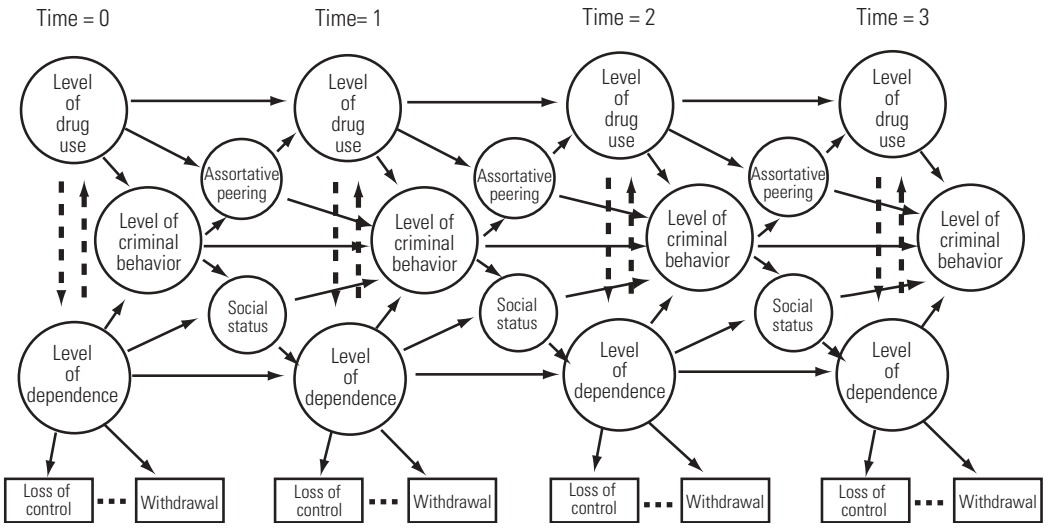
This model is one that makes no allowance for the possible effect of criminal behavior on levels of drug use or dependence, but this defect is remedied in later elaborations of this model (e.g., see exhibit 7).

observational studies of causal mechanisms that account for observed drugs-crime relationships.

Exhibit 6 presents even more simplification to sharpen focus on the drugs-crime relationship specifically. The genetically based diathesis and other covariates of exhibit 5 are set into the background (i.e., presumed to exist but not explicitly depicted). In exhibit 6, we see a readily appreciated reciprocity between the level of drug taking and the level of drug dependence: (a) the more drug taking, the more we find increased drug dependence levels, and (b) the more drug dependence, the more we find increased levels of drug taking. We also see the level of criminal behavior expressed as a function of levels of drug taking and drug dependence, as shown in exhibit 5. An additional elaboration involves the longitudinality of this model. We have levels of criminal behavior at one point in time influencing levels of criminal behavior at future points in time, but in exhibit 6, we do not specify a link from levels of criminal behavior to subsequent drug taking or drug dependence levels. At least in theory, and in some prior suggestive evidence, this omission represents a potentially important mis-specification of our model for the drugs-crime relationship (e.g., see Johnson et al., 1995).

Exhibit 7 adds a level of complexity to the model depicted in exhibit 6 and poses a substantive question for the agenda of action research: "How might an intervention lead to change in this system of interrelationships?" We introduce the possibility that social status (e.g., status in the community, socioeconomic status, lawful income) depends on criminal behavior and also on the level of drug dependence, and that criminal behavior influences the subsequent level of drug dependence

Exhibit 7. How an intervention might lead to a change in the drugs-crime relationship



Note: Depiction of a longitudinal mediational model that links levels of drug use and levels of drug dependence with levels of criminal behavior. The model depicts criminal behavior's influence on subsequent levels of drug use via differential association as well as a possible influence on subsequent levels of drug dependence via changes in social status. Once the drug dependence process begins, there is a reciprocity, with the level of dependence influencing the level of drug use and vice versa. As in exhibit 5, the level of drug dependence is manifest in the covariation of clinical features, such as loss of control and withdrawal signs.

by its intermediate influence on social status. The model depicted in this exhibit also provides for a plausible link from the level of drug dependence to subsequent criminal behavior. Namely, as drug dependence increases and social status (e.g., lawful income) falls short, criminal behavior may increase (as in the Goldstein-Brownstein tripartite model). In addition, subsequent levels of drug dependence may be influenced by the changes in social status, either upward or downward.

The model in exhibit 7 also introduces a conglomerate concept of "assortative peering," expressing a well-known truism: "birds of a feather flock together." The occurrence of drug taking is linked to later formation of peer group relationships, as is the occurrence of criminal behavior. To some extent, we can say that past drug use and past criminal behavior influence current peer group affiliations, and to some extent, we can say that past peer group affiliations influence future drug use and future criminal behavior. These complexities are expressed by hypothesized causal paths in exhibit 7.

Conceptual models of this type are incomplete representations of the causal mechanisms that lie beneath observed drugs-crime relationships, yet they are elaborations of the Goldstein-Brownstein tripartite model. Nonetheless, most readers will agree that these representations are oversimplified. If they have value, it is to highlight some future directions for the joint NIJ-NIDA research agenda on drugs-crime relationships.

We do not yet have a longitudinal research program to investigate the relatively simple model of interrelationships between levels of drug use, drug dependence, and criminal behavior as depicted in exhibit 6, let alone the more complex model of exhibit 7, with its sociological construct of social status and the social-psychological construct of affiliation with behaviorally similar peers (assortative peering, homophily, etc.). Fortunately, there already is a cadre of criminologists and drug researchers who are trained in sociology and social psychology and can readily incorporate the biomedical and clinical concepts of drug dependence into their research plans, if supported to do so.

It will be more difficult to forge a research agenda that integrates the genetics research and cognitive sciences constructs depicted in exhibit 5. For the most part, genetics and cognitive sciences are unknown territories for most NIJ and NIDA investigators who have made important contributions in past research on the drugs-crime relationships. For most drugs-crime researchers, it would not be difficult to integrate concepts and measurements of aggressive behavior and the clinical syndrome of drug dependence within their existing research plans. Far more difficulty will be encountered during the process of integrating genetics and the neuropsychological and neurophysiological measurements of the cognitive sciences.

We can learn a lot about the drugs-crime relationship simply by replicating and refining important longitudinal research on drugs-crime relationships that was initiated during the second half of the 20th century. Many of these longitudinal studies have cohorts that still are intact, and followup studies are now underway to learn more as these cohorts mature into adolescence and make the transitions into young and middle adulthood. There are mountains of data from 20th-century studies that have not yet been fully exploited through careful analysis.

Nonetheless, as we look forward through the next decades of research, the NIJ-NIDA agenda must go beyond what has developed as the best 20th-century research on the drugs-crime relationship. Ten decades from now, if we are to leave the 21st century with an enhanced

There are mountains of data from 20th-century studies that have not yet been fully exploited through careful analysis.

understanding of the drugs-crime relationship and with a greater capacity for effective action to improve public health and safety in this domain, we cannot continue to work within the narrow paradigms and methodologies of the traditional scientific disciplines mastered by drugs-crime investigators of the 20th century. If we are successful, then in a few decades, the biomedical, genetic, and cognitive science substrates of the drugs-crime relationship will no longer be a matter of mere speculation, as depicted in exhibits 5 and 7. There will be definitive evidence, solid understanding, and effective action-plans based on what we learn from the pioneers who move into that now-unexplored territory.

Prevention and control. The long-term value of research on causal mechanisms depends on identifying potentially vulnerable linkages in the sequence of states and processes that lead to illegal drug use and criminal behavior. It may go without saying that increasingly definitive evidence about causes and causal mechanisms will help us achieve our goals in the domain of effective prevention and control. Nonetheless, a reminder may be useful with respect to a dynamic interrelationship between etiological studies (of causes) and the emergence of effective interventions. As illustrated in the circumstance of DS and maternal age, with limited evidence on the underlying causal mechanisms of DS, by manipulating maternal age we have a very effective instrument to prevent and reduce the risk of DS. As explained in our original paper on the rubrics of epidemiology, many effective public health preventive interventions emerged before firm knowledge about causes and causal mechanisms became available (Anthony and Van Etten, 1998).

A related concept involves the use of randomized preventive trials to provide increasingly definitive evidence about suspected causal relationships. Some readers of this paper will know of work that Kellam and our Johns Hopkins research team have completed, using randomized field trials to probe the interrelationship between early aggressive and rule-breaking behavior and later drug involvement among boys (e.g., Kellam and Anthony, 1998). In essence, we decided that more observational research on the link from early aggression or deviance and later drug use would be less important than an experimental test. Within the framework of a randomized field trial, we tried to and succeeded in reducing aggressive and deviant behavior of first-graders using an experimental intervention assigned at random. For the boys assigned to experimental intervention, we have found later reduced occurrence of drug involvement, and we have replicated these results in a second cohort of first graders (Kellam and Anthony, 1998). More replications along these lines are needed before anyone can claim that early aggression or deviance is a "cause" of later drug use, but this experimentation illustrates how experimental research in the domain of prevention and control can yield benefits in the form of improved evidence to test causal theories. This idea is not new. Hawkins, Catalano, Offord, and others have noted it as well (e.g., Hawkins, Von Cleve, and Catalano, 1991; Hawkins, Catalano, and Miller, 1992; Jones and Offord, 1989). But it is an idea that often is overlooked by investigators more interested in theory testing and who orient themselves toward goal 1, described in this paper's first paragraph. Under the fifth rubric, we try to orient the research to serve both goal 1 and goal 2.

Because elements of this rubric of prevention and control are being covered in the companion papers that accompany this working manuscript, I will close this section more quickly than might be

customary. Before doing so, I would like to mention the contributions of operations research and systems research in this domain, which often have been neglected in epidemiology. Over the years, the thoughtful and quantitatively sharp work of Blumstein and colleagues has continued to inspire an important line of research on prevention and control that is pertinent to the drugs-crime relationship. Although I am not confident about all of the data or assumptions of the underlying analysis approaches, I have been especially impressed by the directions taken by Blumstein colleagues Caulkins and Cohen in this regard.

For example, Cohen (1998) discusses potential synergy of programs and distinguishes the aggregate benefits of programs designed to reduce crime versus the sum of the benefits of individual programs. It is possible that no single program would help city residents feel safe enough to derive lifestyle-related expenditure benefits (e.g., walking a mile through a rough neighborhood versus taking a taxicab because of concerns about safety). Combinations of programs might do so. This distinction ties into the concept of marginal costs versus average costs associated with drug-using and delinquent youths or criminals, where the marginal costs exclude fear of crime and private security expenditures because these costs are largely unaffected by any one criminal's actions.

Caulkins and his colleagues developed a challenging line of systems research that can ultimately yield new ideas and evidence about policy instruments in relation to the drugs-crime relationship. The evolution of this work toward selection of policies and programmatic instruments at different stages of a drug-taking epidemic is especially important (Caulkins, Crawford, and Reuter, 1993; Behrens et al., 1999).

A selective overview of tensions faced in research on drugs and crime

Numerous tensions are faced at the intersection of public health and criminal justice research on the drugs-crime relationship. This section identifies and describes a selection of these tensions, and in some instances recommendations are offered for NIJ and NIDA action to help resolve the tensions.

Tensions in theoretical perspectives, concept, and definition

Heterogeneity at the intersections of public health and criminal justice research is not limited to differences of opinions and judgment about empirical observations, the inferences we can draw from these observations, and the uses to which we apply the observations (e.g., cost analyses of alternative programs). There are some fundamental tensions within and across theoretical perspectives and also approach.

The concept of scale. Ecologists work with a concept of scale that may help us understand some of the tensions mentioned above and may serve as an axis of orientation as we turn to future directions for research (e.g., see Brown, 1995; Wiens et al., 1986). As a concept, scale resonates with what educational researchers and behavioral and social scientists often have termed multilevel or hierarchical models, as in Ennett's and the Duncans' research with young people nested within ecological niches of higher order such as classrooms, schools, or families (e.g., see Ennett et al., 1997; Duncan et al., 1997; Duncan, Duncan, and Hops, 1998) and our own research group's nesting of individual drug users and collections of drug users in their neighborhoods of residence (e.g.,

Bobashev and Anthony, 1998; Petronis and Anthony, 2000). Parker and Toth (1990) also have appealed to related macro versus micro concepts in their research on alcohol and homicide, as have Patterson and colleagues in their research on peer groups (Patterson, Dishion, and Yoerger, 2000). Bronfenbrenner's ecological systems theory for human developmental research slices scale into macro, meso, and micro divisions that many investigators have found useful (Bronfenbrenner, 1979, 1986).

Although not with any direct reference to a formal ecological concept of scale, we can see resonance of this concept in Markowitz and Grossman's studies of taxes and regulations on alcohol and their hypothesized effects on criminal behavior (Markowitz and Grossman, 2000), the research of Caulkins and colleagues on national drug policy and programmatic initiatives (e.g., Behrens et al., 2001), and Holder's research on preventive interventions directed toward communities in the United States (Holder 1993, 2001; Holder et al., 1999, 2000). Scale is worked outward from the individual organism in the direction of larger social groups, organizations, and geopolitical units. In public health and criminal justice research, we often refer to pre-established institutional or geopolitical boundaries (schools, census tracts, nations) when we work at higher scale. In ecology, mathematical models and methods such as advanced wavelet analysis are used to allow the empirical data to inform scale—as in research on landscape ecology (Anthony and Bradshaw, 2001).

Some tensions arise in research when investigators ignore scale in their theoretical perspectives or empirical research reports. For example, most of us work within a conceptual framework that leads us to comprehend estimates of the drugs-crime relationship without reference to scale. However, one should expect the drugs-crime relationship to be of one order of magnitude when we are investigating individuals who all reside in the same local area (e.g., as in much of the ethnographic research on the drugs-crime nexus), a different order of magnitude when we work with individuals and data from multiple neighborhoods, but with matching on neighborhood in the analysis, and a different order of magnitude when our data are from individuals across the Nation, with no analytical attention to who lives near whom, except perhaps during the process of estimating variances for confidence limits and standard errors (e.g., see Bobashev and Anthony, 1998).

Although not clearly within the scope of the original ecological concept of scale, an investigator may work inward from the boundaries of the whole organism toward subunits, ultimately leading to the signaling pathways between neurons, messenger systems originating from genetic material, and the simplest proteins and the encoding genes themselves. This elaboration of the concept of scale creates yet another tension, in part because the concepts of genetics and signaling pathways for neurotransmission are more familiar in the public health research community but are not yet in the mainstream of graduate or postdoctoral research training in the criminal justice research community. To illustrate, when I have talked with my criminal justice research colleagues about Elliott's inclusion of DNA assays in the most recent waves of his National Youth Survey, many of them have asked, "Why?" To be sure, some skeptical behavioral genetics colleagues also have asked, "Why?" but this is an instance in which the same verbal behavior has origins in substantially different theoretical models. My point is that tension can arise when concepts of scale are not made explicit.

Some of the work at the intersections of public health and criminal justice research

will be to make our concepts of scale explicit. In some respects, this will be more readily accomplished as we work from the whole organism outward, and the task may be more difficult as we try to integrate molecular biology, genetics, and neuroscience into our discussions. Nonetheless, this hard work will be essential as we make a 21st-century science of drugs-crime relationships.

Orienting definitions and constructs. The literature also displays considerable heterogeneity in orienting definitions and constructs. On the public health side, there often has been an orientation toward drug use and drug dependence or addiction as useful constructs in their own right. One orientation often has been called the "medical model," but it amounts to little more than an analysis of empirical syndromes (i.e., co-occurring manifestations of the neuroadaptational processes that get started when drug use begins, followed by a cascade of secondary and tertiary adaptations, some of them occurring in the domain of social adaptational roles and responsibilities). In a later section of this paper, I will return to this syndrome concept. On the criminal justice side, drug use and the drug problems associated with drug use often are treated as if they are not interesting in their own right but are something akin to interchangeable observable manifestations of something else that is more fundamental, such as the "problem behavior syndrome" construct first elucidated by Jessor and Jessor (1977) some 30 years ago. A more recent version of this concept is a general deviance construct used by Scheier, Botvin, and others in empirical studies (e.g., see Scheier and Botvin, 1996), and there also is a recent respecification of the Jessor and Jessor model, with elaborations that encompass the epidemiological concepts of risk factors and protective factors (Jessor, 1998).

The literature also shows heterogeneity in the typologies of criminal behavior or social maladaptation. Notions of childhood conduct disorder followed by Antisocial Personality Disorder appear prominently in some formulations, but are absent elsewhere (Loeber and Schmaling, 1985; Stevens, Kaplan, and Bauer, 2001; Langbehn and Cadoret, 2001).

These definitions and constructs in our theoretical perspectives demand work at the intersection of public health and criminal justice research. If we cannot bridge these different approaches or marry them to produce adaptive offspring, they will prove to be an unending source of unresolved tension with implications for research progress. Unresolved tensions slow down our progress in research that depends on a peer review process, whether the peer review occurs at the stage of reviewing proposals or of vetting journal articles.

At NIJ and NIDA, an important part of the research agenda can be a series of meetings or technical workshops. The charge to workshop participants is to bridge these orienting concepts and definitions across disciplines or create an articulation between concepts that will accelerate research progress on drugs-crime relationships rather than slow it down.

Orienting conceptual frameworks and theories. The originating biomedical branches of public health research sometimes take theory as a given or work with theory in the background when there are emergent problems of human suffering and disease to be solved. For example, the important 20th-century line of investigations required to identify lung cancer as an adverse consequence of tobacco smoking was guided more by implicit concepts of carcinogenesis secondary to tobacco smoking. Strongly articulated,

explicit theories, if any, would have been mis-specified and incomplete in that they could not possibly have incorporated the postsmoking DNA adducts, protein adducts, and gene-encoded metabolizing enzymes now prominent in the models of carcinogenesis. In criminal justice research, true to its origins in the social and behavioral sciences, the theoretical underpinnings are made more explicit (e.g., see Thornberry, 1997; Kaplan, 1995). One might say that without explicit theory, the research in this domain stands little chance in peer review, no matter how important the empirical contribution.

This is another source of tension at the intersections of and sometimes within the domains of public health and criminal justice research. In Public Health Service study sections, I have seen study section members be less than enthusiastic about proposed epidemiological research on drug use and Antisocial Personality Disorder because the applicants had not oriented themselves to the major theories of deviance well known in criminal justice circles: "inadequate conceptual model" is the phrase that comes to mind. I also have observed major differences of opinion about scientific priority among experts in the criminal justice and social science world, some of whom are comfortable with "psychologizing" constructs within their theories (e.g., the self-derogation models developed by Kaplan), and others who are more focused on constructs with a behavior analytic origin (e.g., coercive process and deviancy training models developed by Patterson, Dishion, and their research groups in Oregon).

Tension in relation to theoretical models has been readily apparent in this NIJ-NIDA collaboration, which has offered a chance to step back and look over a broad expanse of scientific progress in public health and criminal justice research on the drugs-crime association. This broad perspective creates germs of ideas that might be useful in a synthesis or integration of various theoretical perspectives that range from the disciplines of molecular or behavioral genetics to those of econometrics and the other social sciences. However, there clearly is diversity and tension even within fields as narrow as behavior genetics, where some work is oriented toward developmental family processes (e.g., as advanced in the recent work of Neiderhiser and colleagues), and other work is not (e.g., see Neiderhiser et al., 1998, 1999; Neiderhiser, 2001; Brennan, Mednick, and Jacobsen, 1996; Tehrani et al., 1998; Kotler et al., 1999).

These tensions surface most clearly in debate and discussion of an intersection of genetics research and studies of the drugs-crime relationship. Many investigators from social science backgrounds are hesitant to take part in discussions of genetics, gene expression, and mechanisms of inheritance that might account for covariation of drug-taking behavior and criminal offending. This hesitation can be traced in part back to serious and important concerns about ethical issues, eugenics, and the like. Some of the hesitation can be traced back to a gap in graduate education: Graduates of social science training programs often have not mastered the basics of human biology and genetics.

Looking from a different perspective, an observer can see other sources of tension in relation to conceptual framework and theories. Graduates of human biology and genetics programs often have not mastered the basics of behavioral and social sciences research.

The intersection of the Human Genome Project, gene expression, and proteomics with research on drugs-crime relationships merits close attention at NIDA and NIJ. To some extent, this intersection can be cultivated in a gradual process of shaping new investigators. NIDA's peer review of its

The intersection of the Human Genome Project, gene expression, and proteomics with research on drugs-crime relationships merits close attention at NIDA and NIJ.

portfolio of research training programs and individual career development awards can specify requirements for cross-discipline mastery. On one side, new social science investigators can be required to master the basics of human biology and genetics. On the other side, new human biology and genetics investigators can be required to master the basics of behavioral and social sciences.

NIDA already is sponsoring a series of training workshops for new investigators to expose them to the different disciplines that now contribute to its research mission. The initial workshops have focused on epidemiology, pharmacology, and neuroscience and introduced participants to those fields. Future workshops are planned, with a broad agenda that cuts across the behavioral and social sciences, including ethnography and behavior genetics, as well as domains of medical sciences such as proteomics, drug development, and NIDA's clinical trials network.

Sustained investment in research education of these types will be needed at NIJ and NIDA. Without attention to pharmacology, neuroscience, and pharmacogenetics, it will be difficult for future investigators to develop a fundamental understanding of the pharmacological and economic-compulsive categories of offending in the Goldstein-Brownstein tripartite conceptual framework. Without grounding in the social sciences, it will be difficult for them to develop a fundamental understanding of the systemic categories.

There now are investigators who can bridge the gaps that appear as canyons between disciplines. Elliott's attempt to articulate his work with the NIH human genetics initiative provides one example. In a primate lab run by Steve Suomi at NIH, research on gene-environment interactions as substrates of aggressive behavior, social maladaptation, and drug use provides another example. This research is especially useful because the environmental conditions experimentally manipulated in this lab have conceptual linkages back to the deviancy training, inept parenting, and parent-infant relationship models developed by Patterson, Dishion, Brook, and others (Higley et al., 1996a, 1996b; Higley, Suomi, and Linnoila, 1996a, 1996b; Patterson, Dishion, and Yoerger, 2000; Dishion et al., 1996; Brook et al., 1996; Brook, Tseng, and Cohen, 1996).

More examples of this type of bridgework are emerging from the work of the research pioneers who try to keep pace with evolving contributions from the NIH Human Genome Project. The NIJ-NIDA research agenda can be enriched by a technical report series that brings examples of this type to the community of investigators and research trainees.

Tension that involves approach or methods

Review of the drugs-crime literature creates an opportunity for developing new insights about the sometimes different approaches and methods that have been developed in public health and criminal justice research work groups. For example, ethnography with small groups has expanded to almost large-sample ethnographic research that bears some resemblance to large-sample survey research, but in many ways is different. To an outsider, this expansion is a puzzle to be solved and has not yet been grasped. In the public health research domain, the original role of an ethnographer bore some resemblance to the role of the medical practitioner as a student of the natural history of disease. The original natural history studies were intensive case studies, with the doctor at the bedside of individual sick patients making careful systematic observations about this individual case and then that individual case, in the days when there might have been symptom palliation (e.g., cold cloths for fever), but no

effective curative interventions to change the clinical course of disease. This has some resonance with Agar's concepts of the ethnographer's attention to the details of behavior and verbal expression and of writing the narrative and taking down the stories of drug users in their own words (Agar, 1973). The link from this role of the ethnographer to large-sample ethnography remains unclear.

Measurement methods pioneered in behavioral sciences research and introduced to studies of drug taking by Larson, Kaplan, and Schiffman have started to surface in criminal justice research as well. Experience Sampling Methods (ESM), originally developed to study the daily lives of high school students, have now been introduced in research on drug use (e.g., see Csikzentmihalyi and Larson, 1987, 1992). Their ESM procedure requires study participants to wear an electronic pager device that beeps at randomly scheduled intervals, signaling the participant to record some predetermined aspects of his or her present feelings, activities, and/or surrounding environmental conditions. Usually, dozens of self-reports are collected over a week or more to capture as much of participants' daily living as possible. One advantage of this method is the ability of the researcher to examine drug use specific to each individual, given the assessment of his or her baseline characteristics for comparison. An additional benefit is the possibility of taking into account measured social context of the behavior (e.g., see Farnworth, 2000). ESM also creates new opportunities to investigate the determinants of drug-taking behavior that might be unique to each individual and each situation (e.g., see Kaplan and Lambert, 1995).

These evolving ESM procedures require a number of conditions if reliability and validity are to be enhanced. Kaplan and Lambert (1995) identified the following prerequisites: having a favorable and trusting relationship between study participants and researchers, ensuring complete confidentiality of responses, meeting labor or equipment and programming costs associated with beeping the participants several times per day, and addressing difficulties faced when the participants are illiterate or challenged by technology.

Several recent studies of delinquent and antisocial behavior may help clarify the utility of ESM procedures in research on the drugs-crime relationship. For example, Farnworth (2000) studied a group of young Australian offenders on probation and found that these respondents were engaged in such productive activities as employment or education an estimated 10 percent of the time. Compared with reference norms for Australian adolescents, offenders spent 30 percent more time on passive leisure activities. An estimated 42 percent of the time, offenders on probation reported being bored, while 62 percent of the time they were involved in unchallenging activities. The use of ESM to integrate studies of drug-taking and criminal behaviors will provide new and important evidence on relationships that generally have been studied via retrospective reconstruction of behavior over long spans of developmental time.

On another measurement front, there is a related tension that involves the use of bioassay methods to study recent and past drug taking. Wish has been a pioneer in the use of these methods for research on arrestees, and recent studies by Harrison and Fendrich are extending this reach into general household population samples of the type surveyed for the National Household Survey on Drug Abuse (Wish, 1988; Yacoubian, Wish, and Perez, 2001; Fendrich, 2001; Harrison, 2001). In future research, one may anticipate these differences in approach to sustain a tension until a general consensus has evolved.

With respect to approach in the domain of statistical methodology, computational advances have contributed to an acceleration of innovation. There is a resulting air of optimism for what might be accomplished, as in the domains of longitudinal latent transition modeling, multilevel or nested models, approaches to nonignorable missing data, and alternative methods of research on directed acyclic pathways with mediation versus cyclical pathways with reciprocities. At the same time, there is a tension because these new statistical approaches have not become integrated in most research training programs, and there remains certain skepticism about heavily modeled data.

Limitations on numeracy keep many of us from probing the assumptions of complex models, whether these are models of behavior in individual studies, econometric models, or operations and systems research models to probe alternative program and policy decisions. Tension may be inevitable in the face of such complexities.

Tension involving research ethics

NIJ can play an important role in relation to investigations that probe drugs-crime relationships. At present, a good part of the NIJ role has been ceded to HHS and its new Office of Human Research Protections (OHRP). True to its origins in NIH, OHRP is oriented toward the standards of experimental medical intervention research (e.g., randomized trials to test safety and efficacy of new drugs). OHRP specifications for informed consent procedures and disclosure statements share this orientation.

Many behavioral and social sciences researchers have expressed concern that the standards and specifications of experimental medical research are not appropriate for studies of the drugs-crime relationship. For example, in ethnographic and observational survey research, different specifications for informed consent procedures and disclosure statements are required.

NIJ officials can initiate a useful dialogue with OHRP on this important research topic. Perhaps more than any other government agency, NIJ can help to stimulate a dialogue and negotiate a reorientation of current practices in a manner that fosters new and creative research on the drugs-crime relationship without a lapse in research ethics or slippage in the protection of human subjects in this research.

Outside the Federal Government, researchers now face increasingly thorny challenges in the protection of their research participants and the assurance of confidentiality in relation to research data. For example, research that includes assessments of tobacco smoking now requires special handling as a result of legal action by the tobacco industry. These requirements apparently extend to criminal justice research in which tobacco smoking is approached as a self-reported indicator of deviance. The integration of molecular biology and genetics into these research agendas, and even the introduction of experience sampling methods or bioassays for drug testing, raise new questions in the domain of research ethics, some of which have been scrutinized in randomized experimental designs. These challenges deserve the close attention of these research communities, with OHRP and its NIJ counterpart in suitable roles.

Computational advances have contributed to an acceleration of innovation in the domain of statistical methodology.

Does drug use cause crime? A focal point

Each author of working papers for the drugs-crime research forum was asked to identify a circumscribed set of research issues and probe what we really know about them. Mindful of other sections to be written, we have been able to organize these research issues in relation to a single focal point, expressed in the question,

"Does drug use cause crime?" One advantage of this specific focal point is that it has a broad range and can encompass many different strands of evidence developed in public health and criminal justice research. Another advantage is that it is a crucial open question for research on crime and drugs. As characterized by Harrison and Backenheimer (1998), "Research has not been able to validate a causal link between drug use and criminal behavior."

When confronted with an etiological research question such as "Does drug use cause crime?," a public health scientist typically might turn to a 20th-century elaboration of the 19th century Henle-Koch postulates or conditions for judging whether a specific disease might be caused by specific bacteria. For a time, this 20th-century elaboration was known as Hill's postulates (after Sir Austin Bradford Hill, a medical statistician) and also as Evans's postulates (after A.S. Evans, an epidemiologist; Evans, 1976; Hill, 1965). Today, students of epidemiology learn them as criteria for judging whether an association is causal or guidelines for evaluating the evidence of a causal relationship, together with an analysis of the relative strengths and weaknesses of evidence from randomized trials, prospective and longitudinal studies, retrospective studies, and case-control comparisons. Exhibit 8 presents these criteria and guidelines.

Before reviewing these criteria, four clarifications may be in order. First, the criteria for evaluating causal significance of observed associations represent standards of scientific evidence that are substantially different from the standards used to judge causal evidence in civil and criminal proceedings. For some segments of this paper's readership, the question, "Does drug use cause crime?" may sound silly: "Of course drug use causes crime. My grandmother could tell you that." (This was the type of reaction TV/radio personality Rush Limbaugh gave to some of the

Exhibit 8. Criteria and guidelines for judging the causal significance of an observed association

Criteria/guidelines	Associated questions
Temporal relationship	Is the temporal sequencing consistent with the idea that A causes B, or is there an ambiguity or the possibility that B causes A?
Biological or other theoretical plausibility	Is the idea that A causes B supported by theory or by trustworthy common experience and wisdom?
Biological or other theoretical plausibility	Is the available evidence consistent with the suspected causal link between A and B, or is there considerable inconsistency across studies?
Alternative explanations ruled out	If we are skeptical that A causes B or that B causes A, are there other specific alternative explanations for the observed statistical relationship between A and B, such as some background factor C that accounts for a spurious association between A and B?
Dose-response or gradient relationship	Is there regularity in the observed plot of B as a response to A? Where we see more of A, do we see more of B?
Strength of association	How strong is the relationship? Is it strong enough to make other alternative explanations less plausible?
Cessation effects	In this extension of the dose-response criterion, do levels of B drop substantially when A no longer is present?

early work that Howard Chilcoat, Tom Dishion, and I published on the topic of whether inner-city mothers and fathers might be able to help protect their children against risk of early-onset drug use if they maintained levels of parental vigilance generally associated with good parental supervision and monitoring.)

Our response to these gentle readers is to beg forbearance. Of course, some of what our grandparents learned to be true is not true, and the analysis of responsibility for negligent or criminal acts in the individual case (as in a court of law) necessarily has a different set of standards of evidence. For example, evidence beyond a reasonable doubt is not the same as the definitive evidence referenced in the first paragraph of this paper.

Our second clarification is that we acknowledge a possibility that delinquent or criminal behavior might be a cause of drug use, the chicken-egg problem referenced by Inciardi and advanced with evidence by others. This possibility surfaces when one considers earlier sociological models of deviance (e.g., Sutherland, Matza) or later sociopsychological developmental models for youthful deviance, antisocial behavior, and delinquency, such as the coercive interaction and deviancy training models introduced by Patterson, Dishion, and colleagues; Coie and his colleagues at Duke; and Kaplan at Texas A&M University (e.g., see Patterson, Reid, and Dishion, 1992; Patterson, Dishion, and Yoerger, 2000; Dishion et al., 1996; Coie and Lenox, 1994; Sandstrom and Coie, 1999; Bagwell et al., 2000; Hubbard et al., 2001; Kaplan, 1995). For example, minor rule violations in early childhood, well before the years of starting drug use, might be followed by general peer rejection, differential association or affiliation with other rejected and deviant peers, and subsequent group-fostered delinquency and norm violations, including illegal drug use. We note that this possibility, and the more advanced idea of reciprocities between drug use and criminal behavior, do not necessarily undermine inferences about drug use as a cause of crime. We face a problem of slightly different conformation in our research on drug dependence: The use of a drug is an absolutely necessary but not sufficient condition for development of clinical syndromes of drug dependence, but once the drug dependence process has started, the drug dependence takes on a life of its own and becomes a determining influence for subsequent drug use (i.e., drug use causes drug dependence, and then drug dependence causes drug use).

Our third clarification is to ask first whether it is plausible that there is no association between drug use and crime or criminal behavior or whether there might be an inverse association (the more crime, the less drug use). In our review of available evidence, we must acknowledge the possibility that in some subsegments of human experience, there well may be a negative association between drug use and criminal behavior (e.g., in the highly disciplined and controlled environments of industrial espionage), just as we must acknowledge the fact that some 90-year-olds have smoked a pack or more of tobacco cigarettes virtually each day of adult life and have not developed lung cancer. We also acknowledge the high probability that in certain times and places or in certain subsegments of population experience, there is no association between drug use and criminal behavior (e.g., see Blum and Associates' studies of clinicians and professionals who used LSD before it was regulated by the Food and Drug Administration; Blum and Associates, 1964).

Notwithstanding these exceptional circumstances, there is a generally consistent overall pattern of positive and sometimes quite strong associations between illegal drug use and criminal behavior of other

There is a generally consistent overall pattern of positive and sometimes quite strong associations between illegal drug use and criminal behavior of other types.

types. These associations are observed not only in samples of offenders in the criminal justice system (e.g., DUF and ADAM), but also in general household population samples. This evidence has some vulnerability due to constraints on methods (e.g., refusals by study participants to give informed consent for participation), but recent consistent evidence from general population surveys indicates that the observed association extends beyond officially recognized crimes and does not suffer the transition bias that is present in DUF, ADAM, and other criminal justice samples (e.g., perhaps the arrested or incarcerated offenders were caught because of impairments from drug use, or the drug use of an offender is a manifestation of a more general characteristic of carelessness that might lead more readily to apprehension by the authorities).

Fourth, a "cloud of confusion" sometimes descends when people begin talking about causes and causation. We will try to be clear. Although we are asking whether drug use causes crime, we are not saying that there are no other causes of crime. This issue sometimes is subject to misinterpretation. For this reason, it might be more sensible to express the question in a different way: "Under what conditions, if any, does criminal behavior, as a response variable, depend in any substantive way on drug use, such that we might be able to shape criminal behavior by shaping drug use?" This question is not as pithy as, "Does drug use cause crime?" but it might help us escape the cloud of confusion when we try to review available evidence pertinent to this issue of causal inference.

Criterion/guideline 1: Temporal relationship

If illegal drug use is believed to be a cause of criminal behavior, then we require evidence that illegal drug use has preceded the onset of that criminal behavior. Judgments about this criterion or guideline can become difficult when there are potential reciprocities. For example, when sustained medicinal use of phenacetin and acetaminophen compounds (e.g., Tylenol, Datril) was being investigated as a cause of interstitial nephritis and end-stage renal disease (ESRD), one of the complications was the possibility that the earliest clinical features of ESRD include headaches. Of course, headaches can promote the sustained use of pain-relieving medicines, including the acetaminophen compounds.

The drugs-crime relationship presents this type of temporal complexity, as was seen in exhibits 6 and 7. Earlier aggression, conduct problems, and criminal behavior may function as a direct cause of illegal drug use (e.g., see Kellam and Anthony, 1998), and possibly as an indirect cause (e.g., by promoting affiliation with other delinquent and drug-using peers). Earlier drug use also may function to promote later growth of conduct problems or criminal behavior (e.g., see Johnson et al., 1995).

Criterion/guideline 2: Biological or other theoretical plausibility

Carrying books of matches is associated with the risk of developing lung cancer, tends to precede rather than follow the onset of lung cancer, and has at least a moderately strong association with lung cancer. However, except with respect to the associated characteristic of tobacco smoking, we have no biological or other theoretical plausibility to link carrying matches per se with the etiology of lung cancer. Even if the matches-cancer association were to withstand the challenges posed by the other criteria for evaluating causal significance of an association, we would be inclined to ask about the underlying theory and its plausibility and coherence in relation to known relationships and facts.

The tripartite model for the drugs-crime nexus represents a substantiation of plausible causal links from illegal drug use to criminal behavior. Other related strands in the fabric of plausibility have been mentioned (e.g., differential crime opportunity, differential association).

The plausibility of a link between drug use and aggressive or violent crimes rests to some extent on neuroscience theory and observed clinico-pathological associations, as in contemporary thinking about cocaine's influence on limbic-hypothalamic substrates of aggression (Davis, 1996). In addition, there is a line of preclinical and clinical laboratory experiments that has helped to solidify the plausibility of a link from drug use to aggressive or violent behavior, and possibly to the types of norm violations associated with nonviolent crime. The evidence on links from the use of psychostimulant drugs (e.g., methamphetamine, cocaine) and aggression is noteworthy in this respect. Administration of cocaine to hamsters during adolescence increased the number of bites and attacks indicative of a surge of offensive aggression (Harrison et al., 2000). Moore and Thompson (1978), studying pigeons, found that high doses of cocaine elicited aggressive behavior. In some species, increased levels of aggression also have been observed with the administration of amphetamine stimulant drug—not only when a large single dose (e.g., Melega et al., 1997), but also after sustained lower doses (Haber, Barchas, and Barchas, 1981) are administered. These psychostimulants also may increase the risk of self-directed aggression (e.g., see Peffer-Smith et. al., 1983).

Experimental laboratory research with human subjects also has produced supportive evidence along these lines, often with computerized point-subtraction methods used to evoke aggression after the drug has been administered and under control (no drug) conditions. For example, Licata et al. (1993) administered a high dose, low dose, and no dose of cocaine and found that subjects in the high-dose group expressed significantly greater aggression than subjects in the control group; the low-dose group did not differ from the control group.

Notwithstanding these strands of plausibility, there also is a considerable amount of inconsistency in the observed data and some complexity in relation to dose-response analyses. For example, Crowley et al. (1992) found no increase in aggression when cocaine was administered in primate lab research; Darmani and colleagues (1990) found increased aggression among mice that were given relatively low doses of cocaine but not when the mice were given higher doses of cocaine. Moro et al. (1997) found reductions in the total number and length of aggressive activities in mice after amphetamine administration. Cherek et al. (1989), studying humans, examined the relationship between d-amphetamine on aggression using point subtractions and found an increase in aggression among those receiving 10 mg per 70 kg of body weight but a decrease in aggression when 20 mg per 70 kg of body weight was administered.

Police experience on the street implicates dissociative drugs such as phencyclidine (PCP) in relation to violent and aggressive behavior and crime. We have been able to find some supportive experimental laboratory evidence consistent with this street-wise experience (e.g., Burkhalter and Balster, 1979; McCardle and Fishbein, 1989). Nevertheless, even with PCP, there is a complex pattern of inconsistent evidence that does not ring true with the experience on the street and common wisdom about PCP. Tyler and Miczek (1982), Emley and Hutchinson (1983), and Miczek and Haney (1994) reported no increase in aggressive behavior after experimental administration of PCP and an erratic increase in aggression only in a

The tripartite model for the drugs-crime nexus represents a substantiation of plausible causal links from illegal drug use to criminal behavior.

subgroup of animals receiving low doses. Hence, it may be that PCP promotes aggression only in certain subgroups of the population (e.g., see McCardle and Fishbein, 1989); and in some experiments, animals receiving high doses of PCP were more likely to be victims of aggression by nondrugged animals (e.g., see Russell, Greenberg, and Segal, 1984; Tyler and Miczek, 1982).

In sum, there is some plausibility to the idea that drug use might promote criminal behavior, with strands of plausibility coming from neuroscience theory, the common wisdom and experience of criminal justice officials and drug users, and laboratory experiments. The links between being a drug user and becoming a crime victim represent an understudied phenomenon, and the inconsistent patterns of laboratory evidence provoke us to investigate the possibility that there might be substantial heterogeneity within the population with respect to links from drug use to aggressive behavior or to crime (e.g., see Parker and Rebhun, 1995).

Given the multiplicity of drugs, types of crimes, and varieties of social contexts, it may be inevitable that the accumulated body of evidence on the drugs-crime relationship appears inconsistent.

History demonstrates one of the difficulties with this criterion for judging causal significance of associations. Time and time again, new evidence has contradicted what appeared to be a biologically plausible or theoretically pleasing link between a suspected cause and a suspected response. Today's biologically plausible or theory-driven causal inference may be tomorrow's "old wives' tale." As is true for the other criteria and guidelines, by itself this one counts for little.

Criterion/guideline 3: Consistency of the association

We already have clarified the possibility that no association or a negative association might exist for certain subsegments of population experience. For example, at some point, drug taking may incapacitate an individual who otherwise would be involved in criminal behavior. Despite examples of this type, and notwithstanding contrary evidence, the drugs-crime research literature now includes a generally consistent replication of positive associations between illegal drug use and criminal behavior (e.g., see Harrison and Backenheimer, 1998).

The body of laboratory experiments on drugs and aggressive or violent behavior is not as consistent as one might expect. As described under criterion/guideline 2, under some circumstances, laboratory experiments have established a small set of drugs as causal agents in relation to aggression and violence. However, for most drugs and many circumstances, there are negative findings, and the evidence is not consistent with causal links from drug taking to aggressive and violent behavior.

Given the multiplicity of drugs, types of crimes, and varieties of social contexts, it may be inevitable that the accumulated body of evidence on the drugs-crime relationship appears inconsistent. Variation in the quality of the research also has a bearing on consistencies or inconsistencies in the evidence. As every first-year graduate student learns, research with imprecise measurements will tend to yield evidence of no relationship even when a relationship exists; research with measurements of limited validity will tend to yield evidence of relationships where none exists.

Although not generally introduced as a feature of studying consistency of relationships between causes and effects, a developmental perspective may help to lead the reader to a greater appreciation of inconsistencies and complexities faced in research on the drugs-crime relationship. That is, the timing of the onset of the drug taking may condition the later expression of criminal behavior and may lead to

greater heterogeneity in the population with respect to the drugs-crime relationship. For example, we have some evidence on the possibility that earlier-onset drug use is associated with later risk of developing drug problems (e.g., see Anthony and Petronis, 1995). We also have evidence that prompts us to conceptualize earlier-onset drug use as a type of precocious adolescent development that may disrupt normative developmental trajectories (e.g., see Newcomb, 1992; Dawes et al., 2000). There may be a tendency to interpret these disruptions as sources of increased levels of later criminal behavior, consistent with the idea that risk of drug problems are increased for early-onset drug users; this has been the perspective our research group has taken in its studies of this topic (e.g., Johnson et al., 1995; Anthony and Petronis, 1995). Nonetheless, it is possible that precocious (i.e., early onset) drug taking is followed by disproportionately greater increases in frequency of drug use and in risk of drug problems but that the early-onset drug use dampens the level of criminal behavior that otherwise might occur if the drug use had not started so early.

Our study of early-onset alcohol use and the later developmental trajectory of conduct problems represents a case in point. In that study, cited above under criterion/guideline 1 (Johnson et al., 1995), we found that baseline levels of conduct problems were greater for boys who had started drinking alcohol before the adolescent years without parental permission and that growth of conduct problems was greater for these early-onset alcohol users—*when compared with boys whose drinking did not start until later.* Similar relationships were observed for girls with early-onset alcohol use—*when compared with girls whose drinking did not start until later.* However, a discussion of this research with Blumstein has prompted us to reapproach this problem with a different comparison in mind. Using random effects regression, we are seeking to hold constant the baseline level of conduct problems and study boys who have a high initial level of conduct problems but who start drinking alcohol early on and compared them with boys with an equally high initial level of conduct problems but for whom alcohol consumption is delayed until adolescence. Approaching the contrast in this manner, we may discover that early-onset drinking dampens the growth trajectory for conduct problems; the steepest trajectory for growth of conduct problems may be observed for boys with high initial levels of conduct problems but without the impairments associated with early drinking. The early drinking might lead to retardation in the growth of conduct problems for boys who otherwise would escalate to very high levels of conduct problems in adolescence.

This is a somewhat counterintuitive proposition, and it may run counter to common wisdom and experience with respect to the effects of early-onset drinking or drug use and the later lifecourse of young people. However, our intuitions and common experience about these circumstances tend to reflect a type of population-averaged summary of developmental trajectories and generally do not encompass all varieties of human experience. We mention this open research question as an example of the complexities faced in developmental research on the drugs-crime relationship and as a possible explanation for the inconsistencies observed in drugs-crime research. The timing of the drug use may induce subgroup variation in the drugs-crime relationship, which then is interpreted as inconsistency in and a challenge to causal significance of the observed associations.

Fortunately, complete consistency of evidence is not required. What is required is a focused probing of the circumstances under which the drugs-crime relationship is a causal relationship, with a deliberate

effort to ferret out situations in which there is no causal linkage between drug use and criminal behavior. Deliberate scientific pursuit of these circumstances and situations may require investigators to look overseas, where use of such drugs as marijuana, cocaine, and heroin are not treated as criminal behaviors. In social contexts of this type, by studying the developmental trajectories of criminal behavior among young people with and without early drug-taking experiences, we may be able to illuminate some of the inconsistencies now observed in the drugs-crime evidence available to us. For example, longitudinal studies of children growing up in the Netherlands are underway. The recent effective decriminalization of marijuana use in the Netherlands creates a social context for research on this drug and later criminal behavior that merits attention on the NIJ-NIDA research agenda.

Criterion/guideline 4: Alternative explanations ruled out

This criterion or guideline represents the Achilles heel for much of the prior research on the possible causal links between illegal drug use and criminal behavior and represents a general difficulty for observational research in general. Observing a possible causal relationship between antecedent A and response B, the skeptical critic always can ask, "Isn't there some unrecognized background factor C that can account for the A-B relationship that you have observed in this study?" If so, "Isn't this a poorly developed conceptual model?"

To some extent, these are a coward's questions about the drugs-crime relationship in specific and about empirical research in general. Of course, there might be some unrecognized background factor in empirical research plans and in completed studies; if not the hand of the mischievous Norse god Loki, then something else of a less celestial nature.

The challenge for the courageous skeptical critic is to assert a specific background factor or set of background factors that might account for the observed A-B relationship and that have not been considered explicitly or taken into account in a study plan or description of completed work. For example, observing the suspected causal association between tobacco smoking and risk of lung cancer, the statistician Sir Ronald Fisher posed a question of the following type: "Can't we explain the observed association as a manifestation of an underlying predisposition or liability that determines both the tobacco smoking and the lung cancer?"

In relation to the drugs-crime relationship, the most plausible background factors seem to be of the variety named by Fisher, namely, unmeasured predispositions; in this instance, the predispositions might involve who abides by the conventional rules of society, who is willing to run afoul of the law by taking a drug illegally, and who is willing to commit crimes other than the crime of drug possession for personal use. To some extent, these predispositions may be a manifestation of family heritage, a manifestation of early experiential conditions and processes, or a synthesis of both. Nevertheless, no matter what their origin, until these predispositions are taken into account, they represent a plausible form of alternative explanation whenever a drugs-crime relationship is found in our empirical studies.

One line of response to this criticism has been to measure personality or facets of temperament in observational studies and to re-estimate the drugs-crime association with personality or temperament held constant (e.g., via stratification or statistical adjustment in a regression model). But this response always is subject to the criticism that the wrong facets of personality or temperament were measured or that the measurement of personality or temperament was not as good as it should have been.

It is in relation to this criterion that we now have new opportunities for research at the intersection of public health and criminal justice research on the drugs-crime relationship. Three important opportunities at this intersection involve (1) genetics, twin, and family research; (2) longitudinal studies with "subjects as their own controls" designs; and (3) controlled experimental trials.

Future genetics, twin, and family studies can help to narrow the alternative explanations in a useful manner. For example, in an earlier section we described a design that exploits the genetic matching of monozygotic twins to search for environmental conditions that contribute to the occurrence of disease. Discordant MZ twin designs also can be used to hold constant predispositions or liabilities linked to the individual genome of the twins, while studying differences in the trajectory of criminal behavior for the MZ twin whose illegal drug use starts first versus the MZ twin whose illegal drug use starts later (or not at all).

Alternative twin and family research designs can be used to narrow other explanations of the observed drugs-crime relationship (e.g., studies of discordant siblings, studies based on the transmission disequilibrium test when specific polymorphisms are under investigations). Cadoret and colleagues have offered recent illustrations of the power of twin studies in which some twins have been separated at birth, but these "natural experiments" have become scarce in the United States and other parts of the world where twins now generally are kept together in their new adoptive families (e.g., see Cadoret et al., 1986, 1995; Cadoret, Leve, and Devor, 1997). Tsuang et al. (2001) provide a recent useful overview of pertinent findings from the Harvard Twin Study.

Longitudinal subjects-as-their-own-controls research designs also can help rule out alternative explanations in the sense that each individual participant is carrying forward a within-individual set of propensities to become engaged in illegal drug use and other criminal offending. In these longitudinal designs, in an otherwise law-abiding individual, if we were to observe that criminal offending occurs only in the immediate aftermath of a drug intoxication experience or only in the stages of withdrawal after drug dependence, we would have additional evidence of a drugs-crime association at the individual level. These longitudinal designs remain vulnerable to a possible counterclaim that there is an underlying predisposition that links earlier illegal drug use to later criminal offending only during the context of drug intoxication or withdrawal states. That is, the observed association between illegal drug intoxication or withdrawal and the later criminal offending is a spurious artifact of uncontrolled confounding: There is something else in the background, a third variable that explains the observed sequence.

Medical and public health research is host to a variety of examples of this type of spurious confounding. One of them involves the connection between chickenpox and shingles. For most people, chickenpox occurs early in life and shingles occurs late in life. There sometimes is an exceptional case of shingles occurring with no prior history of chickenpox in childhood, but these exceptional cases might be understood as instances of "clinically inapparent" infections (i.e., with mild or minimal symptoms in childhood, so mild as to pass without notice). A longitudinal research design on this topic can lead to the impression that chickenpox causes shingles, in the sense that shingles rarely or never occurs unless chickenpox occurs first. This observed longitudinal link between chickenpox and shingles satisfies

the requirement described above: Criminal behavior occurs only after a bout of illegal drug use. The fly in the ointment in our chickenpox-shingles example is that we now know that chickenpox does not cause shingles. Rather, it is an underlying virus that causes both of these clinical phenomena. Exposure to the chickenpox virus (herpes zoster) is the cause of chickenpox in childhood and is the cause of shingles in later life when the virus emerges from an otherwise dormant or latent state of no activity. The apparent linkage from earlier chickenpox to later shingles is due to an underlying third variable, the herpes zoster infection, which accounts for the appearance of both outcomes.

The analogy to research on illegal drug use and later criminal offending should be clear. Even when longitudinal research shows us examples of participants who become engaged in criminal behavior only in the context of drug intoxication or withdrawal states, we cannot be confident that the illegal drug use is the cause of the associated criminal offending. Some unknown underlying cause may be accounting for both outcomes.

The third approach, involving randomized trials, offers a way to bring these unknown underlying variables into check. This approach already has been described in relation to our research group's studies of an alternative explanation for the drugs-crime relationship. Namely, we advanced the hypothesis that a predisposing characteristic in the form of early aggression or rule breaking is a potentially modifiable determinant of both later illegal drug use and criminal behavior or other sorts. This hypothesis does not reject the possibility that illegal drug use causes later criminal behavior, but it introduces one alternative explanation for the observations association between illegal drug use and criminal behavior (i.e., the earlier aggression or tendency to break rules and social norms). As described earlier, we sought to test this hypothesis by constructing an experimental trial in which we disrupted the development of early aggression and rule breaking (e.g., Kellam and Anthony, 1998). We used the power of randomization to hold constant the profile of alternative explanations that might account for later illegal drug use and criminal behavior. In a current followup study of the youths who participating in this trial, we will be testing whether the primary school intervention had a sustained impact on illegal drug use and criminal behavior. If so, we might expect a weakened association between illegal drug use and criminal behavior in the subgroup of youths exposed to the active behavioral intervention arms of our study.

A related opportunity to test the drugs-crime relationship and to use randomization to rule out alternative explanations involves controlled trials of new therapeutic interventions directed toward illegal drug use and drug dependence of adolescents. Observational studies now suggest that entry into drug treatment reduces the rate of criminal offending, but these studies leave open possibilities for alternative explanations (e.g., selection biases in the assignment of subjects to treatment, imbalances in the other determinants of criminal offending). Randomization in the setting of controlled trials of new therapeutic interventions creates an opportunity to constrain these selection biases and bring into balance the alternative sources of variation in criminal offending (e.g., see Manski et al., 2001).

By adding followup measurements of posttreatment criminal behavior to current and newly emerging randomized controlled trials of therapeutic interventions, NIJ and NIDA can help foster new evidence on the degree to which illegal drug use is a cause of criminal offending. Alternative explanations for the observed drugs-crime association and other determinants of the offending behavior can

either be brought into balance by randomization or held constant as measured covariates in statistical models of analysis. Some examples of past research along these lines are described under criterion/guideline 7.

Criterion/guideline 5: Dose-response or gradient relationship

Absence of a dose-response or gradient relationship does not rule out causal associations; there are good examples of threshold relationships with no clear gradient. Nonetheless, there are examples in which the probability or rate of criminal behavior is observed to be lower with lower levels or frequencies of illegal drug use and is observed to be greater as levels or frequencies increase.

In one recent and especially informative longitudinal cohort study, Brook et al. (2001) studied the developmental trajectory of marijuana use from childhood into adulthood and found that behavioral and attitudinal indicators of unconventionality (e.g., attitudes tolerant of norm violations) had a gradient relationship with later increases in marijuana involvement. The research team also found that as levels of unconventionality increased, so did marijuana involvement. These gradient relationships between unconventionality and marijuana use help to substantiate a possible causal link between earlier unconventionality and later developmental trajectories of marijuana involvement. However, as in the circumstance of research on the drugs-crime relationship, this research report leaves us with unanswered questions of the following variety:

a. What about the predisposition that links unconventionality to the earliest marijuana use? Where does the unconventionality come from, and is this predisposition the same as the predisposition to smoke marijuana?

b. What about the reverse causal pathway and the possibility that increasing marijuana use might promote later increases in unconventionality?

c. As levels of marijuana use increase, are there later dose-response or gradient-like increases in unconventionality?

In light of the population heterogeneity mentioned above, this dose-response criterion might be especially troublesome in research on the drugs-crime relationship. For example, consider the drug user whose increasing bouts of intoxication yield less criminal behavior than otherwise might occur and whose intoxication-associated carelessness leads to apprehension and detoxification and outpatient treatment prior to a bench appearance. The detoxification and treatment might be followed by a return to the baseline level of criminal behavior (i.e., a higher level of criminal behavior than was observed during the period of intoxication) and an impression that treatment was ineffectual with respect to the frequency of criminal behavior.

Criterion/guideline 6: Strength of association

Weak associations seem especially vulnerable to sources of spuriousness and bias. One benchmark standard for strength is the association between tobacco smoking and lung cancer: The risk of dying from lung cancer is estimated to be 10 times or greater for persistent tobacco smokers than for nonsmokers. Toward the other end of the spectrum of magnitude is a widely appreciated but quite modest strength of association between being male and illegal use of drugs: The risk of becoming an illegal drug user is an estimated 1.5 to 3.0 times greater for an American male than for an American female (Anthony and Helzer, 1995).

When a positive relationship is observed, the strength of relationship tends to be quite modest.

Examining the range of study estimates on the drugs-crime relationship, there are some studies with extremely large relationships, but when a positive relationship is observed, the strength of relationship tends to be quite modest. This generally modest relationship may imply that alternative explanations (e.g., predispositions) are sufficient to account for the observed relationship.

Criterion/guideline 7: Cessation effects

Cessation effects already have been mentioned in the context of our discussion of alternative explanations under criterion/guideline 4. There are many studies of co-occurring maturation processes that lead to fading of both illegal drug use and other criminal behavior, especially since the work of Winick. The observational studies of McGlothlin, Anglin, and Hser in California and the work of Nurco, Lerner, and colleagues in Baltimore also shed light on declines in criminal behavior during periods of abstinence or reduced illegal drug use. The literature includes numerous studies of what has happened to crime involvement after cessation of drug use, based on observational studies.

As noted under criterion/guideline 4, some of the strongest evidence about cessation effects can come from randomized experiments in which drug treatment or other interventions are used to disrupt illegal drug use, with subsequent evaluation of crime as an outcome of treatment. As noted under criterion/guideline 6, for some segments of the drug-using population, the cessation of drug use is followed by increases in frequency of criminal behavior (i.e., once impairments associated with intoxication are reduced).

Reprise: Does drug use cause crime? What do we not know?

This review of a specific hypothesized causal relationship was intended to highlight some of what we know about the drugs-crime relationship. Its main purpose was to provoke discussion and help in a process of identifying weaknesses and gaps in evidence that might be used to guide a future research agenda.

Evaluated in relation to these conventional criteria or guidelines for judging the causal significance of observed associations, the reader may have a better appreciation for the uncertainty conveyed in a recent summary statement cited above: "Research has not been able to validate a causal link between drug use and criminal behavior" (Harrison and Backenheimer, 1998). The available evidence is ambiguous with respect to temporal relationships.

Instead, we offer a series of discussion points about what we might not yet know.

Is the evidence on a temporal relationship compelling? Illegal drug use precedes formal criminal behavior in some of these studies, but what about the earlier antecedents of both drug use and crime in the form of rule breaking, misbehavior, and minor norm violations? One can imagine a co-occurrence process that begins with expression of irritable temperament or aggression in the preschool years, followed by rule breaking or norm violations in the primary school years, and then later co-occurrence of illegal drug use and delinquent or criminal offending. Our own research group and others have added some evidence on the possibility that drug taking that starts by age 11 might promote growth trajectories for later conduct problems among both boys and girls. The pattern of co-occurrence of conduct problems

and drug use is a centerpiece of Jessor's problem behavior theory, and there is reason to look to experiments that will help us differentiate these problem behaviors (e.g., differential response of each form of problem behavior to different interventions, as suggested in Dishion's early Adolescent Transitions experiment).

Plausibility? Our focus has been oriented toward the individual, but there is a perspective on the drugs-crime relationship that is more ecological or contextual in orientation. For example, a social environment characterized by illegal drug use of individuals might give rise to norm violations and criminal offending of other sorts, and not necessarily in the form of offending by the drug users but rather in the form of offending by others. The mugging of a heavily intoxicated drug user by a group of nonusing passersby serves as one example of aggregate effects of illegal drug use on crime that would not be apparent in individual-oriented studies but would require multilevel studies of interrelationships between individuals.

Consistency? What about the exceptions to a general pattern of observations? It seems likely that the drugs-crime association varies from time to time, place to place, and subgroup to subgroup. The study of variation in these patterns of association will help to disclose the boundary conditions and mechanisms that give rise to strong, weak, and possibly inverse associations. Research across borders and in settings such as the Amsterdam cannabis environment can help illuminate these boundary conditions.

Alternative explanations? Several lines of research have been started on the common causes for both illegal drug use and other criminal behavior, some of them originating in family history studies and the clever adoption paradigm adapted by Cadoret and his colleagues, some with a sharper focus on mechanisms of inheritance (e.g., assays of genetic polymorphisms), and some with a focus on personality and early social environment. It is not clear that studies to date have provided adequate control over these sources of co-variation. Nonetheless, the longitudinal study of individuals over time has provided evidence from subjects-as-their-own-controls designs, and the randomized trials of interventions provide some evidence that, despite common causes, an intervention directed toward illegal drug use can reduce frequency of criminal behavior. Even if there are common causes (e.g., inherited traits), for many observers, the longitudinal evidence coupled with experimental evidence is sufficient to draw the inference that illegal drug use causes criminal behavior. Reasonable people will disagree about this inference from available observations, and the points of disagreement will lead us to specific experiments or new studies to gather evidence that will be more compelling.

Gradient? Is it possible that some of the inconsistency in observations about the drugs-crime relationship can be traced to (a) selective attention either to the lower end of drug involvement (e.g., among children, adolescents, or high school seniors followed through the college years; see Schulenberg et al., 1994) or to the higher end (e.g., among arrestees or clients in drug treatment programs); (b) possible thresholds in the gradient relationship, with between-sample heterogeneity with respect to the effective threshold; or (c) an uncertain metric for assessing the type or level of drug involvement? As described in the prior section entitled "Criterion/guideline 2: Biological or other theoretical plausibility," we have noted some inconsistent pharmacological effects across dosage

levels of the same drug and across different drugs. If we are to appropriately sort the consistent and inconsistent findings of field studies on the drugs-crime relationships, it may be necessary to reach for greater specificity with respect to dosage levels or intensity of drug use and also with respect to the pharmacological differences observed in laboratory experiments. It no longer is enough to sort drugs into the non-scientific colloquial "soft" and "hard" categories, nor to lump all "illegal drug use" as if there were no heterogeneities of effect across the various forms of internationally regulated drugs. The best field studies of the 21st century will abandon these relatively crude classifications and will not carry forward an obsolete tradition from the earlier groundbreaking days of drugs-crime research.

Strength of association? Due to uncertainties about reciprocal and dynamic interrelationships between drugs and crime, it would be advantageous to look closely at studies with fine-grained temporal analysis of the drugs-crime relationship and to estimate strength of association prospectively. This should be done in a manner that allows change in the level of criminal behavior to be gauged in relation to change in the level of drug use and vice versa, or with an expression of the relative risk of criminal acts with and without antecedent illegal drug use.

Cessation? Our recent National Research Council committee expressed concern that selection effects, transition biases, or other artifacts might lead to a spurious inference that criminal behavior declines or stops when illicit drug use is ended, either with or without intervention. The evidence on this criterion might require special scrutiny in light of concerns such as these.

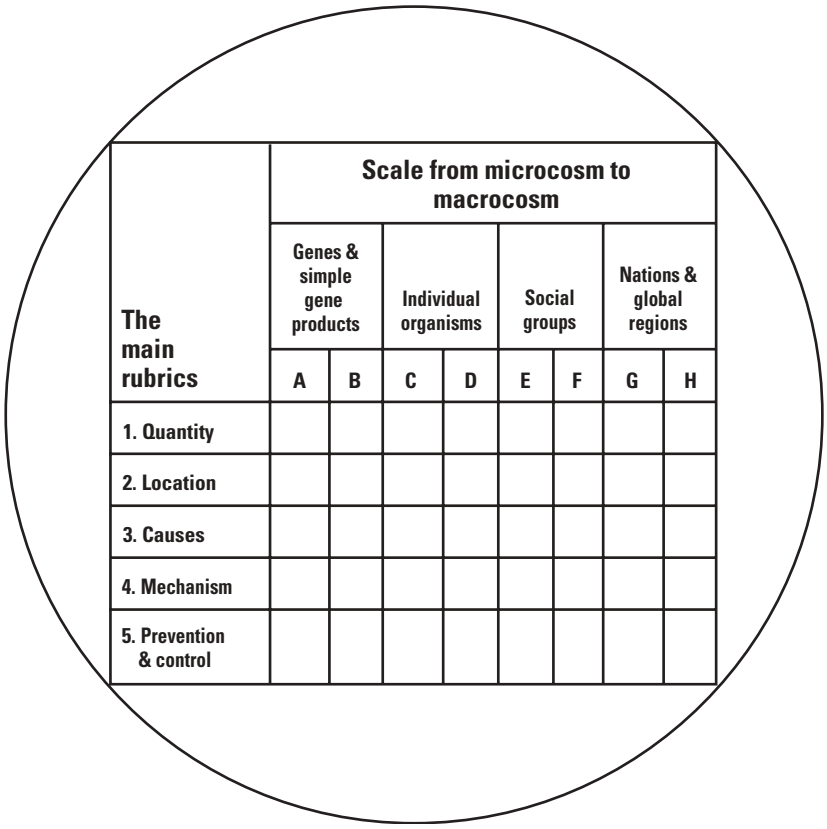
Conclusion

In the final section of this working paper, I would like to integrate the organizing conceptual framework presented in the section on the rubrics with the ecological concept of scale described previously. Here, there is an adaptation of the formal ecological concept of scale that includes the microcosm and an extension of the concept that reaches to the macrocosm of the international regulatory environment.

The integration of the five rubrics and the concept of scale is depicted in exhibit 9. The result is a two-dimensional grid with the rubrics on one axis and scale on the other axis and showing the conceptual domain where research on drugs and research on criminal offending intersect. Each rubric-scale intersection or subunit in the grid can be populated by past and current examples of research on the drugs-crime relationship. In some subunits, density of past and current research is quite high; work in these domains may require strengthening, or perhaps these investigators should be left alone to do their work. In other subunits, we have done little or no past research activity; these subunits might warrant attention in a new agenda for drugs-crime research.

Starting in the upper left-hand corner of this framework, we have the intersection of quantity research with the microcosm represented by the genes we inherit from our forebears. We may expect one day to have an investigation that produces quantitative estimates of the frequency of homozygotes and heterozygotes with respect to genes that are implicated in the drugs-crime relationship, just as we now have these estimates for the frequency of alleles mapped to apolipoprotein E4 and other genes or polymorphisms implicated in the risk of developing Alzheimer's disease.

Exhibit 9. A conceptual framework for research on the drugs-crime relationship



The main rubrics	Scale from microcosm to macrocosm							
	Genes & simple gene products		Individual organisms		Social groups		Nations & global regions	
	A	B	C	D	E	F	G	H
1. Quantity								
2. Location								
3. Causes								
4. Mechanism								
5. Prevention & control								

Working our way to the far upper right-hand corner, we stop at the level of Nations. To the best of my knowledge, we have a limited set of quantitative estimates for rates of drug-taking behaviors and criminal justice statistics at the level of Nations; but definitive evidence on variation across regions of the globe is lacking and represents a current gap in knowledge. To some extent, this gap can be filled by cross-national studies now underway, such as the World Health Organization's (WHO's) recent World Mental Health 2000 research initiative being led by Ron Kessler at Harvard and T. Bedirhan Ustun at WHO, with collaborators in more than 20 countries around the globe (Kessler, 1999); the European School Survey Project on Alcohol and Drugs (*www.ipdt.pt/investigacao/espad99/indice.htm*); and cross-national studies supported by NIDA in Latin America (e.g., Brook et al., 2001), including our own PACARDO Project (Anthony, 2000).

In the middle range, between the microcosm of the gene and the macrocosm of global regions, we have collections of estimates for various social and geopolitical groups. In aggregate, these estimates can help us to draw generalizations about the relative magnitude of problems associated with drug taking of one sort or another (e.g., marijuana use versus cocaine use) or with criminal behavior of one sort of another (e.g., aggravated assault versus shoplifting or vandalism).

A few investigators have started to integrate genetic variation in their studies on such topics as drugs and crime.

Even within the rubric of quantity, there are many gaps. For example, our quantitative estimates often are based strictly on officially recognized offending and do not encompass unrecognized offending. With respect to drug taking, there is a plethora of evidence on the prevalence of drug use and drug dependence but not much evidence on the incidence or risk of becoming drug dependent. Here, also, we have big gaps in the evidence that warrant some attention as we design an agenda for future research.

The intersections of the location, causes, and mechanisms rubrics with the scale dimension brings us closer to evidence on variation from place to place, time to time, or in relation to personal characteristics. A few investigators have started to integrate genetic variation in their studies on such topics as drugs and crime, and soon we may have more definitive evidence on the relative frequency of different polymorphisms or gene-encoded protein products for different subgroups of the population or in different geopolitical zones. We can expect ecological analyses of the between-subgroup and between-zone rates, with new evidence on location.

Similarly, working outward from the simplest gene products to more complex products of gene-environment interaction, the sex hormones research of separate research groups led by Logan and by Angold, Costello, and others should provide us with more evidence on rates of antisocial behavior, drug use, and offending in relation to levels of testosterone and other hormones before and after drug use (Logan, 2001; Federman et al., 1997). The initial evidence is not expected to allow causal inference, but the understanding of locational variation will allow us to sharpen our causal theories and to integrate new biological perspectives on the drugs-crime relationship.

In a middle position in this framework, somewhat overlapping the different segments, the important line of research being conducted by Higley, Suomi, and their colleagues in relation to gene-environment interactions merits attention. This research, already mentioned in one of the preceding sections, touches on aggressive behavior, social conditions of child rearing, and drug use. Using a primate model, this research group has been able to extend the line of research on infant-mother relations that Harlow initiated. The group is engaged in experimental manipulation of the early conditions of infant rearing, crossed with genetic predispositions that in the wild have been found to be related to aggressive behavior and excess mortality. The evidence from this research serves as an important example of how the effects of an apparently noxious inherited predisposition might be modulated by a change in child-rearing environments. Does this animal model of gene-environment interaction also hold for aggressive children, with later implications for their drug-taking behavior? Questions such as this one merit discussion in relation to the proposed drugs-crime research agenda, if only to choose not to pursue these lines of research.

Turning to the last row of the framework, I offer some speculations about gaps in research on prevention and control. At the level of scale that reaches from microcosm to the whole organism, I see a gap in research on underlying brain structures that subserve neuropsychological functioning of clear importance in the choice behavior of drug users and offenders. To the extent that drug users and offenders are making choices about various elements in their behavioral repertoires, we may be able to understand variations in response to prevention and control interventions as a function of neuropsychological performance (e.g., with respect to direction, control, and planning). Our

comprehension of this variation can increase through a program of research on fMRI brain imaging and neuropsychological testing under experimentally controlled paradigms (e.g., aggression evoked through computerized point subtraction or other procedures). In time, we should be able to evaluate the degree to which response to these interventions depends on brain structure and function as manifest in neuropsychological tests as well as in response to genetic predispositions of the type now being characterized in Suomi's primate laboratory and elsewhere.

Working our way to the bottom right-hand side of this matrix, we find the intersections with social groups and contexts of increasingly larger scale, not only the peer group and family of origin or procreation, but also the larger neighborhood, employment context, the community at large, and across national boundaries. As we plot examples of intervention research in this two-dimensional framework, it is easier to find examples of individual investigations with narrow breadth of scale. For example, we can find an intervention focused on the community but without elements of intervention directed toward specific individuals in the community. We can find many interventions directed toward individual arrestees but not toward the social groups of which the arrestees are members.

One of the challenges for those who seek to shape the future research agenda on drugs and crime will be to encourage broadband research that cuts across multiple levels of scale. This is not to say that we should eliminate narrow-band research because it often is necessary to solve a research problem through focus, and focus is one of the defining characteristics of narrow-band research. Nonetheless, as we look over some of the more exciting research projects now underway, we can see that the excitement is coming from the investigators' attempts to encompass more than one level of scale. These attempts deserve encouragement.

Before closing, we must turn to the empty spaces created in the circle but not included as part of the two-dimensional grid. Within these spaces, we have important drugs-crime research that does not fall neatly into the two-dimensional conceptual framework. I am thinking of the recent ethnographic studies of the gangs involved in drug sales (e.g., Levitt and Venkatesh, 1998), and some of the other recent innovative qualitative research on drug trafficking (e.g., Natarajan, Clarke, and Belanger, 1996; Natarajan and Belanger, 1998), which shed new light on the structure and organization of the criminal organizations that sustain drug supply and influence drug-related criminal offending around the world. There also are good recent examples of operations research focused on the organization and administration of criminal justice agencies and the deployment of law enforcement, prosecution, and judicial resources (e.g., see Maltz, 1996). To the extent that these investigations guide us toward useful evidence about prevention and control, and to the extent that they focus on individuals or small groups of individuals (e.g., in a city or State), they may be placed in the space on the left-hand side of the figure, between the grid and the surrounding circle. To the extent that these control-oriented investigations are directed toward international drug trafficking (e.g., see Montagne, 1990), they may be placed in the space on the right-hand side of the figure.

There are other research programs and initiatives that do not fall neatly within the two-dimensional grid presented in exhibit 9. Methodological research constitutes one set of examples (e.g., Wish et al., 2000; Harrison, 1997, 2001; Fendrich, 2001). Proposed new research on drug prices and a consumer product index for

One of the challenges for future research on drugs and crime will be to encourage broadband research that cuts across multiple levels of scale.

illegal drugs represents another set (e.g., see Manski et al., 2001).

As we move toward a new drugs-crime research agenda for NIJ and NIDA at the intersection of public health and criminal justice studies, it is important to remember the two major themes mentioned in the introduction to this paper:

- There is no single drugs-crime relationship. Rather, there are drugs-crime relationships, most of which are complex rather than simple.
- There is no simple solution to the complex challenges faced when drugs-crime relationships come into play.

The two-dimensional grid encircled in exhibit 9 offers no simple solutions to the complex challenges faced when drugs-crime relationships come into play. That grid is only a tool that may help us identify important gaps in the research evidence, gaps that must be filled as we work toward a more complete understanding of the drugs-crime relationship and more effective action plans that apply new understanding in the service of public health and safety. In an important sense, the empty spaces encircling the two-dimensional grid also can be useful tools as we try to identify and fill the gaps in evidence. These empty spaces can serve to remind us that no conceptual framework is all encompassing. We must "think outside the box" in this regard. If we organize our scientific resources simply to continue our current lines of research, we will not achieve lasting reductions in illegal drug use and drug-related crimes, and we will never lay claim to great victories in the service of public health and safety.

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Author's note

Valerie Forman coauthored the following sections: "Tension that involves approach or methods" and "Criterion/guideline 2: Biological or other theoretical plausibility." Correspondence concerning this paper should be addressed to James. C. Anthony, Electronic Collaboratory for Investigations About Drugs, JHU School of Hygiene and Public Health, 624 North Broadway, Room 893, Baltimore, MD 21205; e-mail *janthony@jhu.edu*.

Research on Drugs-Crime Linkages: The Next Generation

Robert MacCoun, Beau Kilmer, and Peter Reuter

Introduction

The association between drugs and crime in the public mind is so strong that a recent psychology experiment showed the word "drug" tightly linked to such words as "choke," "knife," "fight," and "wound" in participants' associative memory networks (Bushman, 1996). Although it is routine in academia to deride public ignorance of all things criminological, in this case the public is hardly deluded. Consider the following facts:[1]

- Across 35 cities in 1998, between 40 and 80 percent of male arrestees in the Arrestee Drug Abuse Monitoring (ADAM) Program tested positive for at least one drug at arrest (Arrestee Drug Abuse Monitoring Program, 1999).
- Nearly one-quarter (22 percent) of Federal prison inmates and one-third (33 percent) of State prison inmates—nearly 40 percent of State inmates convicted of robbery, burglary, or motor vehicle theft—reported being under the influence of drugs at the time of their offense (Bureau of Justice Statistics, 1997a, 1997b).
- Among State and Federal prison inmates, 27 percent of those serving sentences for robbery and 30–32 percent of those serving sentences for burglary said they committed their offense to buy drugs (Bureau of Justice Statistics, 1991a, 1991b).
- In the 70 percent of cases in which the victim formed an opinion, 31 percent believed the offender was under the influence of drugs or alcohol (National Crime Victimization Survey, 2000).
- A recent estimate of the economic costs of drug abuse reported that 60 percent were associated with crime and criminal justice (Harwood, Fountain, and Livermore, 1998).

Considerable complexities and nuances underlie these associations. Although many of these subtleties were anticipated by astute observers in the 1970s (see Gandossy et al., 1980), the past decade has seen a solid scholarly consensus form around the following principles (see Fagan, 1990; Parker and Auerhahn, 1998; White and Gorman, 2000):

1. Many different data sources establish a raw correlation between drug use and other criminal offenses. But correlation does not equal causation: In principle, drug use might cause (promote, encourage) crime; criminality might cause (promote, encourage) drug use; and/or both might be caused (promoted, encouraged) by some set of "third variables"—environmental, situational, dispositional, and/or biological. In fact, all three pathways have empirical support in at least some settings and populations.

2. These causal influences are probabilistic, not deterministic. Most drug users are not otherwise criminally active, and the vast majority of drug-using incidents neither cause nor accompany other forms of criminality.

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Nevertheless, drugs clearly play an important causal role in violent and property crime.

3. These causal influences are contingent, not unconditional. There is little evidence that drug use per se directly causes people to become aggressive in some direct and unconditional manner or that criminality per se causes someone to use drugs. The drugs-crime link varies across individuals, over time within an individual's development, across situations, and possibly over time periods (as a function of the dynamics of drug epidemics and, possibly, drug control policies).

4. That drug use can causally influence criminality does not necessarily implicate the psychopharmacological properties of the drug. Intoxication, the need or desire to raise money to buy drugs, and the nature of illicit markets are distinct mechanisms by which drugs can cause crime. Thus, drug prohibition cannot be only a *response* to drug-related crime, but it may also be a *causal antecedent* to some drug-related crime.

5. Alcohol is a drug, and it stimulates or augments a great deal of criminal behavior, almost certainly more than the street drugs combined.

We expect that understanding the considerable heterogeneity of effects across users, substances, cities, neighborhoods, and situations—and the interactions among these factors—will be the central focus of drugs-crime research during the remainder of this decade. This paper reviews the existing literature, focusing particular attention on Goldstein's (1985) taxonomy, the temporal dynamics of drug markets, and the consequences of prohibition. These highlight some of the questions that should drive this research.

Drugs-crime linkages: Expanding the Goldstein taxonomy

Goldstein's framework

Paul Goldstein's (1985) conceptual essay offered a tripartite classification of drugs-violence connections:

- **Psychopharmacological:** Violence due to the direct acute effects of a psychoactive drug on the user.
- **Economic-compulsive:** Violence committed instrumentally to generate money to purchase expensive drugs.
- **Systemic:** Violence associated with the marketing of illicit drugs, such as turf battles, contract disputes, and so on.

Goldstein and his colleagues (Brownstein et al., 1992; Goldstein et al., 1989; Goldstein, Brownstein, and Ryan, 1992) applied this scheme empirically to homicides in New York State (1984) and New York City (1988). They found that drugs and alcohol were important causes for a large share of all homicides in both samples. For 1988, near the height of the crack epidemic, they classified 53 percent of 414 homicides as drug or alcohol related; there was also a substantial percentage whose drug-relatedness could not be determined. Of those homicides that could be determined to be drug or alcohol related, 14 percent were psychopharmacological (68 percent alcohol, 16 percent crack), 4 percent were economic-compulsive, and 74 percent were systemic (61 percent crack, 27 percent powder cocaine). By contrast, in 1984, before the crack surge, only 42 percent of homicides were drug or alcohol related; 59 percent of those were psychopharmacological (79 percent alcohol), 3 percent were economic-compulsive, and 21 percent were systemic. The difference

between the findings of the two years might reflect differences in geography to some extent (New York State versus New York City), but it also reminds us that these numbers are not eternal verities; they result from complex and historically dependent market dynamics.

Subsequent applications

The generalizability of Goldstein et al.'s (1989) original findings was limited by their location (New York) and timing (the height of the crack explosion; see U.S. Sentencing Commission, 1995, 106).[2] Many studies have tried to determine whether crimes were drug related, but few have assessed whether the offender's drug need, drug use, or role in the drug market was directly responsible for the crime. Although most of the studies that used this framework were conducted by Goldstein and his colleagues in New York (Parker and Auerhahn, 1998), there are others worthy of attention, especially given their unique approaches. General findings include the following:

1. Non-NDRI (National Development and Research Institutes, Inc.) studies of New York City in the mid- to late 1980s found that crack sellers are more violent than other drug sellers and that their violence is not confined to the drug-selling context (U.S. Sentencing Commission, 1995, citing Fagan and Chin, 1990).

2. Studies of juvenile delinquents in Miami in the mid- to late 1980s found that they were much more likely to commit a drug-related economic-compulsive crime than a psychopharmacological or systemic crime (Inciardi, 1990).[3]

3. The per capita drug-related homicide rate remained fairly stable in Chicago from 1973 to 1984 and fluctuated from 1985 to 1995 (data are from the Chicago Homicide Dataset; Block, Block, and Illinois Criminal Justice Information Authority, 1998). Despite the fluctuations, the 1995 homicide rate was strikingly similar to the 1985 rate for all drug-related motives except for homicides that resulted from a drug transaction; the latter increased tenfold from 1985 to 1995.

4. Results from Lattimore et al.'s (1997) homicide study of eight cities, which included surveys of local officials and ADAM/UCR (Uniform Crime Reports) analyses for 1985–94, suggest that drugs other than cocaine and crack were not associated with homicide trends "in any discernible way." They also found that the drug market structure was less associated with violence than was expected.

The Lattimore et al. study questioned the role of crack and systemic crime because the crack markets were described as highly competitive in cities where the homicide rate was declining, increasing, or remaining the same (1997, p. 89). It is not clear, however, that the same conclusions could be drawn if disaggregated homicide rates (by circumstance) were considered. (Additional discussion and methodological descriptions of these studies are reported in appendix A.)

Limitations of existing research on the Goldstein framework

The Goldstein tripartite framework has been a boon to drug research reviewers—it is invaluable as an organizing scheme—but still, we are struck by the relative rarity of actual empirical applications. Existing applications overrepresent New York, and they overrepresent the crack epidemic at its height relative to earlier and later periods. In fairness, the taxonomy was not proposed until 1985, but it could be applied retrospectively to earlier homicide case files. In our view, such comparisons

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The prevailing view about psychopharmacological (as opposed to economic-compulsive or systemic) violence is that it is rare and attributable mostly to alcohol rather than illicit drugs.

would be invaluable. There has been little consistency in the methods used to implement the scheme (e.g., Goldstein's trained coders versus Inciardi's survey approach). Little has been learned from that methodological diversity because, to our knowledge, no two methods have ever been applied to the same sample of cases for comparative purposes. Indeed, if one imagines a three-dimensional matrix of major cities by time periods by methods, almost every cell is empty and there are almost no vectors with more than one cell occupied. This spotty record makes it hard to identify either temporal trends or the influence of local variations on drug popularity, drug market structures, or policies and enforcement practices. Finally, the scheme has been applied mostly to homicide and less often to other, more prevalent violent crimes.[4]

Parker and Auerhahn (1998) complain that Goldstein's categories are not mutually exclusive. This critique presumes a classical set-theoretic approach that, in our opinion, is neither feasible nor scientifically useful for drugs-violence research. Mutually exclusive categories are not necessary for scientific classification (Meehl, 1995), and they are usually impossible to achieve using sparse and noisy archival data (Ragin, 2000). But we agree with Parker and Auerhahn's (1998) contention that "the Goldstein tripartite framework . . . is not treated as a set of testable propositions but rather as a set of assumptions about the nature of drug- and alcohol-related violence."

In our view, an understanding of the taxometric properties of drug-related violence ought to emerge inductively from more fine-grained coding of the underlying features of these events—whether various drugs were found as evidence, the results of toxicology on the offender and the victim, various features of witness reports, prior record information, and so on. Because each property or attribute would be coded separately, there would be no effort to force events into a single classification. Psychometric analysis could be used to test the hypothesized latent structure.[5] Such analyses pose enormous logistical difficulties, but the payoffs for advancing our understanding of drug violence would surely justify the effort.

In the remainder of this section, we will examine other ways in which Goldstein's taxonomic scheme might be expanded and refined.

Psychopharmacological violence

The prevailing view about psychopharmacological (as opposed to economic-compulsive or systemic) violence is that it is rare and attributable mostly to alcohol rather than illicit drugs (Fagan, 1990; Parker and Auerhahn, 1998; White and Gorman, 2000). According to Fagan (1990, p. 243):

> [I]ntoxication does not consistently lead to aggressive behavior . . . only limited evidence that consumption of alcohol, cocaine, heroin, or other substances is a direct, pharmacologically based cause of crime.

According to Parker and Auerhahn (1998, p. 306):

> Our review of the literature finds a great deal of evidence that the social environment is a much more powerful contributor to the outcome of violent behavior than are pharmacological factors associated with any of the substances reviewed here.[6]

The Goldstein et al. (1989) analysis provides some support for these claims; only 14 percent of the drug-related homicides appeared to be psychopharmacological, and these largely involved alcohol either alone or in combination with other drugs. But one in seven is hardly a trivial fraction,

and those results reflect the peak of the crack market wars, when systemic homicides were occurring in unprecedented numbers, inflating the denominator.

Moderators. Examining the literature cited in many recent review essays, it is difficult to avoid the suspicion that some authors hold neuropharmacological factors to a stricter standard of proof than the sociological factors under study. If the psychopharmacological claim is that marijuana, heroin, or cocaine ingestion directly promotes violent behavior absent any situational provocation or stressors, then that claim is probably false. But evidence for Drug × Situation and Drug × Psychology interaction effects hardly exonerates drug use as a causal factor. It may be that no drug is sufficient to produce aggression in isolation from psychological and situational moderators. But it seems clear that some drugs—certainly alcohol—can amplify the psychological and situational facilitators of aggression. Relevant moderators (see Bushman, 1997; Fagan, 1990; Ito, Miller, and Pollock, 1996) include:

- Situational stressors and frustrators (see Ito, Miller, and Pollock, 1996).
- Expectancy effects: personal and cultural beliefs about the effect of the drug on behavior, and local norms about tolerable versus unacceptable conduct when under the influence (e.g., Critchlow, 1986; Stacy, Widaman, and Marlatt, 1990).
- Disinhibition (e.g., Parker and Auerhahn, 1998; but see Fagan, 1990).
- Impaired cognitive functioning, including reduced executive functioning (self-control and decisionmaking ability; Fishbein, 2000; Giancola, 2000), reduced attention to situational cues (Steele and Josephs, 1990), and reduced self-attention (Ito, Miller, and Pollock, 1996).
- Social threats to self-identity or self-esteem (Baumeister, Smart, and Boden, 1996) that seem particularly relevant in "cultures of honor" (see Anderson, 1994; Bourgois, 1996; Cohen et al., 1996).

Moreover, the absence of evidence does not equal evidence of absence; the laboratory literature on drugs and aggression is simply too spotty at present to permit any firm conclusions. Almost the entire experimental literature on moderators of the drugs-aggression relationship has examined alcohol rather than illicit drugs.

The absence of evidence does not equal evidence of absence; the laboratory literature on drugs and aggression is simply too spotty at present to permit any firm conclusions.

Comorbidity: Drugs in association with mental illness or alcoholism. A second potential class of moderators of the drugs-aggression link involve comorbid conditions—substance abuse in tandem with schizophrenia or other psychoses, personality disorders, or alcoholism. Numerous studies have identified a high prevalence of illicit substance abuse among individuals diagnosed with psychiatric disorders (e.g., Compton et al., 2000; Kessler et al., 1996; Mueser et al., 2000).[7] The causal nexus of these comorbid conditions is unclear. The MacArthur Violence Risk Assessment Study (Steadman et al., 1998), a prospective followup study of clients admitted to acute psychiatric inpatient facilities, found that substance abuse increased the probability of violent behavior, but this was true for both psychiatric patients and matched community controls. Neither drug dependence nor psychiatric illness predicted subsequent violent crime in a 6-year followup of released jail detainees (Teplin, Abram, and McClelland, 1994).

Drug use and victimization[8]

Increased victimization provides another mechanism by which drugs can become linked with violence. Although this category can be subsumed under Goldstein's psychopharmacological category, treating it as a fourth category might have merit because the causal mechanisms differ and it has been largely neglected by researchers. There are a number of reasons to expect that drug users ought to be particularly vulnerable to criminal victimization, especially when intoxicated. First, intoxicated people often appear (and sometimes are) more vulnerable than other targets for such offenses as robbery, rape, or hate crimes. Second, intoxicated people are often obnoxious, annoying, and/or offensive in their appearance, conduct, and speech. Third, intoxication makes people's conduct unpredictable and ambiguous—intoxication impairs the perception of signals, but it also impairs the transmission of clear signals to others. Finally, in an active illicit drug market, drug sellers are sometimes both intoxicated and flush with cash.

Fagan (1990) notes that the vulnerability of drug users to victimization has been long recognized. For example, Wolfgang (1958) studied "victim-precipitated homicides" by assessing the incidence of intoxication among victims. And Fagan (1990) reviews evidence from animal studies showing that "substances that induce changes in an opponent's behavior might result in increased aggression by a drug-free attacker . . ." (p. 251).

Although Goldstein (1985) acknowledged that the victimization of drug users constituted a distinct drugs-violence linkage, he did not include it as a separate category in his classification scheme. Since then, the victimization of drug users has received little attention in the drugs and crime literature. This is not surprising given how difficult it is to assess the relationship. First, as Goldstein (1985) argues, it is difficult to obtain this information because victims do not want to talk to the police while intoxicated and often do not remember the details of the offense; thus, it may go unreported. Second, the victimization surveys that ask about substance use usually include it as a predictor but do not ask whether it contributed to a specific event. Third, many of these surveys only ask about (or report) general drug use, not about specific drugs or the circumstances of their use. Finally, the label "victim" is often problematic when the participants are codisputants; indeed, the "victim" may have initiated the provocation. In our view, these concerns are valid, but they do not undermine the importance of victimization as a research topic.

The ubiquity of alcohol has made it the subject of victimization work for 50 years, and there is general agreement about its role in victimizations, especially sexual assaults. The research on drugs is not as robust, but there are some important findings that should be addressed in future works on drugs and crime. The following sections provide insight about this relationship by examining existing victimization studies of the general population, women, and hard drug users.

The general population. The Nation's largest victimization survey, the National Criminal Victimization Survey (NCVS), does not ask about victim drug use, but it is used in conjunction with other data to provide insight about drugs and crime. Using NCVS, Markowitz's (2000) multivariate analysis of almost 450,000 observations found that marijuana decriminalization (a proxy for lower marijuana prices) will result in a higher incidence of robbery and assault while higher cocaine prices will decrease these crimes.[9] Neither measure was significantly related to rape or sexual assault. When victims' perceptions of

offender drug and alcohol use during assaults were used as the dependent variable, the significance of marijuana decriminalization and cocaine prices was ambiguous (significance depends on model specification). For perceived use during robberies, neither was significant. Although Markowitz suggests the perception variable is questionable because of underreporting, these findings raise questions about the causal relationship and the role of drug use by victims, especially marijuana.

Based on an instrument similar to NCVS, Fisher et al.'s (1998) survey of 3,472 randomly selected college students found that regularly taking recreational drugs predicted an increased likelihood of a violent victimization but not of a theft victimization. For the general population, Cottler et al.'s (1992) survey of a probability sample of 2,663 household residents found that those who had used cocaine or heroin more than five times in their lives were more than three times as likely to have experienced a physical attack than nonusers. Those who used marijuana more than five times (no use of other drugs) and those who used pills or hallucinogens more than five times were no more likely to have experienced a physical attack than nonusers. This is one of the few studies that presents its results by drug and raises questions about the situations in which hard drug users put themselves.

Women. Much of the victimization research focuses on women because many of the studies are about sexual assault. Fisher, Cullen, and Turner (2000) randomly selected 4,446 college women to participate in their National College Women Victimization Study. That study did not find that marijuana use was a significant predictor of sexual victimization and stalking.[10] These findings are consistent with Markowitz's claim that the price of cocaine and marijuana are not significant predictors of sexual victimization.

Beyond using prices and self-reports, some researchers have drug-tested rape victims to assess their drug use. Hindmarch and Brinkmann (1999) found that 41 percent of the 1,033 participants tested negative for alcohol and other drugs, 37 percent tested positive for alcohol, 19 percent tested positive for cannabinoids, and 0.6 percent tested positive for flunitrazepam (Rohypnol); however, the lack of information about participant characteristics and site locations would prevent researchers from creating the necessary control groups.

Drug users. Tardiff et al. (1994) found that 31 percent of one sample of homicide victims tested positive for cocaine metabolites. This rate did not vary for firearm deaths versus nonfirearm deaths. McElrath, Chitwood, and Comerford (1997) surveyed 308 intravenous drug users who were receiving methadone and/or inpatient drug treatment about their victimization and drug use in the previous 6 months. Those reporting heroin use were significantly less likely to be victims of violent and property crimes. McElrath et al. argue that heroin users sometimes have "running partners" who may also look out for each other, thus decreasing victimization. Crack cocaine users were four times as likely to be victims of property crime than nonusers, leading the authors to suggest, "it is possible that the drug-seeking behavior associated with crack-cocaine places users in contact with a larger pool of motivated offenders."

Drug-user-on-drug-user crime was also addressed in Inciardi's delinquency study (1990). Respondents were asked about not only drug-related offenses they committed but also drug-related victimizations; 4.6 percent reported being victims of psychopharmacological-related crimes, 39.9 percent reported being victims of drug robberies, and 9.0 percent reported being victims of systemic violence.

Although every youth in the survey used at least one drug daily, it is not clear whether the victimizations occurred while the victim was under the influence.

Crime victim surveys and offender surveys require respondents to make attributions about the causes of offenders' behavior. Such causal attributions are susceptible to numerous well-documented biases (e.g., Nisbett and Ross, 1980), but to date there has been little methodological work validating these survey responses.

Economic-compulsive violence

Arrested and incarcerated offenders report that they committed their offenses to raise money to purchase drugs. Of course, this might be a convenient rationalization or excuse for antisocial behavior. Should we believe them?

At least for heroin addiction, the answer is probably yes. Studies of heroin "careers" show that the frequency of criminal activity tends to covary with periods of intense use (see Fagan, 1990, for review), and addicts significantly reduce their criminal involvement during periods of methadone maintenance (see review in Rettig and Yarmolinsky, 1995). But in studies applying the Goldstein taxonomy (see above), economic-compulsive criminality has been relatively rare. White and Gorman (2000) argue, "[B]ecause there is more money in crack distribution than in previous illegal drug markets, drug dealing may have obviated the need to commit property crimes and income-generating violent crimes" (p. 189). Indeed, in our survey of drug sellers in Washington, D.C., in the late 1980s (Reuter, MacCoun, and Murphy, 1990), more than 40 percent reported keeping some drugs for their own consumption—39 percent of crack sellers and 69 percent of heroin sellers. However, the claim about the high returns for crack selling is probably no longer correct. Bourgois (1996) reports that proceeds from crack sales by experienced users who could not maintain legitimate jobs were less than minimum wage.[11]

But the argument that drug selling has replaced other income-generating crime might reflect limitations of recent work. First, as we have noted, most studies applying the Goldstein framework were conducted at the peak of the crack epidemic, when the sheer prevalence of street drug sales was probably at an all-time high (see Saner, MacCoun, and Reuter, 1995). Second, most studies have largely examined crimes with violent outcomes rather than robberies or burglaries in which no homicide occurred. One exception is the Caulkins et al. (1997) study, which attributed a substantial fraction of robberies and burglaries to economic-compulsive crime, and a sizeable fraction of those economic-compulsive crimes to cocaine.

The ADAM Program provides some opportunities for studying these issues (e.g., Arrestee Drug Abuse Monitoring Program, 1999). The ADAM/DUF (Drug Use Forecasting) instrument was modified in 1995 to include a question asking whether the arrestee needed drugs or alcohol at the time of the offense.[12] Appendix B summarizes data for the period 1995 to 1999 for this survey item. As one would expect, these attributions are more common for income-generating offenses (14 percent) than for non-income-generating offenses (10 percent)—a reliable but quite modest difference.

Our understanding and interpretation of economic-compulsive crime ought to evolve as the scientific understanding of drug dependence evolves. Recent decades have seen great progress in the understanding of such phenomena as tolerance, withdrawal, reinforcement, and drug craving (see *Science,* 1997). Leshner (1997, pp. 45–46) notes that many assume the following:

> [T]he more dramatic the physical withdrawal symptoms, the more serious or dangerous the drug must be. This thinking is outdated . . . many of the most addicting and dangerous drugs do not produce severe physical symptoms upon withdrawal. . . . What does matter tremendously is whether or not a drug causes what we now know to be the essence of addiction: compulsive drug seeking and use, even in the face of negative health and social consequences.

There are also intriguing new findings from behavioral economics research on the price elasticity of demand for cocaine and opiates—the percentage decline in demand for a 1-percent increase in price. The conventional wisdom is that addicts are relatively insensitive to price, at least in the short run, because they are enslaved to their drug and must find ways to obtain it to avoid withdrawal symptoms. If addicts were relatively insensitive to price, one would expect price increases to produce increased economic-compulsive crime. But recent studies (reviewed in Caulkins and Reuter, 1996) suggest considerable price sensitivity, with elasticities for cocaine ranging from –0.7 to –2.0. A possible explanation for the high elasticity among heavy users is that they spend most of their earnings on the drug and may respond to the increased difficulty of maintaining desired consumption levels (i.e., avoiding withdrawal) by seeking treatment.

Systemic violence

The third of Goldstein's categories is systemic violence. This has been narrowly interpreted as referring to struggles for competitive advantage. We suggest here that drug markets generate violence in a variety of ways and that market violence varies systematically over time and place.

A brief history of the markets. There was an epidemic of initiation into heroin use in the 1970s; after that, heroin initiation rates remained low until the late 1990s. The number of heroin addicts (a function of the number of initiates and the length of their addiction careers) remained fairly stable at about 750,000 from 1981 to 1997.[13] During that period, most heroin purchases were made by an aging cohort of experienced users.

Powder cocaine and crack had a similar dynamic, only with different parameters. Powder cocaine initiation rates were high from about 1975 to 1988; the number of dependent users has been quite stable since about 1988. The crack epidemic came later, from about 1982 to 1990 (depending on the city; see Blumstein and Cork, 1996). Estimates of the number of dependent users of either crack or powder cocaine range from 600,000 to 3,600,000 (see Rhodes et al., 2000).

Many retailers are now also frequent users (Arrestee Drug Abuse Monitoring Program, 1999). Selling seems to be opportunistic for many users; sudden access to an unusually large source of cash may lead a regular buyer to become a seller for a day. Thus, at the low end of the market, it may be difficult to distinguish systemic from psychopharmacological violence.

Enforcement against these markets, as measured by years of jail time per ton of drugs, probably declined through the early 1980s but then intensified from 1985 onward. In 1990, the Colombian government aggressively attacked the principal exporters of cocaine from Colombia. There are a number of indications that this led to a temporary tightening of the cocaine market; otherwise, prices have declined throughout the period, while consumption has been declining modestly since 1988.

Conceptual issues. The markets for illegal drugs operate without the usual protections against fraud and violence offered by the civil tort system. The state, instead of attempting to facilitate transactions, aims to disrupt them. Contracts cannot be enforced through written documents and the legal system; agreements are made hurriedly, sometimes in ambiguous code, and orally.[14] Territories cannot be allocated through bidding for desirable locations because there is no enforceable ownership of property for these purposes.

Yet the illegality itself is insufficient to generate high levels of violence in the market. Prostitution, although frequently unsightly and sometimes a nuisance, does not generate much by way of additional violence. Bookmaking, notwithstanding the drama of the film "The Sting," was also a generally peaceful affair; bookies were more likely to die in bed than on the job. Even for some drugs, the markets generate little violence; marijuana in general does not spark much injury as the result of competitive or transactional disputes.[15]

Some drug markets, however, are clearly violent; many participants are at risk of being killed or seriously wounded by others in the same business, either as buyers or sellers, and there are unintended shootings of innocent bystanders. The crack market is thought to be particularly prone to market-related violence.

Why are these drug markets, particularly for crack, so violent? We suggest that four factors contribute:

1. *The youth of participants.* Rates for violent crime peak early, at about ages 18–22. The young are particularly likely to lack foresight and thus engage in violence to settle disputes. The crack market was the first mass drug market in which most of the sellers were young.
2. *The value of the drugs themselves.* The cocaine that fills a plastic sandwich bag is worth thousands of dollars. The return to sudden, situational violence could be very high.
3. *The intensity of law enforcement.* Transactions are conducted under considerable uncertainty as a consequence of increased law enforcement. Intensified enforcement increases the incentives for violence by raising the adverse consequences of identifying someone as a potential informant.
4. *The indirect consequence of drug use.* Users are more violent and aggressive, and this encourages dealers to prefer selling out of doors or in highly protected settings. It also promotes unreliable behavior among user/dealers and thus more retaliation by their suppliers.

It is probably the combination of these factors, rather than any one of them, that accounts for the extraordinary violence associated with crack markets in the late 1980s. That violence seems to have fallen substantially in the late 1990s, perhaps reflecting the aging of participants in crack markets (Golub and Johnson, 1997), although violence itself, as well as enforcement, may also have selected out the most violent participants; Taylor, Caulkins, and Reuter (2000) present a model in which violence declines with more intense enforcement as a consequence of selective incarceration.

Competitive and internal violence. Attention has been given to violence generated by competition between sellers. Less attention has been given to violence within selling organizations, although the older literature on organized crime and illegal markets reported a great deal on this (e.g., Block, 1980).

Criminal organizations are hindered internally by lack of access to the civil courts. Employment contracts cannot be enforced except privately. Managerial succession is complicated by the specificity of reputation within the organization; a promising midlevel manager cannot readily provide evidence of performance to another potential employer so higher level managers get weaker market signals and may withhold deserved promotions or merit increases. This gives incentives to lower level agents to use violence for upward mobility.

Symmetrical with successional violence is disciplinary violence. Managers have reason to fear subordinates who can provide evidence against them; the longer lasting the relationship, the greater the potential for harm from informing. Thus, managers may use violence as a tool to reduce risks of informing. They have more incentive for doing so than do high-level dealers in transactions with low-level dealers because the information about these acts will spread more rapidly and extensively.[16] There are numerous stories of this kind of violence in Colombian drug-dealing organizations.

Thus, the violence in atomistic markets has different sources than that in markets serviced by larger selling organizations. Which generates greater violence from a given set of participants cannot be determined theoretically, but some of the decline in market-related violence may reflect changes in organizational structure.

Other market characteristics and violence. Exhibit 1 presents a simple classification of markets according to whether buyers and sellers come from the neighborhood or elsewhere. We believe that this taxonomy, originally identified for purposes of analyzing vulnerability to enforcement (Reuter and MacCoun, 1992), may also be useful in the study of violence. Markets characterized by mostly resident dealers and customers are labeled *local markets. Export markets* are ones in which residents of the neighborhood sell drugs to nonresidents. Markets in which mostly nonresident dealers sell to local residents are characterized here as *import markets.* Finally, markets in which both sellers and customers are mostly nonresidents are labeled here as *public markets* because they tend to occur at such large public locations as parks, train or bus stations, or schoolyards.

Each class of market differs in the potential for violence. Local markets, precisely because they involve buyers and sellers who know each other, do not lend themselves to territorial competition. At the other extreme are public markets, in which buyers and sellers cannot readily find each other except at specific locations; the incentives for territoriality are consequently greater.

The violence in atomistic markets has different sources than that in markets serviced by larger selling organizations.

Exhibit 1. Types of illicit drug markets

	Customers	
Dealers	**Mostly residents**	**Mostly outsiders**
Mostly residents	Local market	Export market
Mostly outsiders	Import market	Public market

The case for crack's role in the crime rise is quite compelling; its role in the post-1993 decrease is more subtle.

Transactional violence may also vary in these dimensions. Local markets discourage cheating of buyers as a consequence of the ongoing connections between buyers and sellers; a local customer is more likely to spread information effectively to other potential customers than one who has little connection to other buyers. It is not clear whether much of the transactional violence comes from buyers, as opposed to associates and rival sellers.

If this is correct, then the maturation of cocaine and heroin markets will tend to reduce market-related violence by reducing the size of all but local markets. Moreover, as a result of the dissemination of beepers and cell phones, an increasing share of cocaine transactions may be occurring in locations (apartments, restaurants, offices) that are agreed on by the buyer and seller for their mutual convenience. Johnson, Golub, and Dunlap (2000, p. 191, table 6.1) report that in New York City in the 1990s, the "seller style" included phone and delivery services as well as freelancers. Poor and socially isolated cocaine users still frequently conduct transactions in exposed locations, chosen precisely because they facilitate the coming together of buyers and sellers. So probably do many heroin addicts, given their generally impoverished state. The ability to choose locations on the basis of specific situational need not only reduces territorially motivated violence but also reduces the vulnerability of buyers to robbery and other victimization because fewer of them need to congregate at specific locations, which thus become less attractive to predators.

The temporal dynamics of drug markets

In the past several years, numerous authors have examined the emergence and decline of crack markets as a key factor in the steep rise in American violence from 1985 to 1990, and the even steeper drop since 1993 (see Blumstein and Wallman, 2000). In our view, the case for crack's role in the crime rise is quite compelling; its role in the post-1993 decrease is more subtle and by no means an open-and-shut case.

Many discussions of the crime drop fail to distinguish between a decline in the crack market and a decline in the linkage between crack and crime—but a decline in the crack-crime link is part of the crime drop outcome to be explained. It is true that DUF (and now ADAM) data show declines in positive cocaine tests among arrestees in many cities (e.g., Arrestee Drug Abuse Monitoring Program, 1999). And the reduced violence attributable to crack selling has made crack markets less visible. But nationwide, hardcore cocaine use remained surprisingly stable during the 1990s (Rhodes et al., 2000). Indeed, from 1990 to 1998, there were rising cocaine mentions in emergency rooms (Substance Abuse and Mental Health Services Administration, 2001) and rising cocaine seizures. Nevertheless, recent multicity comparisons (Baumer et al., 1998; Lattimore et al., 1997) indicate reliable positive correlations between various indices of crack use and homicide and other offense rates.

Various experts have suggested that the changing dynamics of drug markets may matter as much or more as any decline in total market activity (e.g., Ousey and Lee, 2000). Below, we consider a few more complex accounts of the link between crack market dynamics and violence.

NDRI'S conduct norm account. Johnson and his colleagues at NDRI (Lipton and Johnson, 1998) have produced a valuable interdisciplinary, multimethod program of research on street drug markets in New York, spanning several decades. They

recently offered an account of the decline in drug-related violence based on the notion of "conduct norms" (Johnson, Golub, and Dunlap, 2000), arguing that New York street drug markets have passed through three phases. (They vacillate between "period" and "cohort" versions of the story.) The "heroin injection era" peaked during 1960–73; the "cocaine/crack era" peaked during 1984–89; and the "marijuana/blunts era" started around 1990. Associated with each era are distinct birth cohorts with distinctive behavioral patterns. "HeroinGen" drug users (born 1945–54) were active in drug sales and property crime, but gun use was relatively rare. "CrackGen" drug users (born 1955–69) frequently participated in robbery and used guns for protection and reputation. Finally, "BluntGen" drug users (born 1970–79) are less likely than early cohorts to engage in violence.

Drawing on their rich ethnographic database, Johnson and colleagues (2000) argue that these behavior changes reflect two successive transformations of conduct norms for appropriate behavior in the drug-using community. For example, in CrackGen's "Subculture of Assault," a shared norm counseled: "Be aggressive and threatening to avoid robbery. . . . Carry weapons for protection. . . . Threaten or assault those who attempt to sell crack in your territory. Maintain your reputation as dangerous, tough, and 'crazy,' regardless of the physical harm inflicted or suffered" (p. 181). But for the BluntGen, the norm states: "Don't use crack. Crackheads are s—! . . . Addicts are the scum of the earth. Stay safe, stay alive. Don't mix cocaine or heroin with my marijuana. Shun and exclude heroin and crack users from peer groups" (p. 185).

This norm account is fascinating and quite plausible. From a policy perspective, it would be tremendously useful to find a way to preserve and promote the BluntGen's more pacifist stance (though not, of course, their consumption of blunts). Still, the evidence is causally ambiguous. Are these conduct norms actually *causes* of the decline in violence during the 1990s, are they *descriptions* of it, or are they *consequences* of it?

There is little doubt that conduct norms exist and are important in shaping deviant behavior. Cialdini, Kallgren, and Reno (1991) make a useful distinction between *injunctive norms* (what others think I should do) and *descriptive norms* (what others are actually doing). There is ample evidence that purely descriptive norms—changes in the local prevalence of a behavior—can have a self-reinforcing action. But attitudes and norms are shaped by behavior as well as shaping it; research on cognitive dissonance theory and self-perception theory suggest that such conformity-based behavioral changes will tend to produce corresponding (but retrospective) changes in relevant attitudes (see Eagly and Chaiken, 1993). Controlled social psychology experiments show that norm diffusion effects occur and that they can be strong, but these experiments also show that apparent norm effects are sometimes spurious (e.g., Kerr et al., 1987).

Clearly, research on drug-using norms cannot move to the laboratory—although one can imagine informative scenario-based experiments embedded in field interviews. But it would be enormously useful to make additional use of the NDRI data (and related data sources, such as the Office of National Drug Control Policy's *Pulse Check*), linking the timing of the ethnographic material more precisely to month-to-month quantitative archival data on drug selling (or its proxies) and violent crimes. Furthermore, archives of ethnographic data collected in different cities during the past decade might be reanalyzed to search for cross-city norm differences that might correlate with cross-city differences in violent crime. Ideally, one

The linkage between drug selling and gun possession is well established.

might develop methods for identifying "leading indicators" of emerging trends in drug using, drug selling, and drug-related violence.

Blumstein and Cork's drug-gun diffusion account. In a series of articles (see Blumstein, 2000a; Blumstein and Cork, 1996; Cork, 1999), Alfred Blumstein and his collaborator Daniel Cork hypothesize a causal chain linking the late 1980s crack epidemic to rising violence nationwide. According to Blumstein, the 1980s growth in illicit drug markets, together with stringent enforcement crackdowns, led to the recruitment of juvenile drug sellers. The intense market competition together with the recruitment and rewarding of particularly aggressive youths created a need for sellers (as well as nonseller youths in market neighborhoods) to be armed. This increased demand fueled an expansion in the illicit gun market and a diffusion of guns. The linkage between drug selling and gun possession is well established (see Decker, Pennell, and Caldwell 1997; Sheley, 1994; Tardiff et al., 1994).[17] Cork (1999) found support for the temporal sequence of the Blumstein account using a sophisticated diffusion modeling analysis of time-series data from multiple cities.

The Blumstein model is a compelling account of the rise of violent crime, but more work is needed to establish its explanatory power as an account of the subsequent decline in violence. The model is not inconsistent with that decline—a decline in the crack market should have reduced the need to be armed—but future research will have to assess whether declines in the prevalence of drug selling (as opposed to changes in other features of the markets) have produced reductions in the likelihood of gun possession and gun violence.

The maturation of addicts and of illicit drug markets. Because of reduced initiation rates, it appears that the hardcore cocaine-using population consists mostly of an aging cohort who started using in the late 1980s, in much the same way that heroin addicts disproportionately belong to cohorts who initiated use in the 1970s. If this is correct, drug-related criminality should continue to decline, absent new waves of initiation, as addicts "mature out" of violent crime or die from drug-related illnesses or natural causes.

Many observers were struck by the violence of 1980s crack markets relative to earlier heroin and marijuana markets. Many have speculated that such markets "mature" over time as (a) dealer territories are firmly established, (b) casual users drop out of the market, and (c) hardcore users establish reliable dealer connections. All these factors suggest a shift from open-air public markets toward more clandestine arrangements that seem less prone to violence.[18] But at present, this is largely speculative; there is anecdotal and ethnographic evidence for such changes but little systematic longitudinal research that establishes a clear trajectory over time.

The consequences of prohibition and its enforcement

Drug involvement as crime

The convention in articles on drugs-crime linkages is to state that for the purposes of the essay, the fact that drug use (and sometimes drug selling) per se is a crime is not relevant to the analysis. But the illicit status of street drugs is vitally important to the analysis in several ways. First, drug prohibition is arguably necessary for Goldstein's category of systemic (market-related) violence (MacCoun and Reuter, 2001).[19] We simply do not observe routine violence among alcohol or tobacco vendors. Second, Goldstein's economic-compulsive violence, although not caused

by prohibition, is surely exacerbated by it because drug prohibition almost certainly raises the price of heroin or cocaine far above what would be their retail market prices (MacCoun and Reuter, 2001). Finally, there are reasons to believe that the illicit status of drugs might have subtle criminogenic effects through several different mechanisms, including forbidden fruit effects, labeling or stigmatization effects, and "stigma swamping."[20] Here we highlight two such mechanisms.

Incapacitation and replacement effects. Several authors (e.g., Blumstein, 2000b; Freeman, 1996; Kleiman, 1997) have suggested that the incarceration of drug sellers is likely to produce a weaker incapacitation effect than would occur for other offense categories, such as property and sex offenses. Indeed, some have speculated that a *replacement* process might even produce a net increase in the prevalence of drug selling. In a highly competitive illicit market, the incarceration of a drug seller creates lucrative drug-selling opportunities (customers and sales territory) for others. According to Blumstein (2000b):

> The pathological rapist's crimes almost certainly are not replaced on the street, and so one can expect his full array of crimes to be incapacitated. . . . A burglar's crimes may be replaced if he is serving a fence, who would recruit a replacement; alternatively, if he is simply operating on his own, the crimes are not likely to be replaced. And the participant in organized vice activity such as drug dealing would be likely to have his transactions replaced by whatever organizational structure is serving the market demand. That replacement could be achieved by some combination of recruiting new sellers or by increasing the rate of activity of sellers already active in the market.

Freeman (1996) offers a formal economic model that interprets this replacement effect in terms of the elasticity of supply of dealers with respect to drug market wages. The supply of dealers should reflect this sensitivity to wages as well as changes in earnings opportunities in the licit market (i.e., shift in the supply curve) and the demand for drugs (i.e., shifts in the demand curve).

At present, there is surprisingly little evidence either for or against the replacement hypothesis. One indirect argument for its plausibility is that the explosive growth in the incarceration of drug sellers during the past decade was not accompanied by increases in street cocaine prices, as one might expect if the supply of street dealers was tightening (Blumstein, 2000b; see also DiNardo, 1993). Indeed, street prices have dropped substantially (Rhodes et al., 2000). Another indirect argument is the sheer prevalence of drug market participation in some communities during the late 1980s, when drug sellers were being incarcerated at record levels. For example, Saner et al. (1995) estimated that in Washington, D.C., during 1985–91, nearly one-third of African-American male residents from the 1964–67 birth cohorts were charged with drug selling.

Statistical analyses of archival data might test the replacement hypothesis by looking for evidence of increases in the initiation to drug selling as a function of the arrest and incarceration of dealers. Ethnographic studies might examine whether recruitment activities increase following police crackdowns and whether existing street dealers increase their activity. But isolating replacement effects will be tricky; note that general deterrence and replacement effects, if they exist, will offset each other, which may make it hard to find *any* effect of sanctions on subsequent dealing.

Police tactics designed to reduce the supply of drugs (and of drug suppliers) may or may not be the most effective means of reducing the total social harm caused by street drug selling.

Can enforcement amplify violence? Several authors (Eck and McGuire, 2000; MacCoun and Reuter, 2001, chapter 6; Reuter, 1989; Riley, 1998) have argued that under certain conditions, aggressive drug enforcement might actually increase drug-related violence. Rasmussen, Benson, and their associates have examined whether more intense drug enforcement increases violent crime; much of this work is summarized in Rasmussen and Benson (1994). The mechanisms involved are quite varied. For example, enforcement might lead to more violence in competition. Benson and colleagues (1992) found that the violent crime rate in a community increased with more drug arrests in a neighboring community. This, they argue, is a displacement effect; dealers move from the targeted community to the neighboring one and struggle over the establishment of territories. Another mechanism works through the limited capacity of the correctional system; increased prison space for drug offenders reduces the penalties for other crimes, including violent crimes, and thus induces higher victimization. Benson and Rasmussen (1991) argue that, even assuming that prison is effective only through incapacitation and not deterrence, the observed rise in the resources devoted to drug enforcement in Florida in the 1980s might have increased other crime by 10 percent.

Supply reduction versus violence reduction. An important dialogue with respect to drug users involves the prospects and tensions of integrating use reduction strategies with harm reduction strategies (MacCoun, 1998; MacCoun and Reuter, 2001). We see an analogous issue with respect to the policing of drug markets (MacCoun and Reuter, 1994). Police tactics designed to reduce the supply of drugs (and of drug suppliers) may or may not be the most effective means of reducing the total social harm caused by street drug selling. Some tactics might directly reduce drug-related violence.

One example involves efforts to drive dealers indoors (see Kennedy's 1993 analysis of Tampa's QUAD program). Of course, crack houses are not without their harms. In an ethnographic study of the crack market in Detroit, Mieczkowski (1990, p. 90) concludes that "tavern-style crack houses may encourage and make possible hypersexuality among participants and thus increase the STD and HIV rates. The use of barter as a supplement to a cash economy in the crack trade represents further complications in creating social policies in reaction to this behavior." Still, indoor markets are likely to be less violent. But the effects are multiple and hard to balance. On one hand, indoor markets are less susceptible to police surveillance or sting operations. On the other hand, driving dealers indoors might increase users' search costs (Moore, 1990) and thus reduce demand. Consumers in export markets would bear a disproportionate share of these search costs because the locals often know the local dealers and could easily locate them. This might lead to new local markets in the areas from which the export consumers are coming and the associated neighborhood violence that Benson et al. (1992) examined. Further research on these issues is needed.

Heroin maintenance. If the drugs-crime link is mediated by the high price and conditions of sale of a drug, and if a relatively small number of frequent users are responsible for much of the crime, then perhaps allowing access to that drug legally for those least able to quit might reduce associated crime. There is increasing information and interest in exploring just this possibility for heroin (see MacCoun and Reuter, 2001).

In January 1994, Swiss authorities opened a number of government-administered heroin maintenance clinics.[21] Registered addicts can inject heroin at a government clinic under the care of a nurse up to three times a day, 7 days a week. Patients have to be over 18, have injected heroin for 2 years, and have failed at least two treatment episodes. By the end of the initial research trials of this program, more than 800 patients had received heroin on a regular basis without any leakage into the illicit market. No overdoses were reported among participants while they stayed in the program. A large majority of participants had maintained the regime of daily attendance at the clinic; 69 percent were in treatment 18 months after admission. This was a high rate relative to those found in methadone programs. About half of the "dropouts" switched to other forms of treatment; some chose methadone and others chose abstinence-based therapies. The crime rate among all patients dropped during the course of treatment, use of nonprescribed heroin dipped sharply, and unemployment fell from 44 to 20 percent.

Critics, such as an independent review panel of the World Health Organization, reasonably asked whether the claimed success was a result of the heroin or the many additional services provided to trial participants. And the evaluation relied primarily on the patients' own reports, with few objective measures. Nevertheless, despite the methodological weaknesses, the results of the Swiss trials provide evidence of the feasibility and potential effectiveness of this approach. In late 1997, the Swiss government approved a large-scale expansion of the program. A similar program is under development in the Netherlands and in Hamburg, Germany.

The proposal to study heroin maintenance on a trial basis in the United States is politically controversial and would be logistically difficult. Moreover, the normative and moral issues are clearly complex (MacCoun and Reuter, 2001, chapter 15). But we should not reflexively dismiss, without serious analysis, an intervention that could in theory (and with some fragmentary evidence) help reduce the criminality of existing heroin users and perhaps shrink the heroin street market, thereby creating new barriers to heroin initiation. If nothing else, serious discussion of such a program, and perhaps even formal modeling of alternative hypotheses about its likely effects, might significantly advance our thinking about drug market dynamics and the possibilities for effective intervention.

Summing up: Directions for future research

Here we summarize our suggestions for profitable future research, in the order in which we discussed them:

- Methodological attention to the measurement of Goldstein's taxonomy of drugs-violence links and to the validation of self-reports of victim and offender causal attributions for the role of drugs in criminal offenses.
- Greater attention to the role of drug use in criminal victimization.
- Retrospective historical analysis of long-term trends in drug use, drug arrests, and drug-related crime, including recoding of ethnographic databases, application of the Goldstein coding scheme to homicide case files, age/period/cohort analyses, and econometric time-series analyses.
- Determination of the causal relationships underlying comorbid drug abuse and mental illness conditions.
- Extension and replication of the rich experimental literature on situational moderators of alcohol-related aggression, as applied to other drugs.

- Econometric analysis of the effects of drug price changes on drug-related criminality.
- Assessment of the effects of the availability of licit work and licit wage levels on criminality.
- Additional multicity analyses (and cross-neighborhood analyses within cities) with an emphasis on understanding heterogeneity in drugs-crime relationships: Spatial analyses, analyses of variation in the demand for different drugs, gang versus nongang involvement, ethnic and other demographic groupings, indoor versus outdoor markets, import versus export versus local versus public markets, etc.
- Estimation of incapacitation versus replacement effects resulting from the incarceration of drug sellers.
- Simulation modeling and eventual pilot tests of the efficacy of heroin maintenance.

One other topic that was not even hinted at in our analysis and has been almost totally neglected in the empirical research literature also should receive attention: the likelihood of causal linkages between illicit drug use and such white-collar crimes as corruption, fraud, and embezzlement.[22]

This is a long list of topics. That in itself is a reminder of how little has been done to implement and build on Goldstein's insightful taxonomy. Advances will require an acceptance of the fact that drugs may differ widely in the extent and form of their criminogenic effects. That substantially complicates an already difficult enterprise but is likely to be the source of considerable policy insight.

Notes

1. Except where noted, these statistics were reported in *Drug-Related Crime* (Office of National Drug Control Policy, 2000).

2. In fact, Goldstein et al.'s (1989) findings might not fully represent New York City since they did not look at the entire population or a random sample of homicides. Rather, they chose one zone in each of four different boroughs, with the goal of sampling precincts that represented a cross-section of New York City.

3. These findings challenge the recent generalization by White and Gorman (2000, p. 189) that "the economic motivation explanation has not been supported among adolescents."

4. Our understanding is that the new NIBRS (National Incident-Based Reporting System) database perpetuates this. Officers only have to report the circumstances of the offense (which includes drug dealing) for aggravated assaults/homicide (considered one category in the victim-level file).

5. Approaches might include confirmatory factor analysis, cluster analysis, Q-sort, or Ragin's (2000) fuzzy-set approach. We are less interested in defending a particular method than in pointing out the surprising lack of attention to these measurement and conceptualization issues in the field.

6. Fagan (1990, p. 255) and White and Gorman (2000, p. 185) argue that, if anything, marijuana and opiates serve to suppress aggression. Actually, Bushman's (1990) meta-analysis found more aggression among marijuana smokers than placebo controls in laboratory experiments. But this effect is partly due to the fact that the placebo controls showed significantly less aggression than nondrug controls, indicating that participants also believed marijuana would induce passivity.

7. Note that other psychiatric disorders are less common among substance abusers than substance abuse is among the mentally ill (Miller, 1993).

8. Beau Kilmer's work on this section was supported by NIDA grant R01DA12724.

9. The assumption that decriminalization (as opposed to legalization) is an indicator of lower price is questionable. In theory, it might increase demand by reducing the nonmoney costs, which should increase

price. However, evaluations of decriminalization in 11 U.S. States, South Australia, the Australian Capital Territory, and the Netherlands fail to show any effects on demand (MacCoun and Reuter, 2001).

10. The authors report the statistically significant variables, not the entire model. The entire model is listed in Fisher, Cullen, and Turner (forthcoming) and includes a variable for "Frequency of smoking pot or hashish." Because the significant predictors for stalking are the same in the published and unpublished pieces, we assume the same model was used. Because this is likely to be the model used to predict sexual victimization in the published piece, we report that marijuana use does not predict sexual victimization.

11. Even if true, high returns from crack selling do not lessen the criminogenic consequences of the market; the issue is what share of revenues are generated by legitimate earnings or welfare and other transfer payments received by buyers.

12. The question yields four binary variables about whether the arrestee was in need of drugs/alcohol (NEEDNO), alcohol (NEEDALC), cocaine (NEEDCOCR), and marijuana (NEEDMAR) during the crime and one text variable (NEEDOTHR) where the coder is asked to specify if the arrestee mentioned another drug. Curiously, the 1995 (part 2) and 1999 ADAM codebooks do not report any binary variable for heroin—widely believed to be the major source of economic-compulsive crime. Of the 44,000 ADAM arrestees in 1999, we estimate (using the open-ended field responses) that about 1,100 reported they needed heroin, 1,800 needed alcohol, 2,150 needed cocaine/crack, and 700 needed marijuana. Of those reporting that they needed heroin, about 35 percent committed income-generating crimes.

13. ONDCP reports, based on Rhodes et al. (1995, 2000), that the prevalence of frequent use fell by one-third between 1988 and 1993 and then returned to its 1988 level by 1998. It is difficult to identify supporting evidence for such a dramatic fluctuation in the figures.

14. The bookmaking business has certainly generated written records; but that is more central to the business itself, which involves the extension of credit and usually numerous near-simultaneous transactions between any one buyer and seller.

15. In the District of Columbia in the mid- to late 1990s, it was reported that some street gangs were in violent disputes over the marijuana market (Pierre, 1996; Lattimore et al., 1997).

16. Smith and Varese (2001) model the use of coercive violence in markets for Mafia extortion; the model can be applied to intraorganizational violence as well.

17. Decker, Pennell, and Caldwell (1997) did not find that drug users (rather than sellers) were more likely to be carrying a gun than other arrestees.

18. Alfred Blumstein appeared to endorse this account in his public comments at the 2000 Annual Meeting of the American Society of Criminology.

19. Necessary, but not sufficient; see Zimring and Hawkins, 1997; Ousey and Lee, 2000.

20. The term "stigma swamping" was suggested to us by Jon Caulkins as an apt label for a phenomenon about which many have speculated (e.g., Jacobsen and Hanneman, 1992; McGraw, 1985; Petersilia, 1990)—the notion that the stigma associated with arrest and even incarceration is reduced by the sheer prevalence of those sanctions. The term "stigma swamping" is an informal control counterpart to Kleiman's (1993) formal control version, "enforcement swamping."

21. The earlier British experience with prescription heroin is more notorious but less informative; see MacCoun and Reuter, 2001, chapter 12.

22. We thank Terence Dunworth for making this observation.

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Appendix A. Other applications of Goldstein's framework

New York

Even excluding the works of Goldstein and his colleagues, much of the work using the tripartite framework focuses on New York during the mid- to late 1980s. The U.S. Sentencing Commission (1995) used Goldstein's framework to compare the incidence of violence related to the use of powder cocaine and crack. Using expert testimony and existing literature, and largely focusing on the studies done in New York,[1] the Commission concluded that crack was a greater source of systemic violence than powder cocaine, that economic-compulsive violence was relatively rare among cocaine users, and that "neither powder nor crack cocaine excite or agitate users to commit criminal acts and that the stereotype of a drug-crazed addict committing heinous crimes is not true for either form of cocaine" (p. x).

Miami

Inciardi's (1990) survey of 611 serious juvenile delinquents in Miami and Dade County assessed offender self-reports of drug-related systemic, economic-compulsive, and psychopharmacological crime. In the 12 months prior to the interviews, which occurred from 1985 to 1989, about 5 percent of the sample reported being a psychopharmacological victim, 59 percent reported having committed robberies ("the majority of which were committed to purchase drugs," p. 100), and 8 percent reported being the perpetrators of systemic crimes. Inciardi also administered a supplementary crack survey to 254 of these delinquents from October 1986 to November 1987. This survey and other data analyses by Inciardi led him to conclude that the Miami crack market was much less violent and less (juvenile) gang-related than portrayed in the media and may be "kindler and gentler" than other large cities. He also reported that the worst years for murders in Miami were during its cocaine wars in the early 1980s. Inciardi found that "those more proximal of the crack distribution market were more involved in violent crime" (p. 104). This study has at least two advantages over Goldstein et al. (1989): Crimes other than homicide were considered, and respondents were asked about drug-related victimization. But the drug associated with these crimes was not listed as it was in the Goldstein et al. study.

Chicago

One source that was developed to assess homicide fluctuations and motivations is the Chicago Homicide Dataset (CHD). Detailed information on every homicide in the records of the Chicago Police Department is available for 1965–95 (Block, Block, and Illinois Criminal Justice Information Authority, 1998). CHD does not include data on specific drugs, but its motive classification fits nicely with the tripartite framework. The four types of drug-related motives for homicide are selling or drug business (this includes any homicides during or because of a transaction);[2] an argument over possession, use, quality, or cost of drugs; getting money for drugs or acquiring drugs for personal use; and other drug involvement (e.g., baby dies of malnutrition because the parents were high; offender was drug crazed).[3]

The per capita drug-related homicide rate remained fairly stable from 1973 to 1984 (around 0.4 homicides per 100,000 Cook County residents), with "arguments" at a slightly higher rate from 1974 to 1977. Homicide rates related to all of the motives fluctuated from 1984 to 1995, but it is interesting that the aggregate rate for every motive except "business/transaction" was virtually the same for 1984–85

and 1995 (still close to 0.4). The advent of crack likely explains why homicide rates related to all of the motives increased from 1985 to 1989, but it is of special interest that the "business/transaction" motive skyrocketed during those years. Clearly, more might be learned by examining the specific drugs associated with "business/transaction" homicides in Chicago over this time period.

Eight-city study

To learn why city homicide rates did not change uniformly in the early 1990s, Lattimore and colleagues (1997) comprehensively examined homicide in eight cities for 1985–94: Atlanta, Detroit, Indianapolis, Miami, New Orleans, Richmond, Tampa, and Washington, D.C. In addition to comparing ADAM results with UCR data for these cities, Lattimore et al. interviewed key policymakers, law enforcement and criminal justice officials, and community leaders in the cities. These interviews revealed that crack was most likely associated with community violence and homicide, while the market violence associated with marijuana was a growing concern in Washington, D.C., and Richmond. Methamphetamines, LSD, PCP, and heroin were not associated with homicide rates and were rarely mentioned by local authorities. It is important to note that Lattimore et al. found that in many cases the perceptions about local drug trends differed substantially from drug trends as measured by DUF/ADAM.

Lattimore and colleagues question the relationship between crack and market violence because the crack markets were described as highly competitive in cities in which the homicide rate was declining, increasing, or remaining the same (1997, p. 89). But it is not clear that the same conclusions could be drawn if disaggregated homicide rates (by circumstance) were considered. The authors not only looked at how competitive the market was, they also considered the stability of prices, transactions, and participants. Their argument that links between drugs and homicide "appear to fall mainly on the use side" (p. 92) relies on their findings about participants:

> The general structure of participation in crack markets and the nature, duration, and consequences of the "crack high" may account for the relationship between the cocaine prevalence rates among arrestees and homicide rates. Crack users reported the large number of "buys," extensive networks of potential suppliers, and less reliance on a primary supplier, suggesting that transactions were likely to occur in an opportunistic manner. The high from crack lasts as little as 10 minutes; thus, when the high wears off, the crack user may still be in the market and motivated to buy more of the drug—and to commit a crime to obtain the money to do so. (p. 141)

This is essentially an argument about economic-compulsive violence, which other crack-specific studies have dismissed (see U.S. Sentencing Commission, 1995). While this difference may be geographic (the other studies were primarily done in New York City), it may also be the artifact of a bivariate analysis of two datasets (UCR and ADAM) that did not always cover the same populations.

National estimates

Others used nationwide data to learn more about the drugs-crime nexus. Caulkins and colleagues (1997) used the tripartite framework to assess the impact that mandatory minimum sentences have on cocaine consumption and subsequent crime. Relying on estimates from Goldstein and his colleagues (Goldstein, Brownstein, and Ryan,

1992; Spunt et al. 1990; Spunt et al., 1995), the National Criminal Victimization Survey, inmate surveys, and murder data for large urban counties, Caulkins et al. determined the number of systemic, economic-compulsive, and psychopharmacological crimes that were drug related. Their next step was to determine how much of this crime was related to cocaine. Based on information from Rhodes et al. (1995), the ADAM Program, the Office of National Drug Control Policy (1995), and Goldstein (Goldstein et al., 1989; Goldstein, Brownstein, and Ryan, 1992; Spunt et al. 1995), Caulkins et al. (1997) suggest that cocaine accounts for about 75 percent of drug-related economic-compulsive crime, 50 percent of illicit psychopharmacological homicides, and 75 percent of systemic homicides.

Notes

1. New York: Chin and Fagan, 1992; Fagan and Chin, 1990; Goldstein et al., 1989. Miami: Inciardi, 1990; Inciardi and Pottieger, 1991; Inciardi and Pottieger, 1994. Los Angeles: Klein et al., 1991. Detroit: Mieczkowski, 1990.) The Commission also cited an unpublished DEA report and a review article by Fagan (1990). The former found "that seven crack-related homicides were 'multi-dimensional,' with systemic being one of the dimensions," but it is not clear where these homicides occurred and what the other dimensions were.

2. The codebook reads: "Use code 1 when BUSINESS is the motive for the incident (e.g., both victim and offender involved in dealing, victim killed as a bystander of a drug business hit, victim killed because he interfered with the business, victim killed during a drug transaction or because of a drug transaction)."

3. Cases where there was no positive evidence or no information are not included. Of the 23,817 homicides occurring between 1964 and 1995, 22,282 either had no information about drug motive or were not drug related. Unfortunately, the non-drug-related homicides cannot be separated from the no-information group.

Appendix B. Arrestees Needing Drugs and/or Alcohol at the Time of the Offense, 1995–99

Appendix B. Arrestees Needing Drugs and/or Alcohol at the Time of the Offense, 1995–99

City	Income-generating offenses		Non-income-generating offenses	
	Total	% needing drugs and/or alcohol	Total	% needing drugs and/or alcohol
Albuquerque	249	40	1,308	19
Anchorage	105	16	723	9
Atlanta	1,526	17	2,833	9
Birmingham	1,216	17	3,646	12
Chicago	1,825	26	4,183	17
Cleveland	1,569	16	4,191	12
Dallas	1,934	12	3,432	8
Denver	1,195	8	5,842	6
Des Moines	182	20	744	10
Detroit	903	9	2,876	8
Ft. Lauderdale	1,209	19	4,032	13
Houston	1,257	6	4,252	5
Indianapolis	2,447	15	5,248	8
Laredo	185	13	531	5
Las Vegas	355	26	1,638	14
Los Angeles	4,022	10	6,951	7
Miami	1,395	15	2,182	11
Minneapolis	179	21	953	10

Appendix B. Arrestees Needing Drugs and/or Alcohol at the Time of the Offense, 1995–99 (continued)

	Income-generating offenses		Non-income-generating offenses	
City	**Total**	**% needing drugs and/or alcohol**	**Total**	**% needing drugs and/or alcohol**
New Orleans	2,072	16	4,020	10
New York	3,162	16	6,247	16
Oklahoma City	394	14	1,298	9
Omaha	678	13	3,249	5
Philadelphia	2,201	21	1,645	17
Phoenix	1,828	15	5,929	7
Portland	1,550	11	5,032	10
Sacramento	389	14	1,307	9
Salt Lake City	333	17	1,044	13
San Antonio	2,060	8	5,570	4
San Diego	2,407	8	3,982	7
San Jose	1,549	8	4,441	6
Seattle	301	21	1,090	13
Spokane	261	20	1,063	12
St. Louis	1,160	17	2,592	12
Tucson	308	14	1,965	9
Washington, DC	1,529	10	3,200	8
Total	**43,935**	**14% (*n*=6,141)**	**109,239**	**10% (*n*=10,431)**

Notes: Percentages rounded to nearest whole percentage point. Observations with missing data for any of these variables were deleted. Sixty-four observations from 1998 and 374 observations from 1999 were not considered because of a unique charge-coding strategy. Income-generating offenses include burglary, burglary tools, prostitution, embezzlement, larceny/theft, pickpocketing/jostling, robbery, stolen property, stolen vehicle, and drug sales.

Source: 1995–99 data from the Arrestee Drug Abuse Monitoring Program

The Drugs-Crime Wars: Past, Present, and Future Directions in Theory, Policy, and Program Interventions

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Introduction

The relationship between drug use and criminal behavior has generated a substantial body of literature in peer-reviewed journals, government publications, and the public press. The very extent of such research—as well as the breadth of policy positions based on or ignoring such research—argues for the importance of a review that can summarize theory, policy, and programmatic approaches to the issue. In this paper, we do not attempt to provide a comprehensive review of the issues or literature. Instead, we seek to provide a sufficient review of the most pertinent knowledge about the drugs-crime relationship to stimulate further discussion among researchers regarding the most important research questions that still need attention. This discussion holds great promise for the development of new approaches to the drugs-crime relationship. As Brownstein has argued, "those who do the research are in the best position to interpret their findings and offer advice based on their conclusions" (1991, p. 132). This paper approaches the above task by focusing on the following issues: (a) documenting the existence of the drugs-crime relationship, (b) addressing the nature and complexity of that relationship, (c) summarizing philosophical and theoretical contributions that may best address the relationship, (d) reviewing both State- and Federal-level policy approaches to breaking the relationship, including integrated program approaches, and (e) proposing key areas for future research.

The existence of the drugs-crime relationship

The purpose of this section is to briefly discuss what is known about the drugs-crime relationship. This discussion will focus on the historical policy context; the empirical nature of the relationship overall; and specific drugs, crimes, and populations.

Which drugs and what crime?

Before proceeding further, we wish to clarify what we mean by "drugs" and provide a more complete picture of what is involved in "crime" related to drug use. These clarifications are made in the hope that readers will recognize that the crime aspect of the drugs-crime relationship is multifaceted and that the current exclusion of alcohol from most discussions of the drugs-crime relationship may be detrimental.

Substance inclusion decisions

The term "drugs" as used throughout this paper refers to currently illicit substances in the United States based on Federal drug schedules. Alcohol, prescription drugs, and other substances are excluded. Although it is beyond the scope of the current project, it is important to at least mention the alcohol-crime relationship. Greenfeld (1998) reminds us that an estimated 36 percent of convicted offenders were drinking at the time they committed their crimes and that a high correlation has been observed between public order

crimes and alcohol use. Alcohol is also strongly related to violent crime (Coker et al., 2000; Dawkins, 1997; Ernst et al., 1997; Parker and Auerhahn, 1998; Pihl and Peterson, 1995). Ironically, this relationship often remains outside sentencing decisions and monitoring procedures because alcohol is legal and therefore not subject to the same arrest, seizure, and prosecution laws as are illicit drugs. Drug treatment interventions, however, often include both alcohol and other drugs. Comprehensive efforts to address crime and substance use should include alcohol treatment in programmatic considerations.

The history of drug policy and the definition of crime

Crimes associated with drug use range from violent (such as murder and aggravated assault) to acquisitive (burglary, forgery, fraud, and deception) to specific drug-law violations. In addition, crimes such as bribery and corruption are related to drug use as a result of drug policy prohibitions. Traditionally, discussions of the drugs-crime relationship have focused primarily on violent crime; however, it is important to recognize the complexity of criminal acts associated with drug use. When considering the drugs-crime relationship, this paper recommends that researchers and policymakers include both violent and nonviolent crimes as well as drug law violations and corruption associated with drug policy to grasp more fully the resulting harms and societal costs (for example, see French and Martin, 1996).

Efforts to address the drugs-crime relationship must incorporate a realization of how the development of policy and law has contributed to the relationship itself. Policy approaches to drug use in the United States have historically ranged between legal markets in the 19th century to decriminalization, harm reduction, medicalization, and strict prohibition (as the dominant policy) in the 20th. Over time, policy has moved to various points along this continuum, and it often resides at different points at the same time in different locations and for different substances. Each time policy shifts, the act of drug use takes on a slightly different character in relation to crime. Thus, it is important to present a brief history of drug policy in the United States, together with current possible positions in the drug policy discussion, as each position has a unique implication for fighting drug-related crime.

An understanding of American drug policy begins with three early American cultural traditions that still strongly affect drug policy discussions: (a) libertarianism, (b) the emergence of a relatively open legal market resulting from the libertarian perspective, and (c) Puritan moralism. Libertarianism argues that government must have an extremely compelling motive for interfering in the personal lives of citizens. Such interference legitimately occurs only if a citizen's behavior is a significant, actual risk to others (Mill, 1979). Consistent with this libertarian tradition, early America had an open-market orientation that emphasized limited government interference in the production and distribution of desired goods and services.[1] Nineteenth-century national drug policy was consistent with both libertarianism and the open market. While the Federal Government regulated the importation of such drugs as opium and cocaine, few regulations governed the distribution of these and other drugs through what came to be called the patent medicine industry (Belenko, 2000; Inciardi, 2001; Musto, 1999). Patent medicines were extensively advertised and, through them, the use of drugs such as opium and cocaine became integrated into routine American cultural behavior patterns (Musto, 1999).

Conflicting with both libertarianism and the market-driven approach is the Puritan moralist perspective: Individual behaviors with the potential to harm the community

are seen as a community problem within the legitimate purview of community action (Cherrington, 1920; Schmidt, 1995). Puritan and other religious and moral traditions present in American history often viewed behavior such as substance use as undermining the moral fabric of society, potentially causing the withdrawal of God's blessing from America. The Puritan moralist perspective dominated the early 1900s, an era of societal reform and increasing prohibition (and thus increasing penalties for drug use). One of the first successes of the social reform movement in the early 20th century was the passage of the Pure Food and Drug Act of 1906, which required the patent medicine industry to list product ingredients. The subsequent passage of the Harrison Act of 1914 and the Marihuana Tax Act of 1937 made illegal the manufacture, sale, and possession of a variety of drugs, including opiates and cocaine, as well as the nonmedical use of marijuana. A strongly prohibitionist approach continued through the 1950s with the Boggs Act of 1951 and the Narcotic Control Act of 1956, when mandatory minimum sentences for Federal drug trafficking law violations were strengthened and arrests without a warrant for drug charges were enabled.

The 1960s and 1970s represented a major cultural shift in the United States. For a variety of reasons, American society experienced a "drug revolution" during this era. There appeared to be an increase in the proportion of individuals using drugs and in the variety of drugs used. The evidence for this increase is seen in the number of drug-related arrests and the increase in drug use in the general population (Musto, 1999). During this era, drug policy initially shifted to a stronger treatment- and less punishment-oriented stance. In 1966, the Narcotic Addict Rehabilitation Act allowed the establishment of the civil commitment system instead of prosecution for Federal offenders and encouraged State and local governments to develop their own treatment programs. In 1970, the Comprehensive Drug Abuse Prevention and Control Act consolidated and replaced the patchwork of previous Federal drug laws. The Act created the drug schedules in current use today and initiated the so-called "war on drugs"; it also moved some possession or casual transfer offenses to misdemeanors instead of felonies. This era may be considered a time when drug use was primarily considered a medical/mental health problem to be addressed by treatment, with lessened emphasis on criminal penalties for possession and use.

With an apparent increase in drug use, as evidenced by an increase in drug overdose cases and drug treatment admissions, a more prohibitionist movement again swept the Nation. New York's Rockefeller Drug Laws were passed in 1973, establishing mandatory prison sentences of up to 20 years for the sale of any amount of heroin or cocaine. The Anti-Drug Abuse Acts of 1986 and 1988 continued to emphasize law enforcement (although the 1988 Act gave more attention to treatment and prevention). In yet another policy shift, treatment (including diversion into treatment from the criminal justice system) and prevention received increasing attention in the 1990s. Further, some States developed policies that effectively decriminalized marijuana possession (removing jail/prison penalties) and initiated policies, such as needle exchange programs, that would reduce the dangers of injecting drugs.

Although scholars often focus on the relatively rapid development of national drug policy, it is important to remember that many States passed legislation prohibiting patent medicine and/or alcohol sales, as well as marijuana use, a decade or more before similar legislation was passed by Congress (Belenko, 2000). Because of how the United States is organized, States often have or exercise considerable

The history of drug policy can be broken down into five main approaches: prohibition, risk reduction, medicalization, legalization/ regulation, and decriminalization.

discretion regarding alcohol and drug policies (Musto, 1999).

Essentially, the history of drug policy (and debates about where drug policy should move in the future) can be broken down into five main approaches: prohibition, risk reduction, medicalization, legalization/ regulation, and decriminalization (for an indepth discussion, see McBride et al., 1999; see also Goode, 1997). Prohibition emphasizes severe penalties for use, distribution, and production. Risk reduction uses a public health approach to reduce the risks and harms associated with illicit drug use and emphasizes education on risks, safer use practices, prevention, and treatment. Medicalization calls for physician treatment of drug addicts, viewing substance abuse primarily as a medical issue. Legalization/regulation supports increased access to drugs through governmental regulation of these substances, with possible distribution of specific substances through governmentally controlled distribution channels. Decriminalization calls for a complete end to the use of criminal law to address individual drug use. This may imply a relatively open-market approach to drug availability and use, but that need not be the case.

Although there has been significant debate over which policy approach or approaches might best address the drugs-crime cycle, more research is needed that examines scientifically the effects of policy positions on both drug use and crime. For the most part, current Federal drug law takes a prohibitionist stance that includes a strong deterrence approach to reducing the supply of drugs and high penalties for drug law violations. As a result, a significant portion of the drugs-crime relationship is simply an artifact of law and policy itself: "most directly, it is a crime to use, possess, manufacture or distribute drugs classified as having the potential for abuse" (Craddock, Collins, and Timrots, 1994).

The statistical relationship between drug use and criminal behavior

The general conclusion of almost three decades of research on the relationship between drug use and crime has been that there is a clearly significant statistical relationship between the two phenomena (Austin and Lettieri, 1976; Dorsey and Zawitz, 1999; Gandossy et al., 1980; McBride and McCoy, 1993). Research indicates extensive drug use among arrested populations, a high level of criminal behavior among drug users, and a fairly high correlation between drug use and delinquency/crime in the general population. Research also indicates significant differences in the relationship based on drug type and type of crime. Importantly, all these differences are further complicated by ethnic and gender issues.

The drugs-crime relationship within various population groups

Drug use among arrested/incarcerated populations and crime among drug users. From the early 1970s onward, biological and self-report data have indicated a relatively high rate of drug use among arrested and incarcerated populations (Arrestee Drug Abuse Monitoring Program, 2000; Austin and Lettieri, 1976; Dorsey and Zawitz, 1999; Gandossy et al., 1980; McBride and McCoy, 1993). In 1999, the Arrestee Drug Abuse Monitoring Program (ADAM) collected data from more than 40,000 adults in more than 30 sites and more than 400 juveniles in 9 sites throughout the United States (ADAM, 2000). In almost all cities where the ADAM project operates, about two-thirds of both adult male and female felony arrestees had an illegal drug in their bodies at the time of arrest (with higher rates among females). Even among juveniles, the majority of arrestees were found to have an illegal drug in their urine (with

higher rates among males). The data also suggest that, although current drug use rates among adult arrestees are higher than those reported in the more isolated reports of the 1970s (Austin and Lettieri, 1976), these rates have remained steady for the past 5 years (the same patterns are found among juvenile arrestees). An argument can be made that with about two-thirds of arrestees already using illegal drugs in the 72 hours prior to their arrest, there is not much room for an increase.

A recent report from the Bureau of Justice Statistics (BJS) suggests that drug use also is extensive among inmates in local jails (Wilson, 2000). This document reports that the majority of inmates in State prisons and local jails used drugs in the month prior to the offense that put them in prison/jail. Interestingly, this same report also notes that about 10 percent of jail inmates test positive for drugs while in jail.

The extent of crime among drug users also has been documented. From the 1960s through the 1990s, surveys of drug-using populations both in and out of treatment have consistently shown that the large majority of users have extensive histories of criminal behavior and time served in prison (Defleur, Ball, and Snarr, 1969; Inciardi, Horowitz, and Pottieger, 1993). This pattern applies to juveniles as well: Between 40 and 57 percent of adolescents treated for substance disorders also have committed delinquent acts (Winters, 1998).

Drug use and crime levels among the general population. A tradition of studies shows a correlation between drug use and delinquency in general youth populations (Elliott and Huizinga, 1984; Elliott, Huizinga, and Menard, 1989; Harrison and Gfroerer, 1992). Analysis from the National Youth Survey has provided data often used to examine this relationship. These data report a direct correlation between serious drug use and delinquency (Johnson et al., 1991). Youths who used "hard" drugs (about 5 percent of the sample) accounted for 40 percent of all delinquencies and 60 percent of index crimes.

The impact of drug type on the drugs-crime relationship

The first National Institute on Drug Abuse (NIDA)-sponsored *Crime and Drugs Report* (Austin and Lettieri, 1976) noted that a complex relationship exists between type of drug use and type of crime. This relationship is further complicated if multiple drug use exists. The 1999 ADAM report shows that a fairly large proportion of arrestees tested positive for more than one drug (up to 30 percent), and that reported criminal behavior tended to include a wide variety of offenses. The ADAM data show that while cocaine was the most likely drug found among adult arrestees in large cities (and there is literature suggesting a significant relationship between cocaine and violence), for many urban ADAM sites, violent offenders were more likely to test positive for marijuana than cocaine. In addition, property offenders were more likely to test positive for cocaine than marijuana in most sites (ADAM, 2000).

The impact of crime type on the drugs-crime relationship

Drug law violations. A significant proportion of drug user arrests involve violations of drug laws only. As noted previously, the United States experienced wide drug policy shifts in the 20th century. Each shift has uniquely affected crimes related to drug use and distribution. In a study of 611 juvenile cocaine users by Inciardi and colleagues in the early 1990s, analyses showed that participants had committed more than 400,000 criminal acts in the 12 months prior to being interviewed. Of these, 60 percent were for drug law violations, mostly sales of small amounts

(Inciardi, Horowitz, and Pottieger, 1993). At the Federal level, a total of 581,000 drug arrests in 1980 nearly tripled to a record high of 1,584,000 in 1997. By 1997, 79 percent of drug arrests were for possession and 21 percent were for sales. Forty-four percent of drug arrests overall were for marijuana offenses (Uniform Crime Reports, 1998). Drug defendants comprised 42 percent of felony convictions (Bureau of Justice Statistics, 1999). A recent BJS Special Report (Wilson, 2000) also substantiates the extensive percentage of drug-related crimes that result from violation of drug laws, suggesting that about a quarter of jail inmates have a current charge or conviction for drug law violations. Critics have argued that since such arrests likely include many low-level users and dealers, criminal justice processing and the stiff sentences that often are handed down because of mandatory minimums may be inappropriate to the offense level (McBride et al., 2001).

Changes in drug policy are usually driven by concerns for public safety and the perception of a direct relationship between drugs and violence.

The violence connection. Changes in drug policy are usually driven by concerns for public safety and the perception of a direct relationship between drugs and violence (Brownstein, 1996, 2000). For example, the drug policy reform movement of the early 1900s (changing from legal markets to strict prohibition) was accompanied by horror stories focused on exaggerated claims of criminal behavior as a consequence of drug use. In this literature, there was a particular emphasis on horrific violent crime (including rape), with minority group members often portrayed as the drug users engaged in the violent behavior. Musto (1999; see also Belenko, 2000; Hickman, 2000) documents the public concern of the time (perhaps obsession) with Chinese opiate use, African-American cocaine use, and the use of marijuana by Mexicans. The creation of the Narcotics Bureau led to a type of media distribution industry focused on violence associated with drug use, "documenting" the criminal consequences of such activity (see Anslinger and Tompkins, 1953; Inciardi, 2001). Among the best known of these efforts were the films "The Man with the Golden Arm" (purporting to depict the effects of heroin use/injection) and "Reefer Madness" (showing the supposed behavioral consequences of marijuana use). Although such media portrayals exaggerated the possible links between drugs and crime, some research has connected drug use with violence. Grogger and Willis (2000) conclude that without the introduction of crack cocaine into urban America, 1991 crime rates would have been about 10 percent lower. These researchers also examined the impact of crack on specific types of violent crime and reported that the biggest impact was on aggravated assault.

In 1985, Goldstein provided the perspective that has been most commonly used to examine the relationship between drug use and violence. Essentially, he argued for a tripartite scheme, where "psychopharmacological violence" could result directly or indirectly from the biochemical behavioral consequences of drug use; "economic-compulsive violence" could relate to behavior/crimes engaged in to obtain money for drugs; and "systemic violence" could emerge in the context of drug distribution, control of markets, the process of obtaining drugs, and/or the social ecology of drug distribution/use areas.[2] Some researchers have concluded that there is minimal evidence regarding the psychopharmacological impact of drugs on violence (Resignato, 2000); however, Pihl and Peterson (1995) reviewed a wide range of studies on the issue. They concluded that alcohol and drugs can be psychopharmacologically related to violent acts through the release of dopamine, which reduces inhibitory anxiety about the consequences of aggressive behavior and increases the rewards associated with

violence. In addition, they argue that the psychopharmacological effects of drugs interfere with the user's cognitive processing of the consequences of potentially violent situations. It should be noted that these authors believe that the evidence for psychopharmacological effects of alcohol use on violence are much higher than for other drugs.

However, some indications point to the environment as being a more powerful explanation of the drugs-violence relationship than the psychopharmacological properties of drugs (Brownstein, 2000; Fishbein, 1998; Parker and Auerhahn, 1998). In terms of economic compulsive and systemic violence, Collins (1990) as well as Fagan and Chin (1990) argue that crack selling is the main contributor to the drugs-violence relationship. Specifically, their research found that violence (mostly robbery) emerged from the need to obtain money to purchase drugs (predominately crack). Fagan and Chin suggest that the drugs-violence relationship also emerges as a part of the subculture of violence.

In a 1994 study, Roth argued that drug users commit more property crime than violent crime. A recent publication by De Li, Priu, and MacKenzie (2000) examined the relationship between drug use and property and violent crime in a population of probationers in Virginia. Results indicated that drug *use* had a positive association with property crime, whereas drug *dealing* had an association with both violent and property crime (though the relationship was stronger for property crime). The analysis also showed an interactive effect between drug use, drug dealing, and violent and property crime. Among juveniles, Linnever and Shoemaker (1995) found that arrests for both possession and selling of drugs were related to the rate of property crime arrests. However, juvenile robbery arrest rates were related to only drug sales arrests (not possession). A National Institute of Justice (NIJ) Research in Brief supports this research, stating "illegal drugs and violence are linked primarily through drug marketing" (Roth, 1994, p. 1).

The impact of ethnicity and gender

Much of the research that has been conducted on drugs and crime has not had a sufficient focus on gender and ethnic variance. This limitation has significant repercussions on applying findings to other population groups. As Paniagua (1998) notes, the multicultural nature of current society must incorporate a recognition of the complex nature of ethnicity and gender. Specifically, individuals who share a similar ethnicity or gender will not all be the same (i.e., recognition of language, acculturation, and socioeconomic differences); however, it is important to recognize cultural commonalities that may significantly affect both the extent and nature of the drugs-crime relationship across individuals. Research that has focused on ethnicity and gender indicates that these variables may significantly affect various aspects of the drugs-crime relationship, including:

- Source of drugs and/or works (Taylor et al., 1994).
- Predictors of violence (Ellickson and McGuigan, 2000).
- Types of violence experienced and reactions to such violence (Brownstein et al., 1994; Fine and Weis, 1998; Mazza and Dennerstein, 1996).
- Stress-coping factors (Vaccaro and Wills, 1998).
- Biological effects of drugs (Brady and Randall, 1999).
- Epidemiology of substance-use disorders (Brady and Randall, 1999).

- Psychiatric comorbidity (Brady and Randall, 1999).
- Social stigma issues (Brady and Randall, 1999).
- Medical consequences of drug use, including heredity issues and course of illness (Brady and Randall, 1999).
- Assessment and treatment issues, including possible prevention settings (Brady and Randall, 1999; Metsch et al., 1999; Paniagua, 1998).
- Differences in initiation of drug use (Doherty et al., 2000).

Summary: What we know of the past

The intended purpose of this section has been twofold. The first goal has been to review the history of American drug policy (as well as possible drug policy positions) within the framework of the relationship among policy, drug use, and crime. The second purpose has been to summarize the statistical documentation of the drugs-crime relationship. Hopefully, this review has served to remind readers of the following issues:

1. American drug policy originated in the antithetical cultural traditions of relatively open-market/libertarian values and Puritan moralist social reform. These traditions still affect current debates about the drugs-crime relationship, as well as the various policy positions between these two endpoints on the policy continuum.
2. States have a history of experimenting with drug policies in advance of, and sometimes in opposition to, Federal action on the same issues.
3. Public safety concerns have been the underlying rationale for the development of drug policy at all levels of government.
4. Hyperbole, demagoguery, demonization, and perhaps even naivete have historically characterized the drugs-crime debate (and may still). However, there is a clear statistical relationship between drug use and crime. The majority of drug users have extensive histories of involvement with crimes and the criminal justice system; most arrestees are current drug users; and there is a correlation between drug use and delinquency/crime in general populations. A large proportion of this criminal activity is a result of drug law violations.
5. Although there is some evidence that drug costs may be related to property crimes and robberies, and that distribution and subcultural elements surrounding drug use may be related to violence, there is debate about the evidence for a strong and continuous connection between drug use and violence. This relationship is also complicated by the type of drug use, the category of crime, and ethnicity and gender.

The nature and complexity of the drugs-crime relationship

As White and Gorman (2000) note, three main explanatory models exist for grappling with the drugs-crime relationship:

- Drug use causes or leads to crime.
- Crime causes or leads to drug use.
- The relationship is purely coincidental or is based in a common etiology.

Based on their evaluations of the research supporting and/or refuting each of the three main models above, they conclude

that "one single model cannot account for the drug-crime relationship. Rather, the drug-using, crime-committing population is heterogeneous, and there are multiple paths that lead to drug use and crime" (White and Gorman, 2000, p. 151). Ten years earlier, Collins (1990) also rejected simple explanatory models for the complex relationship. The debates over both the direction of a drugs-crime relationship as well as the etiological variables that may be involved in the common occurrence of both drugs and crime have significant implications for attempts to intervene in the drugs-crime cycle.

The direction of the relationship: Searching for a cause

At the popular and sometimes at the governmental level, the drugs-crime relationship is often clearly causal: Drug use causes crime. Models such as Goldstein's tripartite scheme (1985) have been used to illustrate this approach, specifying psychopharmacological, economic-compulsive, and systemic causes of violence. As noted previously, arguments that focus on the *psychopharmacological properties* of various drugs cite research that indicates that stimulants may increase aggressiveness and paranoia and that many drugs have a strong disinhibiting effect that could seriously interfere with judgment (Pihl and Peterson, 1995). *Economic arguments* posit that the cost of drugs, coupled with high unemployment among drug users, results in the commission of property crimes to support drug use (16 percent of jail inmates committed their current offense to get money for drugs; BJS, 1999). Those who argue for a systemic approach maintain that drug use simply has a *subcultural relationship* with criminal behavior: Because it is illegal, drug use involves the user in criminal subcultures that often lead to future deviance (Fagan and Chin, 1990).

On the other hand, some researchers argue that a level of general delinquency often precedes drug use (Elliott, Huizinga, and Menard, 1989). The subcultural explanation is used here as well: Involvement in criminal activity and/or subcultures provides "the context, the reference group, and the definitions of a situation that are conducive to subsequent involvement with drugs" (White and Gorman, 2000, p. 174; see also White, 1990). Individuals with deviant lifestyles and/or personalities may also use substances for the purposes of self-medication (Khantzian, 1985; White and Gorman, 2000) or to provide a "reason" for deviant acts (Collins, 1993; White and Gorman, 2000). Although Apospori and associates (1995) concluded that the relationship between early delinquency and subsequent drug use was relatively weak, Bui, Ellickson, and Bell (2000) found what they called a modest relationship between delinquency in grade 10 and greater drug use in grade 12. Importantly, they found no significant differences by ethnicity for this relationship. Hser, Anglin, and Powers (1993) found that addicts who ceased narcotic use were less likely to engage in criminal behavior over a 24-year followup period.

Although there is some evidence of directionality in the drugs-crime relationship, researchers who have attempted to address this issue generally have concluded that the relationship is extremely complex and defies attempts to sort out directionality. Work by Nurco and colleagues on criminal careers initially found that increases in narcotic drug use were often followed by increases in criminal activity; conversely, periods with no drug use were associated with less criminal activity of all types (these results applied for white, African-American and Hispanic narcotics addicts; Nurco, Cisin, and Balter, 1981; Hanlon et al., 1990). However, in a subsequent 1993 article, Nurco, Kinlock, and Balter found that narcotic drug users had very early

involvement in what these researchers call "precocious criminal activity." This activity pattern occurred prior to the onset of addiction, and therefore simply could not be attributed to addiction itself. A recent article by Maxwell and Maxwell (2000) provides another example of the confusing directionality, suggesting that drug use has a very complex relationship with types of deviant behavior for women. Their findings suggest that frequent use of crack, combined with early onset of crack use, is related to prostitution. Drug selling, however, was found to relate to decreased prostitution as it provided another opportunity for income to purchase drugs. On a broader level, Curtis (1999) found that drug use rates did not decrease in either the general or at-risk populations during the 1990s; however, there was a widespread decrease in urban crime during the same time period. He argues that market and cultural forces were behind the observed changes in substance use patterns and consequences: street drug dealers exerted higher control on both the drug use of those who worked for them as well as the violence often associated with street drug dealing.

Any simple attempt to only deter drug use through severe punishment or treatment will not result in less crime or substance use, as such approaches do not address the complex cause of both behaviors.

A common origin

One of the traditions of research on the drugs-crime relationship has emphasized that drug use and crime may not have a direct causal relationship (White and Gorman, 2000), but may emerge in the same contextual milieu and have the same antecedent variables such as poor social support systems, difficulty in school, and membership in a deviant peer group (Hamid, 1998; Inciardi, Horowitz, and Pottieger, 1993; Lurigio and Swartz, 2000). These variables have been suggested to include such issues as neighborhood context (McBride and McCoy, 1982), the development of street identity for survival (Collison, 1996), social isolation that prevents access to the social and economic systems of society (Harrell and Peterson, 1992; Stephens, 1991), and lack of what is now referred to as human and social capital (described later in this chapter). Dembo and his colleagues have studied the drugs-crime relationship among high-risk youths entering the juvenile justice system throughout the last decade. In an important 1994 article, Dembo and colleagues found that both delinquency and drug use emerge within the context of family problems and peer deviant behavior. These researchers found that for both males and females, as well as African-Americans and whites, family alcohol and drug use, emotional problems, arrest history, and peer deviant behavior were related to continuing drug use. Based on these models, any simple attempt to only deter drug use through severe punishment or treatment will not result in less crime or substance use, as such approaches do not address the complex cause of both behaviors (Harrell and Peterson, 1992).

Summary

Research on understanding the nature of the drugs-crime relationship illustrates that no simple causal model can explain the phenomena. Rather, the statistical relationship between the two activities may be a result of their common etiological origin. As the purpose of this paper is to present a background for discussion of possible research agendas to expand and reform research on the drugs-crime relationship, it is important to ground such a system-wide effort in theoretical frameworks that allow for the complex nature of the relationship. Such frameworks can be then used to help shape possible future research.

Philosophical and theoretical contributions to addressing the drugs-crime relationship

This section will provide a theoretical framework for reviewing current programmatic approaches to breaking the drugs-crime cycle. The theoretical approaches to be presented include both overarching behavioral theories and philosophies specific to justice system programming.

Overarching theoretical approaches

While recognizing the existence of a wide range of theories on human behavior, this paper uses ecosystems theory as an overall framework for examining the drugs-crime relationship. Within this framework, the concept of social capital has emerged recently as a promising approach to breaking the drugs-crime cycle.

Ecosystems theory. Human behavior, including participation in drug use or criminal activities, takes place within the broader social environment: circumstances, social norms, cultural conditions, and interactions with others (Kirst-Ashman, 2000). Ecosystems theory acts as an organizing framework (as opposed to a definitive theory of behavior or development) that calls for an active awareness that the interaction of biology; interpersonal relationships; culture; and legal, economic, organizational, and political forces affects an individual's behavior (Beckett and Johnson, 1995; Kirst-Ashman, 2000). It should be noted that the relative influences of each force are likely to change throughout the lifecourse of each person. Essentially, ecosystems theory helps provide the perspective needed to understand the breadth of systems (micro, mezzo, and macro) involved in any discussion of human behavior, as well as specific theories that might be useful in addressing behavior. The theory calls attention to inherent personal characteristics that affect individual behavior, including competence, self-esteem, and self-direction (Germain and Gitterman, 1995).

Definitive theories of behavior that have been used to explain crime and deviance have varied. Since the 1960s, the following theories have been predominant: anomie, social disorganization, differential association, social control, deterrence, labeling, and conflict (Liska, Krohn, and Messner, 1989). Recently, however, attention has been directed to new approaches with the hope that theoretical and research advances will better support prevention and treatment: "integrated theory, general theory, lifecourse transitions, and social capital appear to offer promise for the future" (Bartollas, 2000, p. 564). We will focus specifically on social capital since it is a relatively new theory with the potential to explain many complex relationships.

Social capital. The social sciences have always had an interest in the relationship among community organization, social interaction, and individual behavior. Today, the concept of social capital increasingly is used to understand the extent of community interaction and its effects. Social capital was originally defined by Coleman (1988) as the quality and depth of relationships between people in a family and community. Putnam (1993) developed the concept to include "the networks, norms and trust that facilitate coordination and cooperation for mutual benefit" (p. 2). The World Bank Group (2002) modified the definition to include "the institutions, relationships, and norms that shape the quality and quantity of a society's interactions" (p. 1). Finally, Rose (2000) emphasized the utility of social capital by defining it as "the stock of networks [relationships between individuals] that are used to produce goods and services in society" (p. 1422). Increasing evidence shows that social

Increasing evidence shows that social capital and the social cohesion and normative environment enabling its development are critical for community and individual quality of life.

capital and the social cohesion and normative environment enabling its development are critical for community and individual quality of life. The productive utility of informal face-to-face associations and formal organizational networks has been noted, for example, in the areas of economic development (World Bank Group, 2000), political participation (Putnam, 2000; Putnam and Campbell, 2000), health promotion (Baum, 1997, 2000; Kawachi et al., 1997; Kawachi, Kennedy, and Glass, 1999; Veenstra, 2000), and general quality of life at the individual and community levels (Billings, 2000; Caspi et al., 1998; Lerner, 2000; Parcel and Menaghan, 1993; Popay, 2000).

Recent studies based on social control and social bonding theories have developed highly innovative solutions to crime prevention, linking the levels of collective efficacy (Sampson and Raudenbush, 1999; Sampson, Raudenbush, and Earls, 1997; Fagan, 1987), community cohesion and/or integration (Hirschfield and Bowers, 1997; Jobes, 1999; Kawachi, Kennedy, and Wilkinson, 1999; Kennedy et al., 1998; Lee, 2000; Mullen and Donnermeyer, 1985; Walklate, 1998), local informal networks (Bursik, 1999; Savelsberg, 1999), and youth family dynamics (Brannigan, 1997; Hagan, 1995, 1997; Macmillan, 1995; Sampson and Laub, 1990) to crime rates in a given neighborhood.

Despite the extent of recent studies applying the concept of social capital, very little research has been conducted to measure the relationship between social capital and drug use. The only related (and very limited) evidence points to the role of social capital in preventing youth behavior problems (Parcel and Menaghan, 1993). Putnam (2000) found that this was especially true for those at higher risk for parental abuse. As effective intervention programs are developed, it is essential to differentiate between the various forms of social capital (informal friendship and family relationships versus formal institutional arrangements) and the quantity versus quality of the social networks involved.

The concept of social capital can be applied to breaking the drugs-crime relationship in several ways. First, high levels of social capital in communities may play a role in preventing drug use and other deviant behavior through the presence of stronger formal and informal social bonds and networks. The presence of anti-drug-use norms within more informal structures (such as family networks, communities of faith, and neighborhoods) may contribute to lower drug use rates. Conversely, lower levels of community social capital may be associated with greater access to drugs and more lenient social norms and lowered social controls regarding the use of drugs or association with drug users. Second, drug users who have recently entered the criminal justice system may find that the presence of high levels of social capital in a community result in a stronger network of diversion options. This could be due, in part, to formal and informal network interest in restorative justice (described later in this chapter) versus punishment approaches to crime intervention. Third, once a drug offender is incarcerated, high levels of social capital within the offender's home community might better preserve networks of support for reintegration upon the offender's release. Offenders might more easily obtain jobs, receive support for continued sobriety, and receive reinforcement for socially appropriate behaviors. Finally, communities with high levels of social capital might have strong formal (vertical) social networks in the form of coalitions or collaboratives working to reduce substance use. Such agency connections may help focus the community on policy development related to drug prevention and treatment systems in homes, schools, and businesses. Such strong, integrated social

networks may offer a larger range of services and may develop more formal horizontal relationships with other service providers, thereby improving the coordinated delivery of services and care to those with drug or alcohol problems.

One example of the impact that social-capital-based concepts are currently having on the drugs-crime relationship in the United States is the recent establishment of the Office of Faith-Based and Community Initiatives in the White House. This action has focused the Nation's attention on the role of faith-based institutions in the provision of drug treatment, aftercare, and other services. Such interventions may be particularly important in poor and minority communities with large numbers of high-risk individuals, where there are few (if any) traditional drug treatment programs. However, these same communities are often served by churches and other faith-based organizations that care deeply about the members of their community and are well established in service provision. While concerns about church-state separation, attempts at proselytization, and teachings of bigotry and prejudice have prompted some to demand a clear ban on the use of public funds to support faith-based institutions, others have begun to carefully examine the potential of these organizations to improve the lives of their clients. At present, there has not been sufficient research to determine the effectiveness of treatment in faith-based settings.

Criminal justice philosophies

An examination of recent approaches to intervention in the drugs-crime cycle requires a brief review of major criminal justice philosophies and recent conceptual developments. Philosophies with the greatest promise for success acknowledge the complex relationship between drugs and crime. In addition, they attempt to incorporate factors that best support the inherent personal characteristics that affect individual behavior and they address the broader context of the social environment. These concepts have significant implications for how programmatic interventions may occur within the criminal justice system.

Retributive justice. The traditional criminal justice perspective of retributive justice generally sees drug abuse as a willful choice made by an offender capable of choosing between right and wrong and acting on that choice. The approach emphasizes deterrence through strict penalties, including increasing arrests, developing tougher sentencing laws, and building new prisons to hold and punish offenders (McBride et al., 2001). Implementation of this perspective does temporarily reduce the number of criminals on the streets as well as interrupt an offender's drug use. However, drug-using offenders do not appear to alter their behavior in the face of punishment alone (Goldkamp, 1994). Thus, it is highly likely that offenders will recidivate, and the cycle of drug use and crime will continue (Hora, Schma, and Rosenthal, 1999).

Therapeutic jurisprudence and restorative justice. Therapeutic jurisprudence has been defined as "the use of social science to study the extent to which a legal rule or practice promotes the psychological and physical well-being of the people it affects" (Slobogin, 1995, p. 196). Within this framework, key players from the justice system (including judges, prosecutors, and defense attorneys) move from adversarial roles to problem solvers as part of a collaborative team while still performing their traditional roles of guardians of community protection, administrators of the law, and protectors of due process (Spangenberg and Beeman, 1998). Therapeutic jurisprudence specifically addresses the needs and problems of drug offenders from a medical, therapeutic perspective.

Drug addiction is viewed as a problem with deeply rooted biological, psychological, and social influences, and substance abusers are seen as having a condition that requires treatment. From this perspective, the criminal justice system offers the best opportunity some offenders will ever have to confront and overcome their drug use and its consequences. Programmatic approaches that often employ therapeutic justice principles include drug courts, restorative conferencing, cross-systems case management, coerced and voluntary drug treatment programs, day reporting centers, and intensive monitoring approaches. Each of these approaches will be reviewed in greater detail later in this paper.

Within the past decade, a justice philosophy associated with the principles underlying therapeutic jurisprudence has emerged: restorative justice. Used primarily for nonviolent adult and juvenile offenders, the restorative justice approach (also termed restorative conferencing) attempts to balance the needs of victims, the community, and offenders. Unlike retributive justice, which is concerned primarily with punishing the offender, restorative justice seeks to repair the damage inflicted by the crime. This approach makes the criminal process less formal by involving the victim and community members in the planning and implementation of the sentencing. Rather than asking what should be done to punish the offender, restorative justice asks the following questions (Zehr, 1990):

- What is the nature of the harm resulting from the crime?
- What needs to be done to repair the harm?
- Who is responsible for the repair?

Restorative justice has been implemented in a number of programmatic methods, including victim-offender mediation, community reparative boards, family group conferencing, and circle sentencing (see Bazemore and Umbreit, 2001). The shared features of these approaches include:

- Promoting citizen and community ownership of the criminal justice system.
- Providing an opportunity for the victim and other community members to confront the offender about his or her behavior.
- Providing opportunities for the offender to learn about the impact of the crime and to take responsibility and be held accountable for the offense.
- Creating meaningful consequences developed by the victim, the community, and sometimes by the offender and his or her support system.

Although concerns and implementation issues exist regarding restorative justice (such as some resistance by the victims' rights movement, the need for collaborative relations with the community at large, and potential clashes with current sentencing and corrections law), the philosophical approach shows promise as a future direction in addressing drugs and crime (Smith, 2001).

Summary

Human behavior is an extremely complex phenomenon, and theories imply that programs that acknowledge the multiple systems and factors that affect behavior will have the greatest chance for realistically assisting in behavior change—in this case, reducing both drug use and crime. Although programmatic interventions focusing on punishment and deterrence alone can temporarily reduce drug and crime rates, long-term solutions seem to favor interventions based on principles similar to those of therapeutic jurisprudence as well as restorative justice.

State- and Federal-level policy approaches to breaking the drugs-crime relationship

As noted previously, American drug policy is undergoing continual modification. Thus, the observed relationship between crime levels associated with drug use and drug policy is constantly changing. There are currently a broad array of drug policy movements that may directly affect the drugs-crime relationship. The most widespread and potentially influential of these policy changes include marijuana medicalization and/or decriminalization, lessening of the powder and crack cocaine sentencing disparity, current activity surrounding club drugs, revisiting the concept of mandatory minimum sentencing, treatment versus prison, and model State drug laws. Each of these movements will be briefly described below, with a focus on how the proposed policy changes may affect the drugs-crime relationship.

Marijuana medicalization

Movement toward the medicalization of marijuana has been ongoing since the 1970s (see Belenko, 2000; Goode, 1997). The two actions that preceded the movement were the National Commission on Marihuana and Drug Abuse report in 1972 that called for reduced penalties for possession, and the unpublished 1975 trial of *United States* v. *Randal,* which allowed the use of a medical necessity defense for marijuana possession when a glaucoma patient was arrested for growing his own plants (Belenko, 2000). By the end of 1982, 31 States and the District of Columbia had enacted medical marijuana provisions (Markoff, 1997). However, in 1986, the Food and Drug Administration approved the use of the brand-name drug Marinol (dronabinol, delta-9-tetrahydrocannabinol, or THC) to prevent the nausea and vomiting often occurring with cancer treatments and to increase appetite in patients with AIDS. Many State medical marijuana laws were allowed to expire or were repealed following Marinol's approval (Dogwill, 1998).

Current efforts at marijuana medicalization began in the mid-1990s as a result of media pressure and general dissatisfaction with Marinol and other antiemetic drugs (Dogwill, 1998). As of the end of the 2000 legislative year, 28 States had statutes providing for the medicinal use of marijuana (Pacula et al., 2001). The type of laws enacted by States varies, and States may have more than one law type. The list below shows the number of States with currently operating laws and a brief description of the laws and related protections (Pacula et al., 2001):

1. Therapeutic research programs (TRPs): 14 (only 6 of which are currently operational). TRPs are administered by State health departments or pharmacy boards and must be approved by the Food and Drug Administration and adhere to specific Federal regulations. Protection is provided only to approved and participating patients, physicians, and pharmacies, and for specified ailments not responding to other available treatments.

2. Physician prescription laws: 13. These laws are of three types: One allows physicians to discuss the medical benefits of marijuana with patients; the second allows physicians to prescribe marijuana for medical purposes; and the third provides an affirmative defense for physician discussion or prescription of marijuana. These laws protect physicians only, not patients.

3. Medical necessity laws: 10. These actions provide a defense from prosecution to patients and/or caregivers for possessing marijuana for medical purposes if obtained via physician

recommendation, certification, or authorization.

4. Rescheduling laws: 3. These laws reschedule marijuana to categories that recognize an acceptable use for marijuana and/or claim a lower potential for abuse.

Of the four types of laws noted above, only TRPs are federally sanctioned. Although the other three types of laws have been or are being challenged in court, no firm ruling has been given that would clearly identify the final outcome of medical marijuana initiatives. Although the outcome of the medical marijuana debate is unknown, the policies in question have several ramifications for the drugs-crime relationship (Pacula et al., 2001). These include potential decreases in marijuana-related arrests due to a supportable defense for medical use, significant changes in black-market marijuana prices between States with varying medicalization policies, changes in the ability or willingness to prosecute recreational marijuana users, changes in possession penalties, and differences in use rates for both adults and adolescents.

Marijuana decriminalization

The decriminalization of marijuana possession in law or in enforcement policy has been evolving for many years. In the early 1970s, the National Commission on Marihuana and Drug Abuse called for the decriminalization of simple marijuana possession. This would mean the removal of all criminal penalties; possession would be neither a felony nor a misdemeanor. In practice, the application of such a simple definition is complex. Although 11 States indicate that they have decriminalized marijuana, an examination of those statutes indicates that, operationally, decriminalization means the removal of incarceration for first or second marijuana possession offenses but may include fines and/or jail/prison penalties for subsequent possession offenses. MacCoun and Reuter (1997) have suggested that a better term might be depenalization. While the exact definition of decriminalization is debated, complex, and inconsistently applied, a review of State statutes shows significant variation regarding possible penalties for simple marijuana possession ranging from no monetary penalties and no incarceration to fines in the five figures and multiple years in prison (ImpacTeen Illicit Drug Team, 2002). In addition, anecdotal reports suggest that some local police departments simply do not enforce existing marijuana possession laws. All of this suggests that States (and communities) show significant variance in marijuana policy, and the impact of this variance should be examined to determine the possible ramifications for arrests, black-market prices, use rates, and associated harms.

Lessening of the powder and crack cocaine sentencing disparity

There has been considerable public and research focus on the current sentencing differences between the possession or sale of powder versus crack cocaine. Sentencing disparities emerged in the 1980s in the context of large increases in crack cocaine use, together with the conclusion that crack cocaine caused significantly more harm than powder cocaine to the individual and the community through increased violence (McBride et al., 2001). Congress eventually enacted legislation mandating 5-year prison terms for the possession or sale of 5 grams of crack cocaine. This same legislation mandated the same penalty (5 years) for the possession of *500* grams of powder cocaine (Sentencing Project, 1998). Thus, the Federal Government defined the mandatory minimum sentencing disparity of crack to powder cocaine at 100:1. The ramifications of this policy became apparent fairly

early in its application: There were significant increases in the prison population, in the number of drug users in prison, and specifically in the number of African-Americans in prison (Beck and Mumola, 1999; Mumola, 1999). Currently, 86 percent of all Federal crack cocaine defendants are African-American (Sentencing Project, 1998). In 1995, the U.S. Sentencing Commission recommended the elimination of the sentencing disparity between crack and powder forms of cocaine, arguing that the policy had not accomplished its goal of reducing crack use but had resulted in significant unintended consequences. The recommendation was not acted upon. In 1997, the same group recommended moving to a 5:1 sentencing ratio, the Clinton administration recommended a 10:1 ratio, and an additional bill was introduced in the Senate specifying a 20:1 ratio. No action was ever taken, however, and the initial sentencing disparity remains at the original Federal level of 100:1. It is important to note that at the State level, sentencing disparity is not universally mandated (but may be specified in State sentencing guidelines). Some States, such as Michigan, have begun to modify the disparity in their laws (Sentencing Project, 1998).

The growing club drug reaction

The general term "club drugs" refers to a "number of illicit drugs, primarily synthetic, that are most commonly encountered at nightclubs and 'raves'" (Drug Enforcement Administration Intelligence Division, 2000, p. 1). Examples of club drugs include Ecstasy, Ketamine, Rohypnol, and GHB (gamma-hydroxybutyrate). Both use rates and emergency department mentions for these substances (especially Ecstasy) have recently increased. Johnston, O'Malley, and Bachman (2001) report that use of Ecstasy in the past 12 months among 12th graders increased from 6 percent in 1999 to 8 percent in 2000. According to the Drug Abuse Warning Network (DAWN), there were only 25 emergency department mentions of Ecstasy in 1994. In 1999, the number had risen to 2,850 (DAWN, 2000). Results of these increases have been felt in both research and policy. Research focus on the psychopharmacological effects of Ecstasy is growing (for example, see Boot, McGregor, and Hall, 2000), as are attempts to provide valid information about the effects and dangers of its use (Larkin, 2000). At the Federal policy level, the Ecstasy Anti-Proliferation Act was enacted in October 2000. The Act directs the U.S. Sentencing Commission to increase penalties for Ecstasy trafficking as part of an increased deterrence approach to use. State laws also are changing, with substantial numbers of States moving to schedule Ecstasy and/or to increase penalties for sales (ImpacTeen Illicit Drug Team, 2002).

Reconsidering mandatory minimum sentencing

Mandatory minimum sentencing plays a significant role in the drugs-crime relationship and has been a major component of the war on drugs. Initially, it was thought that high mandatory penalties for drug law violations (such as serving at least 85 percent of an assigned sentence) would have a deterrent effect on drug use, related criminal behavior, and associated costs (see McBride et al., 2001). However, the primary results of mandatory minimum sentencing likely have been to increase dramatically the number of drug-related arrests and the proportion of prisoners who are drug users (Harlow, 1998; Mumola, 1999). Mandatory minimums for drug charges may play a significant role in the shifting of power from judges to prosecutors, prison overcrowding, and a breakdown in truth-in-sentencing laws because of early release due to prison overcrowding. In reality, prison overcrowding often makes mandatory minimum sentencing laws all but impossible to enforce (see McBride et al., 2001).

Those who question the appropriateness of mandatory minimum sentences have been supported by studies suggesting that this approach to addressing the drugs-crime relationship is not effective and is more costly than treatment (for example, see Caulkins et al., 1998). Significant activity at the State and Federal level is focusing on mandatory minimum sentencing revision. Along with seeking to reduce the crack/powder sentencing discrepancy, the U.S. Sentencing Commission has been actively supporting efforts to reevaluate mandatory minimum sentencing (Sentencing Project, 1998). New York (the State that played a major role in the introduction of mandatory minimum sentencing for drug offenders via the Rockefeller Drug Laws) is seriously considering significant modification of its policies. The proposed New York modifications focus on an expansion of treatment services, a reduction in the range of mandatory minimum sentences, and an expansion of judicial discretion (Sengupta, 2001). If and when these changes take place (at the national level and/or in specific States), it will be important to examine their impact on the drugs-crime relationship.

Treatment versus prison

Coerced treatment (also referred to as compulsory, mandated, or involuntary treatment) is a heavily debated issue. Some oppose the practice on philosophical or constitutional grounds, while many treatment clinicians maintain that treatment can be successful only if a person is truly motivated to change. Other researchers (Anglin and Maugh, 1992; Salmon and Salmon, 1983) and policymakers have argued that few chronic addicts will voluntarily agree to enter and remain in treatment without external coercion. In a review of research examining the relationship between various levels of legal pressure and treatment outcomes, Farabee, Prendergast, and Anglin (1998) determined that findings generally supported the use of coercive measures to increase the likelihood that an offender will enter and remain in treatment. Specifically, they concluded that compulsory substance abuse treatment is "an effective source of treatment referral, as well as a means for enhancing retention and compliance" (p. 7). Since researchers generally agree that length of time in treatment is strongly related to treatment success, coercing offenders into treatment and then applying graduated sanctions to motivate continued participation is a potentially successful strategy. It can certainly be stated that coerced treatment plays a major role in treatment referrals. Recent studies indicate that the criminal justice system is responsible for 40 to 50 percent of community-based treatment program referrals (Farabee, Prendergast, and Anglin, 1998). Rates of referral vary widely by substance, with marijuana and methamphetamine referrals occurring significantly more often than referrals for other substances (Drug Abuse Warning Network, 2000).

However, Taxman (2000) argues that merely mandating an offender to treatment does little to increase motivation or success. Simpson and colleagues (Simpson et al., 1997; Simpson, Joe, and Brown, 1997) have found that failure to address motivation and readiness for treatment reduces treatment effectiveness. In addition, Farabee et al. (1999) maintain that the application of mandated treatment varies widely, ranging from simple referral to treatment to strict graduated sanctions with heavy monitoring and clear penalties for failure. More research is needed to determine which offender types may experience the greatest benefits of coerced treatment, and with which levels of treatment structures and settings (e.g. residential versus intensive outpatient with heavy monitoring).

Reports on the promise of coerced treatment have prompted some State legislatures to adopt various forms of corrections-initiated drug treatment for nonviolent drug-using offenders. The following is a review of these State initiatives, as well as a Federal measure under current consideration.

California. State voters recently passed the Substance Abuse and Crime Prevention Act of 2000, which targets $128 million per year to help counties develop the capacity to provide drug treatment, literacy training, family counseling, and vocational training services for an expected 36,000 new treatment clients per year (*San Francisco Examiner,* 2000).

Arizona. The Arizona Drug Medicalization, Prevention and Control Act of 1996 requires mandatory treatment and prohibits incarceration of first- and second-time drug offenders. A 1998 Arizona Supreme Court report concluded that the State saved $2.5 million in its first year by sending users into treatment rather than prison (Arizona Supreme Court, 1999). Although critics claim it is too early to argue for program effectiveness due to selection bias and lack of long-term recidivism rates, the study found that 77 percent of offenders tested drug free at the end of their outpatient treatment programs. In addition, probationers who received treatment were twice as likely to be employed (90 versus 41 percent), to finish community service requirements (85 versus 40 percent), and to complete probation successfully (85 versus 22 percent) when compared with those who did not complete treatment.

New York. Governor Pataki recently unveiled a plan to reform the State's Rockefeller Drug Laws by cutting minimum sentences from 15 to 8 1/3 years for some offenses, giving judges increased discretion in sentencing, and giving prosecutors the power to divert repeat drug offenders into 18-month residential treatment programs in lieu of prison time (Gallagher, 2001). These plans resulted primarily from the recommendations of an independent commission charged to study the impact of drug cases on New York State courts. The principal recommendation of this commission was to "launch a systematic, statewide approach to the delivery of 'coerced' drug treatment to nonviolent addicts in every jurisdiction" (New York State Commission on Drugs and the Courts, 2000, p. 7).

Massachusetts. The Department of Public Health's Bureau of Substance Abuse Services recently reported that integrating such services across the State resulted in significant improvements in a number of categories, including reductions in crime involvement, psychological problems, and use of health services, as well as improvements in employment levels and abstinence rates (Massachusetts Department of Public Health, 2000). Based in part on these successes, ballot initiative Proposition P was introduced in the 2000 general election to divert drug forfeiture money from police and district attorneys to treatment centers. The measure failed, possibly due to claims that the initiative was a cover for efforts to decriminalize dangerous drugs (*Boston Globe,* 2000).

National. The U.S. Senate is currently considering the recently introduced Drug Abuse Education, Prevention, and Treatment Act of 2001 (S. 304, 2001). The measure would, among other things, authorize new funding grants to States for the purpose of providing drug treatment services to inmates and residential treatment facilities.

Model State drug laws

In 1992, the President's Commission on Model State Drug Laws was charged with the task of creating a compilation of model State laws that would effectively address

drug and alcohol use (President's Commission on Model State Drug Laws, 1993). After a series of public hearings, drug treatment program site visits, and meetings with various individuals, agencies and groups, a total of 44 model laws and policies were developed. In its report, the Commission noted that

> [T]he legislative remedies offered within do not rely exclusively on punishment and deterrence to "solve" drug problems. Instead, the goal of this report is to establish a comprehensive continuum of responses and services, encompassing prevention, education, detection, treatment, rehabilitation, and law enforcement to allow individuals and communities to fully address alcohol and other drug problems. Tough sanctions are used to punish those individuals who refuse to abide by the law. More importantly, the recommended sanctions are designed to be constructive, attempting to leverage alcohol and other drug abusers into treatment, rehabilitation, and ultimately, recovery. (pp. 1–2)

The President's Commission on Model State Drug Laws' five main policy areas are economic remedies, community mobilization, crimes code enforcement, treatment, and drug-free families/schools/ workplaces.

The five main policy areas are as follows (see appendix A for a listing of specific model laws and policies within these areas): economic remedies, community mobilization, crimes code enforcement, treatment, and drug-free families/schools/ workplaces (President's Commission on Model State Drug Laws, 1993).

Following the compilation of the model laws and policies, The National Alliance for Model State Drug Laws (Alliance) was organized as a nonprofit group that would serve as an ongoing resource for States considering implementation of legislation based on the model laws. The Alliance has held several conferences across the United States to work with elected and appointed officials, substance abuse professionals, and other community leaders and members (National Alliance for Model State Drug Laws, 2001). Several States have passed legislation using the model laws as a framework for laws specifically tailored to their needs, including Arizona, Arkansas, Georgia, Iowa, Kansas, Louisiana, Mississippi, New Jersey, North Carolina, Pennsylvania, and Utah (National Alliance for Model State Drug Laws, 2001). However, no known evaluations of the impact of these laws currently exist. Additional efforts by the Alliance to assist with drug policy revision include providing national and Federal agencies with assistance on State and local laws and policies.

Summary

Trends in State- and Federal-level policies aimed at the drugs-crime relationship can (and indeed do) move in different directions for different substances. Although there has been considerable movement to modify marijuana laws at the State level, no comparable action has been seen at the Federal level. The movement toward reducing the sentencing disparity between crack and powder cocaine (as well as reduce overall penalties) is co-occurring with State and Federal trends to increase the scheduling and penalties for club drugs such as Ecstasy. A further concern raised by this section is that although research may indicate the legitimacy and wisdom of revising current policy (such as moving to coerced treatment instead of incarceration), there is often significant resistance to such actions based on the fear of further escalations of the drugs-crime connection or negative voter reaction. The nature of public policy is complex and reciprocal: The public elects policymakers who support the majority view. This tends to make legislators cautious about supporting changes in drug policy. Therefore, the development of possible public policy that might contradict traditional viewpoints can be highly problematic (Tonry, 1996). However, the breadth and scope of potential legislative actions is impressive. With

an increasing number of States developing innovative laws based on examples such as the Model State Drug Laws, there is need for researchers to examine the possible effects of such policy changes.

This paper has reviewed a wide variety of data describing the drugs-crime relationship and its complex nature, conceptual frameworks that may help interpret the relationship, and the implications of policy for the relationship. An important part of society's reaction to the relationship has been to develop programs to intervene with or break the drugs-crime cycle. Although such intervention attempts have occurred for more than a century, they have become increasingly sophisticated as policy makers and clinicians have come to further understand and apply research findings and relevant conceptual models. The next section of this paper examines many of the intervention programs that have been used and assesses key program elements that have shown some success at intervening in the drugs-crime relationship.

Integrated programmatic approaches to breaking the drugs-crime cycle

In developing programmatic interventions designed to break the drugs-crime cycle among offenders, it is essential to ensure that neither community safety nor offender accountability be compromised in any way, particularly for violent and chronic offenders. However, as noted previously, drug-related crimes exist along a continuum of severity ranging from index crimes—such as murder and armed robbery—to more minor offenses such as nonviolent drug possession. Interventions such as drug treatment should be provided along a continuum as well. Drug-involved offenders who commit serious crimes might receive drug treatment services in a significantly restrictive prison-based therapeutic community. Nonviolent drug-using offenders might receive sentencing and ongoing supervision from a drug court and participate in minimally restrictive victim-offender mediation, along with mandated attendance in intensive outpatient drug treatment services.

Many jurisdictions struggle to integrate substance abuse treatment into their criminal justice systems, which often view such efforts as adjunct services rather than primary, integrated components. Taxman (2000) notes six threats that impede the implementation of treatment services:

- Lack of clear crime control goals for treatment services.
- Lack of clear assessment and eligibility requirements.
- Insufficient treatment duration to effect behavioral change.
- Lack of supervision and sanctions/rewards to reinforce treatment goals.
- Lack of objective drug testing to monitor treatment progress.
- Insufficient case management services.

Many researchers and practitioners have argued that to address these threats, a comprehensive and integrated approach should be used to maximize treatment success and minimize future harm to the community (Anglin and Hser, 1990; Inciardi et al., 1997; Taxman, 1998, Farabee et al., 1999; Martin et al., 1999; Taxman, 1998). Taxman (2000) argues for a systems approach in which "correctional and treatment agencies build a delivery system that cuts across and integrates the systems, reduces duplication in efforts to create and recreate processes for unique

programs, and emphasizes empirically driven programmatic components" (pp. 5–6).

The following review will discuss interventions designed to break the drugs-crime cycle among offenders using an integrated approach that can be applied throughout the range of sentencing alternatives.[3] This approach, which integrates restorative justice with an ecosystems framework, includes the following components: immediate and comprehensive assessment; judicial processing, including the use of drug courts; supervision and monitoring, including graduated sanctions and cross-systems case management; cross-systems collaboration; the drug treatment service continuum; and aftercare.

Common screening instruments include the CAGE Questionnaire, the Michigan Alcoholism Screening Test, and the Offender Profile Index.

Comprehensive assessment and treatment planning

Appropriate client selection, assessment, and placement have been identified as critical components of the treatment continuum (Simpson and Curry, 1997–98; Taxman, 1998; Farabee et al., 1999). Substance abuse problems are usually enmeshed within a wide variety of other issues. Thus, comprehensive assessment is necessary to successfully address alcohol and other drug problems.

Assessment. Assessment usually occurs at the point of intake into the criminal justice system (often at either centralized intake centers or police stations). Intake recommendations can heavily affect judicial decisions; it is imperative that intake personnel be thoroughly trained in the use of comprehensive assessment tools. Such training should include incorporation of culture and ethnicity issues in comprehensive evaluations, as well as dealing with the complexities of clients with multiple diagnoses. A poorly conducted assessment, using techniques and measurement instruments that do not consider the offender's entire life situation in a holistic manner, are destined to produce faulty and inadequate recommendations and decisions. Careful assessment mechanisms not only will help identify those services that are most needed by offenders, but also will prevent system duplication leading to inefficient and poorly coordinated service delivery. By properly assessing and coordinating services at intake, the justice system can more effectively work towards preventing increasing levels of future recidivism and drug use.

Offender evaluation generally occurs in two phases: initial screening, followed by more comprehensive assessment. The primary purpose of initial screening is to determine if the need for a more comprehensive assessment exists. Thus, it is inappropriate to use screening instruments to formulate a diagnosis or decide treatment needs. Screening instruments also filter out individuals with medical, psychological, or legal problems that need to be addressed prior to placement. Common screening instruments include the CAGE Questionnaire, the Michigan Alcoholism Screening Test, and the Offender Profile Index (for more detailed descriptions of these tools, see Inciardi, 1994).

If the screening instrument indicates an alcohol or other drug problem, a more comprehensive assessment is needed. At minimum, a comprehensive assessment should include:

- An indepth examination of the severity and nature of the alcohol and other drug abuse identified by the screening process.
- A more thorough assessment of additional problems flagged during screening and further inquiry into problems that may not have been identified up to that point.
- A strong effort to use multiple methods and sources.

Components of a comprehensive assessment instrument include:

- History and current patterns of alcohol and other drug use.
- Past and current involvement in the criminal justice system, including any history of violent behavior and manifestations of antisocial personality and psychopathology.
- Family and social support systems.
- Medical history and current health status, including HIV/AIDS screening.
- Mental health history and current status, including screening for any history of abuse, anxiety, or depression.
- Educational and vocational history and needs.

Two commonly used assessment instruments are the Addiction Severity Index (ASI) and the Wisconsin Uniform Substance Abuse Screening Battery (adapted from the well-known Minnesota Multiphasic Personality Inventory). The Wisconsin instrument is composed of four separate sub-instruments: the Alcohol Dependence Scale, the Offender Drug Use History, the Client Management Classification interview, and the Megargee Offender Typology. Important supplemental tests to these comprehensive assessment instruments include the AIDS Initial Assessment Jail/Prison Supplement and various biological tests to determine recent drug or alcohol use, including urinalysis, breathalyzer tests, blood tests, hair analysis, and sweat tests (for more detailed descriptions of all of these tools, see Inciardi, 1994).

Comorbidity issues. Researchers report high rates of depression in street drug-using populations (McBride et al., 2000). Additionally, a wide variety of data suggest that there is a high rate of comorbidity among incarcerated drug-using populations. Since the early 1970s, researchers have called attention to the special needs of jail inmates with mental illness (Gibbens, 1979; Gold, 1973; Verma, 1979). Although indepth studies on the prevalence of mental illness in prisons are very limited, researchers estimate that around 7 to 9 percent of jail inmates are mentally ill (BJS, 1999, as cited in Lurigio and Swartz, 2000, p. 67). Rates of mental illness among those who are alcohol or drug dependent are believed to be much higher. Peters and colleagues (1992) found that, of jail inmates who were receiving substance abuse treatment, more than half self-reported a history of depression, 45 percent reported serious anxiety or tension, and 19 percent had a history of suicidal thoughts. Among juveniles, the Northwestern Juvenile Project has estimated that two-thirds of juvenile detainees have one or more alcohol, drug, or mental disorders (Teplin, 2001). Because depression is also a consistent predictor of therapeutic noncompliance, it is important to make sure that an alcohol or other drug-diagnosed arrestee is properly assessed and treated for depression or other mental disorders (Markou, Kosten, and Koob, 1998).

The conditions and care received by the detained mentally ill have been found to be grossly inadequate (Alemagno, 2001; Birmingham et al., 2000; Lurigio and Lewis, 1987). Outcome studies suggest that to serve this population better, the most effective approach includes adequately training jail and prison personnel to meet emergency situations, perform basic assessments, and make appropriate referrals to community-based mental health services where safety concerns can be adequately monitored. Such an approach would have the added benefit of also avoiding community-based service duplication (Cox, Landsberg, and Paravati, 1989; Lurigio, 2000).

Treatment planning. The treatment plan should be based on the client's needs, problems, strengths, and resources as identified in the assessment process, and it should seek to use assessment information to match the client with the best treatment modality and level of risk (Inciardi, 1994; McLellan et al., 1997; see also Taxman, 2000). Although clients should participate in the planning process to improve buy-in and treatment compliance, they cannot dictate treatment goals. Treatment planning goals and objectives should be specific, measurable, and attainable. They should also be flexible enough to adapt to emerging client needs as they move through the criminal justice and treatment systems. Goals must conform to the limitations imposed by the court, parole or probation department, or other criminal justice agency that has jurisdiction over the client. Good treatment plans also are designed to address issues related to treatment attrition, noncompliance, and inadequate progress (Inciardi, 1994).

At the conclusion of intake and assessment, intake officers generally have the option of dismissing the case with no further action, placing the offender in a diversion program, or referral to further justice system processing.

Judicial processing

If a decision is made to formally refer an offender to court for further processing, judges will generally use the assessment and arrest report as well as other facts to determine disposition and, if necessary, sentencing. In most jurisdictions, fact-finding and adjudication take place in conventional court systems. However, in an attempt to play a more active role in breaking the linkage between substance use and crime, the judicial system developed the drug court.

Specifically, a drug court takes responsibility for less serious drug-using offenders, and often uses an intensive supervision and treatment program based on graduated sanctions (described below). Drug courts are partnerships between justice system personnel (prosecutors, defense attorneys, and judges); treatment specialists; and other social service personnel (National Association of Drug Court Professionals, 2000). Drug courts allow judges to take a more active role than was provided by such previous options as mandated lengthy sentences and to partner with community resources and agencies. Judges draw on a variety of professionals in assessing needs and recommending services. They are then actively involved in the decisionmaking process regarding what services are to be received. Judges also monitor compliance and apply sanctions when a lack of compliance is evident. Some of the most unique and essential principles of drug courts include immediate and upfront intervention; coordinated, comprehensive supervision; access to a wide variety of treatment services including long-term treatment and aftercare; and graduated sanctions and incentive programs (Tauber, 1994; for more indepth information on suggested organizational factors, see Berman and Anderson, 1999; Cooper, 1997; McBride et al., 1999; National Association of Drug Court Professionals, 2000; Peyton and Gossweiler, 2001).

Evaluations of drug courts have been mixed. Concern has been expressed over evaluation research methodology, wide variations in populations served, and lack of consistent standards for assessment and referral (Inciardi, McBride, and Rivers, 1996; U.S. General Accounting Office, 1997). More recent reviews by Belenko (1998) and Covington (2001) have concluded that drug courts have not been subjected to consistent or methodologically strong evaluations that define terms clearly (from program elements to definitions of success), examine the long-term impact

of drug courts using appropriate comparison groups, or identify what program elements contribute to successful outcomes. Peyton and Gossweiler (2001) suggest the need for more comprehensive policies and protocols consistently applied in all drug courts. This would contribute significantly to methodologically strong evaluations.

With the above concerns noted, evidence still points to a positive impact for drug courts: high treatment retention, increased sobriety, and reductions in recidivism have been noted in many drug court locations; in addition, savings in jail costs can be substantial (Drug Strategies, 1997; Cooper, 1997; Harrell, Cavanagh, and Roman, 2000). A recent evaluation of a midwestern drug court by Spohn and colleagues (2001), which used a comparison group design and controlled for a variety of social and behavioral characteristics, concluded that drug court participants had significantly lower rates of recidivism than those who received standard court processing. To be successful, drug courts require a long-term outlook, significant initial resource allocation, and available treatment slots (Platt, 2001). Additional research is needed to address the significant issues critics have raised regarding the scientific support for drug court enthusiasm.

Supervision and monitoring

As stated in the introduction to this section, interventions for drug-using offenders must ensure community safety as well as offender accountability. Programmatic approaches designed to help accomplish safety and accountability goals include supervision via a system of graduated sanctions, use of drug monitoring and testing to substantiate accountability, and system oversight and coordination through cross-systems case management.

Graduated sanctions. Judicial processing within systems such as drug courts often relies on graduated sanctions for supervision purposes. This approach helps ensure offender rights and deters noncompliance. Graduated sanctions are based on the theoretical foundation of procedural justice, which posits that compliance is enhanced by procedures that are perceived as fair (Taxman, Soule, and Gelb, 1999). Lack of compliance is a significant problem across the justice system. Studies indicate that as many as 61 percent of probationers fail to comply with release conditions (Langan and Cunniff, 1992), and that 30 to 80 percent of new prison intakes each year are probation and parole violators (Burke, 1997; Rhine, 1993). Some critics have expressed concerns that graduated sanctions are a form of "net widening," in which probationers are given technical violations for positive urinalysis tests. Such positive tests have become the equivalent of crimes, although they are described by the drug treatment system as relapses.

Taxman, Soule, and Gelb (1999) state that the efficacy of graduated sanctions results from the use of structured, incremental responses to noncompliant behavior and from an emphasis on swift response to noncompliant acts through a series of specific sanctions that vary based on such factors as the nature and number of violations. The concept of graduated sanctions applies to the following:

- The type of initial treatment intervention (outpatient, residential, or types of collaborative services).
- The service delivery sentencing context (from community diversion to incarceration with coerced drug treatment in a State training school).
- Overall intervention/treatment program outcome goals.
- Progress within the program (McBride et al., 1999).

Taxman, Soule, and Gelb (1999) state that to be effective, graduated sanctions must include three specific elements:

- Inform offenders about infractional behavior and the potential consequences for such behavior.
- Ensure that all members of the graduated sanctions judicial team adhere to the agreed-on sanctions model.
- Strive to uphold offender dignity.

Use of a behavioral contract informing the offender of the graduated sanctions menu should be developed at intake or at the time of court-ordered probation. Such a sanctions menu should reflect certainty, consistency, parsimony, proportionality, and progressiveness (Taxman, Soule, and Gelb, 1999), and it should provide for equivalent responses that allow for tailoring sanctions to specific cases.

Research specifically evaluating graduated sanctions approaches is very limited. However, the use of this approach is quite common within drug courts. In addition, initial studies indicate that offenders in a pretrial intervention program that used graduated sanctions had lower rearrest rates for both short- and long-term (1-year) followup (Harrell, 1998). In addition, the cost-benefits of graduated sanctions indicate promise (Greenwood and Turner, 1993; Rivers and Trotti, 1995).

Although a combination of modalities is likely to offer the most accurate results, privacy and feasibility issues usually determine which methods are used in practice.

Drug monitoring and testing. In recent years, drug testing programs have become increasingly widespread in criminal justice settings (Jacobs, DuPont, and Gold, 2000). In 1998, 71 percent of jails reported having a policy to test inmates for drug use; however, only 8 percent imposed mandatory treatment in response to positive test results. Instead, the most common responses to positive testing involved punitive sanctions ranging from loss of privileges to adding time to the sentence (Wilson, 2000), a practice that critics regard as net widening. Regular drug testing is often part of an overall strategy in which both treatment and criminal justice systems use graduated sanctions to monitor compliance. Advocates of such strategies recommend that testing must be conducted frequently and randomly. Researchers (Marlowe, 2001; Taxman, Soule, and Gelb, 1999) have recommended several compliance-gaining strategies, including clarification of negative and positive behaviors as well as swift, certain, and progressive responses. It is important to use a team approach in which treatment providers and criminal justice personnel share information about progress or relapse issues. It is also important to ensure that offenders are tested as long as they are under criminal justice system supervision.

A wide variety of testing methods exists for illicit drugs, with variation in reliability and validity among testing procedures. The most widely practiced technique is urinalysis. Urinalysis offers a number of advantages compared with other testing methods, including ease in obtaining a sample, ability for sample retest, and low cost (Jacobs, DuPont, and Gold, 2000). However, subjects can easily tamper with samples, and testing only reflects drug use within the last few days. The window of detection is also small for blood sampling, although results are highly reliable. In contrast, hair analysis allows for detection of long-term use (within the last 90 days), but provides unreliable data for studying variables other than simple drug presence. The least invasive testing techniques include sweat patch, saliva testing, and nail testing, but the wider utility of these approaches remains to be studied. Although a combination of modalities is likely to offer the most accurate results, privacy and feasibility issues usually determine which methods are used in practice (Jacobs, DuPont, and Gold, 2000). Comprehensive outcome studies are needed to evaluate the linkages between drug

testing and expected (negative) consequences for positive results.

Cross-systems case management, including TASC. Case management provides one way for criminal justice systems to coordinate the comprehensive needs of offenders. Case management has emerged as a strategy to connect clients to needed resources throughout the service continuum, at intake, during treatment, and after treatment. Case management results in more rapid service access (Bokos et al., 1992), higher levels of goal attainment (Godley et al., 1994; Rapp, 1997), longer lengths of stay in treatment (Rapp et al., 1998), reductions in drug use (Rapp, 1997), improved employment functioning (Siegal et al., 1996) and improved connection to needed resources over time (Dennis, Karuntzos, and Rachal, 1992; Godley et al., 1994; Schlenger, Kroutil, and Roland, 1992) when compared with standard treatment services. Research suggests that case management may be effective as an adjunct to substance abuse treatment for two reasons: Retention in treatment is generally associated with better outcomes, and one of case management's primary goals is to keep the client engaged in the treatment process (Kolden et al., 1997; Siegal et al., 1995, 1996, 1997); and treatment is more likely to succeed when a client's non-substance-abuse problems are also being addressed (e.g. financial problems, family problems, etc.; see Siegal, 1998).

Case managers (CMs), who are often mental health or social workers, support and reinforce treatment goals throughout the treatment continuum by providing the following three functions: assessment (Babor et al., 1991); treatment planning and goal setting, linking, monitoring and advocating (Ballew and Mink, 1996), including navigating the often-confusing social service system (Spear and Skala, 1995); and assisting in offender reintegration with home or other placement, social services, and the workforce. In addition, CMs may intervene in crisis situations or assist offenders with relapse prevention strategies such as developing non-drug-related leisure activities. Intensive case management services are most critical during the vulnerable 2-month period following discharge from primary treatment. They provide continuity of care while simultaneously working to move the client toward independence.

Although a CM can help an offender navigate through the interconnected array of treatment services, it is also clear that such services must be provided in the context of the justice system. Drug courts, probation offices, and other criminal justice system components must work with CMs to coordinate an offender's movement through the justice system via the use of graduated sanctions. The graduated sanctions process allows the judge or probation officer to maintain an appropriate balance between community protection and offender rehabilitation. However, judges generally have neither the time nor the training to ensure that offenders receive a continuum of services. According to a recent NIJ examination of case management within the criminal justice system (Healey, 1999), optimum case management models currently combine two broad approaches: strengths-based case management—focusing on a client's self-identified strengths and talents when developing a service plan, and assuming a client's ability to use these strengths to move toward "socially acceptable choices" (Clark, 1997; Enos and Southern, 1996; Rapp et al., 1998; Siegal et al., 1997); and assertive case management—requiring active involvement of the CM in seeking out and delivering services to clients as opposed to passive service provision (Healey, 1999; Inciardi, McBride, and Rivers, 1996). Within the criminal justice setting, CMs combine support and positive regard for a client's strengths with clear disapproval of the behaviors that led

the client to become involved with the justice system.

Healey (1999) notes that criminal justice case management often involves a conscious blurring of roles between CMs, mental health providers, substance abuse counselors, domestic violence program counselors, and other social service providers. Taxman and Sherman (1998) have suggested that much of the role confusion can be reduced through a systemic approach to case management, including agreed-on role clarifications and resource allocation. Significant cross-training is often necessary to allow such blurring to take place without confusion of appropriate role responsibility or misunderstandings regarding philosophical differences (Healey, 1999).

Effective use of assessment data within a case management framework requires a complex information system that can ensure the availability of relevant information to those involved in service provision (Taxman and Sherman, 1998). If services are to be integrated effectively, it is crucial that intake, assessment, and progress information be shared and not be needlessly duplicated. Such information can play a major role in increased service delivery efficiency and improve the outcome of provided services (for further discussion of this area, see Mahoney et al., 1998).

Perhaps the best example of a programmatic approach incorporating cross-systems case management is TASC: Treatment Alternatives for Safe Communities (also known as Treatment Alternatives to Street Crime, or Treatment Accountability for Safer Communities). TASC is recognized as an offender management model (Anglin, Longshore, and Turner, 1999) that links criminal justice system legal sanctions with drug treatment program therapeutic interventions (Sigmon et al., 1999; see also Inciardi and McBride, 1991). The TASC approach consists of 4 distinct processes and 10 critical elements (Bureau of Justice Assistance, 1995). The four processes are:

- Identification of appropriate drug-involved offenders.
- Assessment of treatment needs.
- Referral to appropriate services and placement.
- Continuous case management at all points along the criminal justice processing continuum (Anglin, Longshore, and Turner, 1999).

The 10 critical elements involve:

- Broad-based support within both the criminal justice and treatment systems with formal communication systems.
- Independence as a unit with designated administrator.
- Appropriate staff training on TASC policies and procedures.
- An established data collection system.
- Explicit and agreed-on eligibility criteria.
- Documented assessment/referral screening procedures.
- Documented policies and procedures for drug testing.
- Offender monitoring procedures, including reporting procedures (Bureau of Justice Assistance, 1995).

The usual position of a TASC program is that of a neutral party. Most program sites do not provide treatment services of their own, nor are they an official member of the criminal justice system. Thus, the programs can be perceived as using nonbiased referral judgments and case management decisions.

Programs can be perceived as using nonbiased referral judgments and case management decisions.

Evaluations of TASC programs have been mixed, based on whether the evaluation is examining operational/procedural issues or outcome issues. Operational/procedural evaluation results (see Anglin, Longshore, and Turner, 1999) have been consistently positive, citing strong screening and identification of drug-using offenders (Toborg et al., 1976); effective linkages with the criminal justice system; increased ethnic diversity in treatment; and increased treatment participation (Collins et al., 1982); improvements in treatment retention (Hubbard et al., 1989; Inciardi and McBride, 1991), and considerable cost-benefit ratios when compared with any form of incarceration (System Sciences, 1979). Outcome evaluations have been mixed. Studies focusing on recidivism generally show that TASC clients either have higher recidivism rates or no significant differences in recidivism compared with control groups (Anglin, Longshore, and Turner, 1999; Owens et al., 1997). However, as TASC uses higher monitoring levels, results on recidivism may simply indicate "net widening"; those who are watched more are caught more. This may indicate a possibility of higher public safety in TASC communities, rather than program failure. Anglin, Longshore, and Turner's (1999) review of five TASC programs chosen to reflect similar programmatic and population characteristics (including adherence to the 10 critical elements) indicated favorable outcomes for service delivery, drug-use days, drug crimes, and sexual activity while high on drugs. However, these results were either modest or were confined to high-risk offenders. Anglin, Longshore, and Turner conclude that more problematic offenders may receive the highest benefit from program participation. Covington (2001) reminds program administrators and researchers that TASC programs have generally not received consistent methodologically strong long-term outcome evaluations. Future research should focus on these issues.

Cross-systems collaboration

By definition, the drugs-crime relationship crosses currently accepted jurisdictional responsibilities and requires system partnerships. The promising components described so far in this paper demand the successful integration of a wide variety of services and jurisdictions, including criminal justice, drug treatment, social services, and public health. Effective use of immediate and comprehensive assessment, drug courts, communication necessary for successful use of graduated sanctions, cross-systems case management in the form of agencies such as TASC, and post-criminal-justice transition services to reintegrate drug users back into the community—all of these approaches are based on an integrated care system. Yet, as Sigmon et al. (1999) note, the adjudication process is historically an adversarial system, and creating successful partnerships that involve a variety of individual agencies is often difficult.

To build the infrastructure required to support cross-systems interactions, collaborative efforts are becoming widespread. Eisenburg and Fabelo (1996) argue that failure to develop an integrated infrastructure not only negatively affects the outcomes of individual programs, but also hastens treatment decay. Such infrastructures have a variety of names but one essential goal: to have representatives from key agencies and services join together to identify the problems their community is seeking to target, develop effective goals and strategies to address those problems, and then oversee the implementation of those goals and strategies (Sigmon et al., 1999). The types of problems such collaborative efforts address should not be narrowly construed. Sigmon and colleagues (1999) refer to adjudication partnerships as an "umbrella concept under which many interagency efforts can be classified" (p. 2).

While collaborative formation usually results from grassroots efforts of local leaders (Sigmon et al., 1999), the recent emergence of State- and county-level managed-care models often require provider subcontracts and collaboration (McBride et al., 1999). Key agency members for collaboratives addressing drugs and crime would include justice system agencies (offices of the prosecution, the defense, and the court), as well as other groups such as law enforcement, welfare, State and local corrections, managed behavioral health care, community treatment, the health department, and State and local managed-care initiatives (Mull, 1998; Sigmon et al., 1999). Such a membership list would allow two essential types of individuals: "1) those who understand and have an interest in the broad and specific problems of community welfare, justice, alcohol and other drug abuse, and health and social services, and 2) community leaders who can ensure that productive change occurs" (McPhail and Wiest, 1995, p. 28).

Although each collaborative will be uniquely tailored to the community it serves, reviews of collaborative efforts have identified several critical elements for success (Sigmon et al., 1999, pp. 2–4; see also Bureau of Justice Assistance, 1995; McBride et al., 1999). These include leadership designation, membership integration, goal setting, development of a team approach, emphasis on a long-term view, research and evaluation, efforts to develop broad-based community support, and sustainable funding (see appendix B for a more thorough discussion of these elements).

Continuum of drug treatment services

Many policymakers, particularly legislators, oppose funding for drug treatment in correctional facilities, believing that the public wants offenders punished rather than coddled (Lipton, 1998). However, research involving numerous large-scale studies consistently demonstrates that treatment has beneficial outcomes. These federally funded and independently evaluated studies—including the Drug Abuse Treatment Outcome Study (DATOS), the National Treatment Improvement Evaluation Study (NTIES), the Treatment Outcome Prospective Study (TOPS), and the Drug Abuse Reporting Program (DARP)—have all confirmed drug abuse treatment efficacy through 1-year followup. These findings remained valid when controlling for type of service received (residential long-term, outpatient drug-free, or outpatient methadone maintenance) as well as drug and client type (U.S. General Accounting Office, 1998). However, the National Research Council (2001) has questioned the strength of these studies' conclusions, arguing that because the studies lacked randomized assignment, researchers "could not provide rigorous evidence on the relative effectiveness or efficacy of particular drug-by-treatment combinations, or estimate the absolute effect size, cost-effectiveness, or benefit-cost ratio of treatment" (p. 230).

Cost savings for treatment relative to incarceration, interdiction, and health care expenditures have been estimated by two recent studies. The first, the California Drug and Alcohol Treatment Assessment (CALDATA), examined the effectiveness, costs, and benefits of providing alcohol and drug treatment in California (Gerstein et al., 1997). Economic savings to the California taxpayer both during and after treatment were estimated to be worth $10,000 per client, yielding a 1:7 cost-benefit ratio (the greatest share of the benefits was found in crime reductions, with smaller savings in health care and welfare costs). The study also reported a 68-percent reduction in drug selling and a 60-percent reduction in arrests resulting from drug treatment. In the second study,

RAND researchers developed an economic model to estimate the relative cost-effectiveness of four cocaine-control programs: three "supply control" programs (source-country control, interdiction, and domestic enforcement) and a "demand control" program treating heavy users (Rydell and Everingham, 1994). Results indicated that for every dollar spent on drug treatment, $7 would have to be spent on incarceration and $25 on interdiction to achieve the same degree of reduction in cocaine use (cost savings would vary depending on factors such as treatment setting, length of time in treatment, and degree of treatment structure). Further, they argued that even when only looking at modest in-treatment effects (assuming 0-percent post-treatment effectiveness through abstinence), cost savings for treatment exceeded those that would be achieved through incarceration and interdiction. This study was later updated to distinguish among a variety of types of domestic enforcement and used a more optimistic assumption concerning how responsive consumption is to enforcement-induced price increases. Caulkins and his colleagues (Caulkins et al., 1997) concluded that

> treatment is more cost-effective than either enforcement approach [conventional or federal] at reducing both cocaine consumption and cocaine spending. Treatment is solidly but not exceptionally more cost-effective than the federal-level enforcement programs at reducing consumption; it has a 1.6:1 edge over conventional enforcement and close to a 3:1 advantage over mandatory minimums. (p. 51)

They also found treatment to be "enormously more cost-effective (on the order of 70 times more cost-effective) at reducing spending on cocaine" (p. 51) than enforcement strategies that shrink consumption primarily by driving up prices.

In a critique of the original 1994 RAND model, the Office of National Drug Control Policy (ONDCP)-funded National Research Council reviewers argued that RAND's conclusions were "based on problematic estimates of treatment effectiveness drawn from uncontrolled observational studies" (National Research Council, 2001, p. 225), and that the assumptions and economic modeling procedures used by RAND researchers were flawed in other ways and therefore not useful for policymaking (Manski, Pepper, and Thomas, 1999). Caulkins, Chiesa, and Everingham (2000) offered an extensive response to the latter set of criticisms, showing that modifying the model to incorporate the reviewers' suggested changes did not in fact materially alter the conclusions. As for the concern that RAND's characterization of treatment was overly optimistic, the evidence is ambiguous. Indeed, some have criticized their model for being overly pessimistic (Caulkins, Chiesa, and Everingham, 2000). Clearly, future research in this area is needed to clarify and tighten assumptions, improve methodologies, and incorporate more carefully controlled data from drug treatment outcome studies (for more comprehensive information on the economics of drug treatment services, see Cartwright, 2001).

Inmate participation in treatment. Although billions of dollars are spent each year to support drug abuse treatment, the large majority of offenders do not receive drug treatment services of any kind. ONDCP spent approximately 20 percent of its $18.4 billion budget on drug treatment in fiscal year 2000 (ONDCP, 2000). More than half of such Federal funding was allocated to support State block grants. In addition to these amounts, State, county, and local governments (as well as private funding sources) contributed significant funds to drug treatment efforts (U.S. General Accounting

Although billions of dollars are spent each year to support drug abuse treatment, the large majority of offenders do not receive drug treatment services of any kind.

Office, 1998). However, it is unclear what proportion of the total available funds have been targeted toward treatment of drug-using offenders. Regarding offender treatment services, 83 percent of State and 73 percent of Federal prisoners reported past drug use in 1997, with 57 percent of State and 45 percent of Federal prisoners reporting use in the month prior to their offense (Mumola, 1999). However, reported participation in drug treatment in Federal and State prisons is minimal in most cases. The 1997 *Survey of Inmates in State and Federal Correctional Facilities* (Mumola, 1999) reported decreases in the percentage of both State and Federal inmates undergoing drug treatment. It is important to note that these trends are difficult to interpret without knowing more about the increases in actual drug treatment capacity within State and Federal systems relative to inmate population increases.

Local jails have fared about the same as Federal and State facilities. According to BJS's 1998 *Annual Survey of Jails* (Wilson, 2000), 66 percent of jail inmates were actively involved with drugs prior to their current incarceration, and 74 percent reported past drug involvement. Almost three-quarters of local jails (90 percent in larger jurisdictions) state that they provide substance abuse treatment or programs for their inmates. However, 64 percent of that total are self-help programs; only 12 percent of jail jurisdictions (mostly large jurisdictions) provided detoxification, counseling, and education in addition to self-help programs. There is a substantial difference between what jails say they provide and what inmates report. The percentage of inmates who actually reported that they participated in substance abuse treatment or programs since their admission to jail was estimated at 10 percent (19 percent for those who had used drugs at the time of the offense). Despite these low rates of participation in treatment, a broad range of studies continues to show that drug treatment for offenders is effective.

Effectiveness of drug treatment for offenders. Drug treatment for offenders is being taken seriously by even the strongest advocates of incarceration for drug possession and use. Flooded court dockets, overcrowded prisons, and high recidivism rates of drug-using offenders have convinced even those most skeptical of treatment that it is impossible to incarcerate all the illegal drug users in the Nation. Scientific research on the brain is offering clues into the nature of drug dependence, leading most to agree with the conclusions of NIDA: "Prolonged use of these drugs eventually changes the brain in fundamental and long-lasting ways, explaining why people cannot just quit on their own, why treatment is essential" (Leshner, 2001). This view has also been adopted by ONDCP, which states that "chronic, hardcore drug use is a disease, and anyone suffering from a disease needs treatment" (ONDCP, 2001, p. 1). Recognizing both the public safety benefits from breaking the cycle of drug use and crime as well as the potential safety risks of allowing drug-addicted criminals on the streets (Taxman, 2000), ONDCP's National Drug Control Strategy advocates a two-pronged approach to the problem: punish criminals for their behaviors while mandating sanctions-based drug treatment. However, questions remain as to which treatment programs are effective, and for which drug users.

Three major cautions must be noted when reviewing the mostly quasi-experimental drug treatment outcome studies. First, many studies rely on client self-reports, which are least valid for higher penalty drugs, recent use, and those involved with the criminal justice system (for further limitations on the validity of self-report drug use, see Hser, 1997). A second and related problem is selection bias. Both the selection of those who elect to enter

treatment (and are thus perhaps viewed as being more motivated to remain in treatment) and program terminations may leave only those participants who are most ready and capable of succeeding when released into the community. Such "weeding out" of participants who may be more likely to fail than succeed could lead researchers to incorrectly conclude greater treatment effects than would be seen through more careful attention to treatment design with randomized assignment to treatment groups (U.S. General Accounting Office, 1998; Pelissier et al., 2000). Third, making a generalization based on the issues just noted, a recent National Research Council report (2001) notes that very few randomized controlled research studies have been conducted on drug treatment outcomes, thereby casting some doubt on the cause of some outcomes.

Despite these challenges, however, some researchers are paying more attention to improving the scientific rigor of these evaluations to achieve the greatest accuracy possible. The National Research Council report summarized five recent treatment evaluation studies that were, in the committee's view, "the methodological state of the art in drug treatment research" (2001, p. 227). The studies, none of which included drug-using offenders, were noted for their random treatment assignment, treatment fidelity, measurement reliability and validity, and continuous rather than dichotomous outcome measurements. The committee also discussed in some detail the ways in which drug treatment outcome studies could be strengthened through improved methodological and statistical rigor. In a separate review (in the same volume) of drug treatment in the criminal justice system, Covington (2001) suggested guidelines for evaluating criminal justice system-based drug treatment. These guidelines included controlling for self-selection bias; controlling for stake in conformity such as employment or marriage (i.e., if an individual is employed, he or she has a greater incentive to adhere to treatment in order to not get fired; or, if married, an individual may have a greater incentive to do well to prevent a spouse from leaving); use of credible outcome measures; identifying appropriate followup periods; linking retention to outcomes; and identifying treatment components that promote recovery.

Treatment settings. Overall, the size and consistency of treatment effects across many reasonably good studies tend to lend credibility to consistent claims of treatment effectiveness. The following section reviews a sample of recent outcome evaluations for offenders in a variety of treatment settings, moving from more restrictive to less restrictive settings. Outcome measures that are typically used to gauge drug treatment effectiveness in such studies include reduced frequency or amount of drug used; relapse time or length of abstinence period; crime, arrest, and conviction rates; and maintenance of parole or probation status.

Overall, the size and consistency of treatment effects across many reasonably good studies tend to lend credibility to consistent claims of treatment effectiveness.

Prison-based therapeutic communities. Therapeutic communities (TCs) are generally intensive, long-term, self-help-based, highly structured residential treatment programs for chronic, hardcore drug users. Although still rooted in a self-help approach, prison-based TCs are more likely than community-based TCs to have professionally trained staff, with inmates being given a reasonable level of power and rewards without too much program control (Wexler, 1995; see also ONDCP, 1996). Three TC approaches will be reviewed below.

Wexler and colleagues have reported on the effectiveness of the Stay 'N Out TC program used by the Department of Corrections in New York State (Wexler, Falkin, and Lipton, 1990; Wexler et al., 1992). TC inmates were compared with

inmates assigned to milieu therapy, counseling, or a no-treatment group (composed of those who volunteered for TC treatment but were placed on a waiting list). Comparing male post-treatment arrest rates, the groups receiving counseling and no treatment were equally likely to be arrested (40 and 41 percent, respectively), while those receiving milieu therapy had an arrest rate of 35 percent, and those receiving TC group treatment had an arrest rate of 27 percent. One significant flaw in this finding is the researchers' failure to account for other background variables, causing some to question the strength of the treatment effect (Pelissier et al., 2000). However, time-in-treatment effects were also noted that showed a strong positive relationship between the number of months in the TC program and the percentage of inmates who were successfully discharged from parole. Specifically, the percentage of male TC inmates who had successful parole discharges grew from 49 percent for those in treatment for less than 3 months to 58 percent for those in treatment for 3 to 6 months. Positive rates further increased to 62 percent when inmates participated in a TC from 6 to 9 months and to 77 percent for those in a TC from 9 to 12 months. Those who eventually failed on parole were still able to stay drug and crime free for significantly longer periods than the comparison groups.

Field (1985, 1989) conducted two evaluations of the Cornerstone Program, a TC for alcohol- and drug-dependent inmates in Oregon's correctional system that also required at least 6 months of followup treatment in the community. Participants had to be granted minimum security status by the prison superintendent. Treatment clients had, on average, about 12 prior arrests, 6 prior convictions, and 6 years of adult incarceration. In the first 3-year followup study (1985), program graduates were found to have had a 29-percent reincarceration rate compared with 74 percent for program dropouts. Similarly, although 54 percent of program graduates were not convicted of any crime (including minor offenses), only 25 percent of the comparison group and 15 percent of program dropouts were not convicted of a crime. Again, these findings should be viewed with some caution given that participants who remained in treatment were acknowledged to have been more highly motivated to succeed than program dropouts. It is also impossible to separate out the effects of the 6 months of community followup treatment (Pelissier et al., 2000). The second study (Field, 1989) found that approximately 75 percent of program completers were not reincarcerated, compared with 37 percent in the comparison group. In contrast, only 15 percent of participants who dropped out of treatment after less than 2 months in the program were not reincarcerated during the 3-year followup.

A major concern of this and similar studies is the high dropout rates from voluntary drug treatment programs. For example, Field (1992) highlighted that, of 220 volunteer inmates who had been admitted to Cornerstone over a 2-year period, 65 withdrew after spending 1 to 2 days in the program, 58 withdrew after spending between 2 to 6 months in the program, 43 withdrew after spending at least 6 months in the program, and 43 graduated. Simpson and colleagues (1997) have estimated that, on average, only 50 percent of all addicts who voluntarily enter treatment actually complete the recommended treatment course. High dropout rates tend to confuse conclusions about treatment outcomes because those who remain in treatment could be arguably more motivated to remain drug and crime free than those who drop out. As has been noted earlier, however, offenders who are given graduated sanctions as a form of coerced treatment generally stay in treatment

longer, complete treatment programs, and report less drug use while in treatment programs than those in voluntary treatment (Simpson et al., 1997; Hubbard et al., 1989).

The Key-Crest program is a corrections-based, three-stage treatment model program that operates within Delaware's correctional system. The first stage, the Key, is modeled on the Stay 'N Out program and includes a 12-month intensive residential TC that is based in the institution but segregated from the rest of the inmates. The second stage, the Crest Outreach Center, is a transitional TC in which inmates work during the day and return to a community-based, more traditional TC environment during their nonworking hours. In the third or aftercare stage, clients have completed work release and are now on parole or other supervision. Intervention at this stage usually involves group or individual counseling as well as the opportunity to return to the work-release TC for booster sessions. While earlier studies (Martin, Butzin, and Inciardi, 1995; Inciardi et al., 1997) demonstrated short-term (1-year) benefits of this TC treatment continuum, many of the positive improvements between the second and third stage clients appeared to disappear in 3-year followup studies (Martin et al., 1999). However, when less conservative analytical models were applied (the new analysis examined Crest dropouts, Crest completers, and Crest completers with aftercare), significant findings emerged. When compared with the comparison group, Crest dropouts were more than three times as likely to be drug free (as measured by initial self-reports and subsequent urinalysis); Crest completers were more than five times as likely to be drug free; and Crest completers with aftercare were seven times more likely to be drug free. Rearrests on a new charge showed a similar pattern, with Crest dropouts having the same rate of rearrests as the comparison group. However, those who completed Crest did much better, and those who completed Crest plus aftercare were the least likely to have a new arrest. Specifically, less than one-third of clients with aftercare had a new arrest, compared with more than two-thirds of the comparison group (Martin et al., 1999).

Long-term residential treatment. Prison-based long-term residential treatment is generally considered to last between 6 to 12 months. Participants often live together in units separated from the regular inmate population. These units are specifically designed to focus on drug treatment. The degree of structure can vary, but generally a professional drug treatment staff coordinates all programs and services. Compared with TCs, prison-based residential treatment is generally more likely to include professional therapeutic interventions using standard treatment approaches. For example, the Bureau of Prisons includes programming on criminal lifestyle confrontation, cognitive and interpersonal skill building, and relapse prevention (Pelissier et al., 2000). Inmate-led self-help approaches are not present in such facilities. The following discussion will present an evaluation of long-term residential treatment, as well as one specific evaluation project.

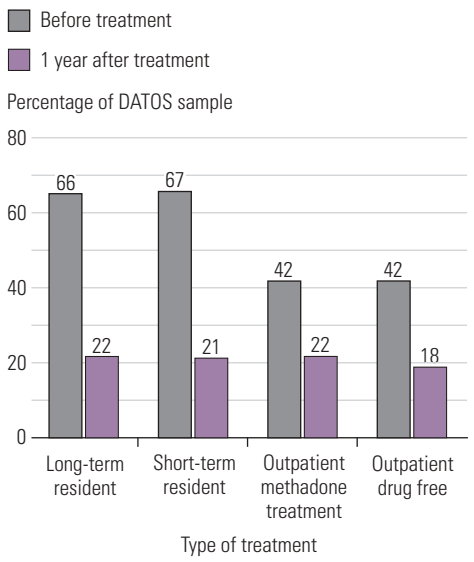
Prison-based residential treatment is generally more likely than therapeutic communities to include professional therapeutic interventions using standard treatment approaches.

From 1990 to 1993, the National Institute on Drug Abuse funded the Drug Abuse Treatment Outcome Study (DATOS), which included 96 programs in 11 cities. Positive outcomes were reported in multiple treatment modalities, including long-term residential treatment (Simpson et al., 1997). DATOS found that individuals in long-term residential treatment reduced weekly or more frequent use of cocaine from 66 percent in the year prior to treatment to 22 percent in the year following treatment (see exhibit 1). This same group reported a 26-percent drop (from 41 percent down to 16 percent) in predatory illegal activity during that same time period

(Fletcher, Tims, and Brown, 1997). Similarly dramatic reductions in self-reported cocaine use were also found for short-term residential treatment.

Using one of the most methodologically rigorous research designs to date, the Federal Bureau of Prisons (BOP) recently conducted a 3-year, 20-site evaluation of its residential drug treatment programs (Pelissier et al., 2000). During the three-phase Treating Inmates' Addiction to Drugs (TRIAD) Drug Treatment Evaluation Project, more than 1,000 inmates first voluntarily participated in a 9- or 12-month residential treatment program. Treatment group results were compared with a true comparison group as well as a control group, neither of whom received any drug treatment services. A second phase required inmates to continue drug abuse booster sessions (including relapse prevention and review of treatment techniques) for 1 year following their return to the general community. During the final phase, inmates were required to participate in community transitional services in which they received individual, group, and/or family counseling from community-based drug treatment providers. Three-year followup findings indicated that men and women who were motivated to change were more likely to enter and complete treatment. Findings on both recidivism and post-treatment drug use were significant for men but not for women.[4] Specifically, men who entered and completed in-prison residential treatment were 16 percent less likely to recidivate when compared with untreated inmates at 3-year postrelease followup. In addition, participants who entered and completed treatment were 15 percent less likely to use drugs than untreated inmates within 3 years after release. These findings are particularly significant because the selection process actually attracted riskier offenders into the treatment programs. In addition, this study carefully addressed the issue of selection bias by comparing results using two different bias correction methods.

Exhibit 1. Self-reported cocaine use among addicts participating in treatment



Source: Chart reproduced from Taxman (1998).

Day reporting centers. As noted previously, many offenders are serving time because of nonviolent drug convictions. To deal with prison overcrowding and the prohibitive costs associated with incarceration-based treatment programs, some correctional facilities have developed day reporting centers (DRCs). DRCs are a form of intermediate sanction in which offenders attend highly structured, nonresidential programs where a variety of services and supervision are provided. First introduced in the United States in 1986, DRCs can be operated by a wide range of public, government, and private agencies, such as residential community corrections centers, work release programs, jails, TASCs, and treatment programs (Parent, 1990; McBride and VanderWaal, 1997). Services such as drug treatment and education, GED courses, English as a Second Language and life

skills are often supervised by both corrections and case management personnel. A DRC has three primary goals: enhanced supervision and decreased liberty for offenders, treatment of offender problems, and reduced crowding of incarceration facilities (Parent, 1990). The concept has been adapted in a number of ways, including:

- Providing enhanced treatment and supervision to probationers or sentenced offenders not on probation.
- Monitoring inmates on early release from jail or prison.
- Monitoring arrested persons prior to trial.
- As a halfway-out step for inmates who have shown progress in community-based corrections or work release centers.
- As a halfway-in step for offenders who have violated their probation or parole (Curtin, 1990, as cited in Diggs and Pieper, 1994).

These programs are probably most appropriate for nonviolent offenders whose behaviors have not been improved through probation and/or who need greater structure and treatment services than could be provided in a less restrictive setting. While attending the center, participants are often required to submit to random drug testing and participate in counseling, education, and vocational placement assistance. Graduated sanctions are applied when participants are found to have violated the terms of their sentence.

Relatively few studies have been conducted to assess predictors of program completion or termination in DRCs. Studies which have been conducted are difficult to compare due to the wide variability of settings, services, eligibility criteria, monitoring procedures, levels of supervision, and termination policies (Diggs and Pieper, 1994). While some studies have shown initial evidence of cost savings (Craddock, 2000) and lower rearrest rates (Diggs and Pieper, 1994; McBride and VanderWaal, 1997), evidence of program effectiveness was not as great in programs that lasted 12 months or longer[5] (Marciniak, 1999). Marciniak (2000) found high rates of program termination for drug violations and rearrests. Several authors (Blomberg and Lucken, 1994; Marciniak, 1999; Tonry, 1990, 1997) have also expressed concerns of "net widening" since many offenders who would otherwise be sentenced to probation are placed in DRCs where they are watched more closely and are therefore more likely to be rearrested. Given the relatively recent emergence of this form of intermediate sanctioning, future studies should focus on success indicators such as program completion, drug use, rearrests, and cost-effectiveness, particularly in longer term programs. Program success indicators should be based on comparisons with offenders who would have been incarcerated as opposed to those traditionally found in probation to avoid a net-widening bias (Diggs and Pieper, 1994).

Outpatient and intensive outpatient treatment. Taxman (1998) notes that the location of drug treatment does not always relate to the intensity of services provided to the client. Instead, the number of service hours is often a better indicator. As such, community-based outpatient and intensive outpatient treatment services are often used as a transition from TCs and other more intensive corrections-based services. Such services are particularly important to drug courts, who primarily use treatment alternatives within the community. The setting is generally less important than the quality and quantity of services provided to clients, although

the organization providing the services must be supportive of delivering interventions to correctional populations (Pogrebin, 1978). The DATOS study introduced in the previous section (regarding long-term residential treatment) also included positive outcomes for outpatient drug-free treatment: self-reported cocaine use dropped from 42 percent before treatment to 18 percent at 1-year followup (see exhibit 1).

Treatment intervention approaches. The previous section reviewed outcome studies on a variety of drug treatment settings, based on a range of restrictiveness. Each of these settings often includes such intervention approaches as life-skills training, group and individual counseling, relapse prevention training, and educational and vocational skills training. In addition, a variety of theoretical models influence the content and approach to such interventions. It is beyond the scope of this paper to review these approaches and theories. As mentioned earlier, however, NIDA has conducted a number of large-scale research evaluations on a variety of interventions (e.g. DARP, TOPS, DATOS), and readers are referred to those studies to review intervention effectiveness. In addition, NIDA is currently conducting controlled, multisite tests of emerging science-based drug abuse treatments such as the use of buprenorphine/naloxone treatments for detoxifying opiate-dependent patients and incorporating motivational enhancement therapy into standard treatments (Mathias, 2001). Motivational enhancements offer abstinent clients a chance to win small prizes such as candy bars, Walkmans, or gift certificates to local restaurants by testing negative for various illicit drugs. As the number of abstinent weeks increases, so do the number and value of the incentives. It is anticipated that such evaluations will provide preliminary evidence of effectiveness and efficacy so that knowledge about treatment effectiveness can be improved.

It is important to recognize the importance of matching the drug-using offender with the appropriate treatment.

Based on a comprehensive review of clinical and health services research on drug abuse, ONDCP (1996) made the following recommendations regarding critical elements for successful treatment in any setting (e.g. prison based, residential, or outpatient):

- Complete and ongoing assessment of the client.
- A comprehensive range of services, including pharmacological treatment (if necessary), counseling (either individual or group, in either structured or unstructured settings), and HIV-risk reduction education.
- A continuum of treatment interventions.
- Case management and monitoring to engage clients in services of appropriate intensity.
- Provision and integration of continuing social supports.

NIDA came to many similar conclusions in their research-based guide, *Principles of Drug Addiction Treatment* (NIDA, 1999). This guide also reviews scientifically based approaches to drug treatment and makes recommendations. A full listing of the NIDA recommendations is found in appendix C.

In addition to the recommendations and principles listed by ONDCP and NIDA, it is important to recognize the importance of matching the drug-using offender with the appropriate treatment. This simple concept is, at times, especially difficult to employ in jurisdictions that may lack adequate resources to provide a full continuum of services. Essentially, treatment matching recognizes that no single treatment is universally applicable. Levels of restriction and supervision, treatment modalities, and psychopharmacological treatment options (such as methadone) must be assessed on a case-by-case

basis. The ramifications of this issue include the need for training system personnel on treatment continuum issues, realistic expectations by both treatment and criminal justice systems regarding the potential impacts of available services, and the potential need to educate the community on what can be expected from available resources.

Gender differences in treatment. Pelissier and her colleagues (2000) completed a comprehensive review of literature on gender differences among substance abusers (for supporting literature documentation of this summary paragraph, see Pelissier et al., 2000). Although much of the current increase in the number of incarcerated women is linked to substance abuse (Kassebaum, 1999), few studies have examined gender differences among substance-abusing inmates. Studies primarily on nonoffending substance abusers show that women generally have different social, psychological, and economic circumstances; different initiation and drug use patterns; and different criminal histories than men. Most discussions of treatment approaches for women include a strong focus on ancillary services such as health care, child care, and female treatment staff. Therapeutic recommendations include a focus on relationship issues, support, skill building, and identification of strengths as opposed to the confrontation strategies that are common for men (for a summary of treatment effectiveness studies for men and women, see Landry, 1997). Despite these differences, however, few treatment programs focus heavily on women's issues, particularly in correctional facilities. Not surprisingly, few studies have looked at outcomes of treatment programs designed specifically for women (Landry, 1997), in part due to the relatively small numbers of female drug treatment participants (Moras, 1998).

Aftercare

Aftercare (or continuing care) is defined as "a set of supportive and therapeutic activities designed to prevent relapse and maintain behavioral changes achieved in previous treatment stages" (Fortney et al., 1998, as cited in Inciardi et al., 2001). The aftercare phase of the treatment continuum is often neglected for drug-using offenders. As noted previously, most drug-using offenders have high relapse rates and therefore require extended periods of treatment exposure and ongoing support to achieve and maintain sobriety. In addition, most treatment graduates are ill equipped to integrate back into their old neighborhoods (Berman and Anderson, 1999). For these reasons, providing aftercare as a followup to more restrictive treatment may improve treatment effectiveness. Cross-systems case management and collaboration are critical at this phase in the treatment process to maintain an integrated continuum of care for clients as they transition back into the community.

Martin et al. (1999) recommend that treatment interventions at this stage include continued monitoring by previously involved treatment counselors (such as TC counselors). Interventions at this stage could include regular outpatient counseling, support groups such as Alcoholics Anonymous, group therapy, and family therapy sessions. In addition, Tauber (1994) calls for educational opportunities, job training and placement, and health and housing assistance.

Several studies (Lash, 1998; McKay et al., 1998; Rychtarik et al., 1992) with noncorrectional populations have suggested that improved treatment outcomes can result from aftercare (most of these studies are correlational in nature). In such settings, it is possible that selection bias is present,

since motivated clients may make better use of aftercare services (Inciardi et al., 2001). However, recent studies with corrections-based treatment followed by aftercare have also shown preliminary indications of success (DeLeon et al., 2000; Wexler et al., 1999). Offenders in the California-based Amity Right Turn Project received voluntary TC treatment followed by community-based aftercare programming. No-treatment control groups were compared with TC dropouts, TC graduates, and aftercare completers after 12, 24, and 36 months. Although recidivism rates increased for all groups as time increased, those who completed both the treatment and aftercare phases had the lowest rearrest rates. Inciardi and colleagues (2001; see also Martin et al., 1999) conducted a similar aftercare study with Key-Crest participants. Voluntary clients were randomly assigned and purposively sampled across four groups: a no-treatment comparison group, treatment dropouts, treatment graduates, and treatment graduates with aftercare. Researchers conducted followup interviews at 18 and 42 months and collected information on drug use (interview and urine screen) and rearrest rates (interview compared with official prison records). Eighteen-month followups indicated that treatment dropouts and graduates were twice as likely than the comparison group to be drug free, and treatment graduates with aftercare were three times more likely to be drug free. Preliminary data from the 42-month followup were even more impressive. Although only 25 percent of the comparison group were arrest free, more than half of the graduates with aftercare remained arrest free. Similarly, 25 percent of comparison cases remained drug free, compared with 36 percent of the treatment-with-aftercare group. Such studies could be further strengthened with larger sample sizes, evaluating suitability of clients for treatment, more careful control of self-selection bias, and careful analysis of other intervening variables.

Summary

Current research suggests that successful programmatic efforts to intervene in the drugs-crime relationship are based on a continuum of integrated services stretching from assessment through aftercare. Although research has evaluated the various components that might be most beneficial for inclusion in a successfully integrated system, we know of no studies that have attempted to measure the success or lack of impact of such integrated approaches.

Suggestions for future research

In any field of scientific inquiry, one of the easiest things to do is to call for more research. Not surprisingly, that is exactly the most appropriate thing to do with regard to the drugs-crime relationship. New conceptual and mathematical models have emerged recently in the social sciences that will allow a fresh perspective on many of the questions that have been addressed in the past and provide a new baseline for the 21st century. Human cultures change, some fairly rapidly, and even a brief review of the past 25 years in the United States with regard to drugs and crime would indicate that ours has changed dramatically. In the area of the drugs-crime relationship, one illustration of this change is the apparent reduction in the violence associated with cocaine/crack distribution. Such changes require fresh examinations of previously collected data and more rigorous evaluations of current programs and policies. Although there are certainly many areas of potential further inquiry, the following areas are suggested:

Using secondary data analyses to provide a new empirical baseline for understanding the drugs-crime relationship

The Federal Government, other agencies, and universities have collected enormous amounts of data that are directly relevant to many key drugs-crime questions. These data include the National Household Survey on Drug Abuse (NHSDA), the Monitoring the Future (MTF) study, the Arrestee Drug Abuse Monitoring Program, and the Treatment Episode Data Set (TEDS). These data could be used to provide a new baseline of knowledge about certain statistical elements of the drugs-crime relationship across the lifespan and in many different segments of the population. In addition, these data could be used to demythologize many policy and popular conclusions about the drugs-crime relationship. For example, data from some of these systems call into question some beliefs about the cocaine-violence connection as well as suggest that the criminal justice system may primarily direct marijuana users to the treatment system to the exclusion of other drug users.

Further studying the nature and complexity of the drugs-crime relationship using the latest interdisciplinary conceptual and analytical models

Many of the interventions that have been applied to breaking the drugs-crime cycle have involved a fairly narrow focus on drug treatment and have not sufficiently recognized the complex origins of both behaviors. Further, there is increasing evidence of a need to include multilevel variables in order to understand how crime and drugs are connected. This was not possible previously due to the statistical precision needed. In addition, the 2000 Census and geocoding provide an opportunity to add another data dimension to drugs-crime analyses. For example, if we could obtain parallel geocoding data for the ADAM dataset, the number of questions that could be addressed about the drugs-crime relationship would expand geometrically. We need to integrate advances in analytical models with advances in neurobiology, personality, family systems, and peer influence studies as well as include broader contextual variables (including ecosystems theory, social capital, economic opportunity, drug prices and market variables, drug laws/policy, and geographical data).

Consider using computer simulation modeling to examine key research questions

Some of the etiological ideas that researchers are examining may be applicable to computer modeling in the future. For example, it might be useful, in a simulated model, to manipulate reductions in supply, increases in price, changes in policy (such as treatment on demand and/or marijuana decriminalization/medicalization) to examine how such issues would affect drug use, crime, and their interrelationship. Although the data entered in a simulation would be based on the types of research previously noted, and the pitfalls and complexities of undertaking this approach have not been thought out, it may be time for the drugs-crime field to begin considering the use of computer simulation technology to address the critical issues facing many communities.

Evaluating State changes in drug policy to examine different attempts to address the drugs-crime relationship at a macro but yet subnational level

Throughout this document, it has been noted that while there has been relatively little modification of drug law and policies at the national level, there has been considerable legislative action in many States

and communities. Model State drug laws have been proposed. Many States are moving towards allowing medical marijuana, and many States have decriminalized marijuana possession (or at least removed incarceration penalties for the first marijuana possession conviction). Other States are changing club-drug laws to increase scheduling and penalties. In addition, there are significant differences between States (and communities) regarding treatment availability and budgets. For many years, there have been calls for international research comparing the impact of different national drug policies. However, given significant differences between national cultures, these comparisons are difficult. Variance in State law and policy provides a more readily available opportunity to examine variance between entities (the 50 States) with differing laws and policies. These changes suggest a number of possible research areas. For example, comparing differences in marijuana use (or drug use in general), perceptions of risk, and peer disapproval in States that have medical marijuana and/or marijuana decriminalization with States with high-deterrence prohibition policies could provide an excellent foundation for evaluating changing drugs-crime policies.

Evaluating attempted interventions in the drugs-crime cycle for net widening

As noted, the increasing availability of drug courts and other mandatory treatment programs may encourage law enforcement to intervene earlier and more formally in the lives of individual drug users. This change in strategy and tactics could begin a formal criminal justice labeling process that may exacerbate, rather than ameliorate, the relationship between drug use and crime. It may also result in changing definitions of law violation and increase the number of those arrested and incarcerated due to new placement criteria and options. It is critical that we evaluate such changes early so that lessons learned from them may be used strategically to change later interventions.

Considering the need to establish research field stations in high-risk communities

One idea that has been discussed episodically in the drug field for the past two decades involves the use of a research field station approach. Although there have been some attempts to undertake such an endeavor, these efforts generally have been limited in time and/or place. Existing data (combined with geocoding) could be used to identify communities with high rates of drug use and crime. Theoretically based multivariate research projects could then be conducted in these targeted communities from a qualitative, on-the-ground perspective. Such an approach might permit researchers to understand some of the changes in violence associated with crack distribution that seem to have occurred in recent years.

Examining the relationship between particular enforcement strategies and drug markets

Recent modifications to the ADAM study (including asking subjects about access to drugs and conditions that they perceive as affecting access) provide the possibility of empirically modeling the effects of specific enforcement strategies on specific drug markets (cocaine, crack, and heroin) and drug prices. In particular, researchers may be able to evaluate a particular enforcement strategy's impact on drug market location (moving it indoors or to more urban settings), the number of dealers typically used, the amount of time searching for drugs, or the price of that drug (from STRIDE [System to Retrieve Information from Drug Evidence] or other sources) and

more. This could provide researchers with very important information about how drug markets operate in local areas in response to enforcement strategies.

Comprehensively evaluating current programs designed to intervene in the drugs-crime cycle

Many programs exist that attempt to intervene in the drugs-crime cycle from the juvenile to adult level. Although there have been significant attempts to evaluate these programs, most of these efforts have been descriptive or have used fairly simple analytical designs (often quasi-experimental). What is needed are large-scale, carefully controlled studies that focus on long-term program outcomes using multiple indicators of success and that identify program elements related to outcomes. These evaluations should focus on what the literature might call best-case program models that generally involve comprehensive assessment, needed service provision based on that assessment, case management, graduated sanctions, and aftercare. Most outcome studies examine such factors as rearrest rates or drug relapses. Additional successful outcome measures might include such non-crime-related outcomes as payment of child support, family formation and stability, employment stability, and residential stability. In addition, it is important to examine how these programs vary in their impact by gender, ethnicity, and age as well as provision context (prison to community). Finally, it is crucial to examine program costs relative to the cost of incarceration and the cost of no intervention. Although specific recommendations for further research were included at the end of each program intervention section in this chapter, the following research questions are of high priority:

- Which drug testing methods offer the best combination of accuracy, privacy, and feasibility? How does drug monitoring alone compare with more comprehensive systems and treatment interventions in terms of outcomes such as drug use and recidivism?
- What assessment protocols can most accurately be used to place offenders in the safest, least restrictive, and most effective treatment settings?
- What level and intensity of drug treatment services are most appropriate for which offender types and settings?
- What forms and mixtures of the reviewed programmatic interventions (e.g. graduated sanctions, supervision/monitoring, various drug treatment services and settings, aftercare, etc.) predict program completion or termination (or other specific outcomes) with which populations and under which conditions?

Using interdisciplinary teams to conduct research on the drugs-crime relationship

A review of the literature shows that individuals from a variety of disciplines have examined the drugs-crime relationship. Each discipline has approached the relationship from its particular perspective, and each discipline likely has an important and unique perspective on understanding the relationship. Some of the critical reviews of conceptualization, methodology, and conclusions in drugs-crime research are often based on particular disciplinary perspectives. To broaden the perspectives of these disciplines, the types of research issues/questions that have been proposed require the efforts of an interdisciplinary team. If there is to be clear definition, development, and operationalization of treatment program elements, treatment providers must provide input. Researchers trained in experimental or quasi-experimental design are crucial in developing and carrying out the needed scientific designs.

Social scientists (survey researchers, geographers, and ethnographers) are needed if issues of gender, ethnicity, and other sociocultural and spatial characteristics are to be included in the design and data interpretation. Given today's strong social concern relative to cost-benefit outcomes, it is crucial to include economists on research teams. Drugs-crime research has clearly reached the stage where interdisciplinary research teams are required.

Establishing interagency cooperation in funding research

An examination of the various governmental reports and our conversations with colleagues about this project suggest that many different agencies focus on and issue reports about the drugs-crime relationship. It appears that the authors of many of these reports are not aware of the excellent research funded by other agencies. Given the limited resources in any given funding agency and the different research traditions in various agencies, integrated research will require significant interagency cooperation. Such cooperation could make sufficient resources available to address the types of complex research needed in drugs-crime analysis.

Notes

1. For economists, the term "open market" has a very precise meaning. In this paper, however, we use the term in a general sense to indicate low levels of government regulation.

2. The companion papers to this work discuss the psychopharmacological and economic components of the drugs-crime relationship.

3. The focus will be primarily on adult intervention strategies since other recent reports have completed a comprehensive literature review and offered program guidelines focusing specifically on juveniles (McBride et al., 1999).

4. Although Pelissier and her colleagues did not find a significant treatment effect on postrelease drug use and crime for women, further analyses indicated no significant differences between the coefficient for men and women. This lack of significance for women is likely a reflection of the smaller sample size for this population (Pelissier, 2001; personal communication).

5. The issue of length of time in treatment as indicative of stronger gains in treatment was raised previously in this paper. This issue is debated in the field. Marciniak (1999) argues that longer may be better only up through 9 to 12 months; treatment deterioration may then begin. Other researchers argue that this outcome needs more study.

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Appendix A. Model State drug laws and policies

The President's Commission on Model State Drug Laws' (1993) model legislation specified five main policy areas. Following is a more complete list of the laws and policies within each general policy area.

Economic remedies

Forfeiture reform; money laundering; financial transaction reporting; money transmitter licensing and regulation; ongoing criminal conduct.

Community mobilization

Expedited eviction of drug traffickers; drug nuisance abatement; crimes code provisions to protect tenants and neighbors; antidrug volunteer protection; community mobilization funding; alcohol/other drug abuse policy and planning coordination.

Crimes code enforcement

Prescription accountability; State chemical control; Uniform Controlled Substances Act controlled substance analogs; continued access by law enforcement to wire and electronic communications; wiretapping and electronic surveillance control; driving while under the influence of alcohol and other drugs.

Treatment

Addiction cost reduction; Medicaid addiction cost reduction; managed care consumer protection; family preservation; early and periodic screening; diagnosis and treatment services; health professionals training; criminal justice treatment; caregiver's assistance.

Drug-free families/schools/workplaces

For drug-free families, underage alcohol consumption reduction; preventive counseling services for children of alcoholics and addicts; sensible advertising and family education; tobacco vending machine restriction; revocation of professional or business licenses for alcohol and other drugs.

For drug-free schools, drug-free school zones; ban on tobacco use in schools; intervention for students with substance abuse problems; State safe schools; alcohol- and drug-free colleges and universities; truancy, expulsion, and children out of school.

For drug-free workplaces, drug-free private-sector workplaces; drug-free workplace workers' compensation premium reduction; employee assistance programs and professionals; drug-free public work force; drug-free workplace; employee addiction recovery.

Reference

President's Commission on Model State Drug Laws (1993), *President's Commission on Model State Drug Laws: Executive summary,* Washington, DC: President's Commission on Model State Drug Laws.

Appendix B. Critical elements for collaborative success

As noted in the main body of this paper, reviews of collaborative efforts have identified several critical elements for success.[1] These elements are specified and discussed below.

Leadership

There is a need for one or more key agencies to start the collaborative process, preferably bringing experienced leadership and/or supervision to the table. This body must be willing to take the responsibility to identify problems and help other members to envision solutions, maintain the support and involvement of other members, and work toward helping build an atmosphere of equality. Because in many communities the relationship between the treatment and criminal justice systems is often strained, there is a need to recognize differing primary responsibilities. Within the context of the courts, the justice system has the primary role in monitoring offenders along the graduated sanctions continuum; treatment systems have the primary role in providing appropriate and effective treatment services. Some evidence indicates that the optimum structure might place in the position of managing partner a "neutral" group that does not provide direct services (such as TASC) to ensure unbiased service organization referrals, case management, and collaborative organization. No matter who holds the leadership role, this individual/agency/group must seek consciously to actively involve all stakeholders from the beginning of design and implementation of the proposed program(s) or initiative(s).

Membership

As noted previously, membership should be broad based, representing key agencies in the justice, law enforcement, and treatment systems, and a broad range of other community agencies.

Goals

Collaboratives should design specific goals that are clear, useful in the minds of participants, and achievable within specified timeframes, including both short- and long-term goals, and with specified priorities. Successful collaborative groups have reported the existence of a strategic plan, including specific goals, an outline of programs related to achieving those goals, evaluation methods, and regular public progress updates. A description of goal and program review and change was related to successful formation and structure.[2] Performance measures can be especially useful for evaluation and thus the possibility of obtaining continued funding.

Team approach

Collaborative efforts should seek a team approach for both decision planning and making. Leader agencies and/or organizations should seek to maintain civility at meetings and encourage flexibility. Decisionmaking should strive to use consensus-building methods. Efforts toward developing a team approach can be assisted by making sure that each collaborative member has a clearly defined role and responsibilities; this can be aided by early cross-training for collaborative members in the activities and responsibilities of the systems involved.

Long-term view

Members should recognize the complexity of collaborative goals and strategies, that neither substance abuse nor crime has a single solution. Realistic timelines for all efforts should be set.

Research and evaluation

Communities considering collaborative work should use available information on best practices from the literature to guide collaborative and program development. In addition, methods should be developed to systematically collect objective data for monitoring and evaluating collaborative projects.

Broad support

The need to gain the support of the community at large is essential for sustainability; active efforts to seek community input can gain support, and regular communication about the goals and accomplishments of the partnership can help maintain that support.

Funding

Long-term funding sources are crucial for the viability of any coalition. External funding sources may assist in providing incentives for development of successful partnerships[3] such as through block grants or private foundations; in addition, communities may have the possibility of pooling funds from various agencies. However, efforts should be made to gain line-item legislative support for sustainability.

Notes

1. Sigmon, J., Nugent, M., Goerdt, J., and Wallace, S. (1999), *Key elements of successful adjudication partnerships* (BJA Bulletin, NCJ 173949) pp. 2–4 [Online], available: *http://www.ncjrs.org/pdffiles1/bja/173949.pdf*; see also McBride, D.C., VanderWaal, C.J., Terry, Y.M., and VanBuren, H. (1999), *Breaking the cycle of drug use among juvenile offenders: Final technical report* (NCJ 179273) [Online], available: *http://www.ojp.usdoj.gov/nij/drugdocs.htm.*

2. Join Together (1999). *Results of the fourth national survey on community efforts to reduce substance abuse and gun violence* [Online]. Available: *www.jointogether.org/ sa/files/pdf/survey98.pdf.*

3. Kraft, M., and Dickinson, J. (1997). Partnerships for improved service delivery: The Newark Target Cities Project. *Health & Social Work,* 22(2), 143–148.

Appendix C. Principles of drug addiction treatment*

NIDA (1999) developed a list of scientifically based recommendations for drug treatment applicable for use across the entire system of service delivery. These principles are listed below:

1. No single treatment is appropriate for all individuals.
2. Treatment needs to be readily available.
3. Effective treatment attends to multiple needs of the individual, not just his or her drug use.
4. An individual's treatment and services plan must be assessed continually and modified as necessary to ensure that the plan meets the person's changing needs.
5. Remaining in treatment for an adequate period of time is critical for treatment effectiveness.
6. Counseling (individual and/or group) and other behavioral therapies are critical components of effective treatment for addiction.
7. Medications are an important element of treatment for many patients, especially when combined with counseling and other behavioral therapies.
8. Addicted or drug-abusing individuals with coexisting mental disorders should have both disorders treated in an integrated way.
9. Medical detoxification is only the first stage of addiction treatment and by itself does little to change long-term drug use.
10. Treatment does not need to be voluntary to be effective.
11. Possible drug use during treatment must be monitored continuously.
12. Treatment programs should provide assessment for HIV/AIDS, Hepatitis B and C, tuberculosis, and other infectious diseases; and counseling to help patients modify or change behaviors that place themselves or others at risk of infection.
13. Recovery from drug addiction can be a long-term process and frequently requires multiple episodes of treatment.

Reference

*National Institute on Drug Abuse (1999), *Principles of drug addiction treatment: A research-based guide* (DHHS Publication No 00–4180), pp. 1–3 [Online], available: *http://165.112.78.61/PODAT/PODATindex.html.*

Appendix A: Summary of Proceedings

Opening remarks were made by Sally T. Hillsman, deputy director of the National Institute of Justice (NIJ), and by forum organizers Henry H. Brownstein and Lynda Erinoff.[1] Dr. Brownstein is director of the Drugs and Crime Research Division of NIJ. Dr. Erinoff is health science administrator at the Epidemiology Research Branch of the National Institute on Drug Abuse (NIDA). Roger Conner, director of Search for Common Ground in America, served as facilitator of the forum discussions.

Dr. Hillsman explained the origins of the collaboration between NIJ and NIDA. In the Omnibus Crime Control Act, as amended in 1976, Congress asked the two agencies to explore the relationship between drug abuse and crime. That year NIJ and NIDA formed an interdisciplinary study team to review state-of-the-art knowledge about drugs and crime and to recommend a research agenda. NIJ published the agenda—essentially a literature review—in 1980, and the resulting research significantly advanced knowledge of the drugs-crime relationship. However, a great deal remains to be done. Dr. Hillsman noted that in a 2001 report,[2] the National Research Council (NRC) recommended that NIJ and NIDA collaboratively undertake research to meet the challenge of informing public policy in the area of drug use.

Dr. Hillsman noted the amount of research being done on drugs and crime makes the field increasingly relevant to policy and practice. She reflected that 25 years after the establishment of the initial NIJ and NIDA collaboration, the two agencies are welcoming researchers to this forum and are anticipating that the forum will stimulate another extraordinary era of interest and productivity in the field. Although a great deal has been learned about drugs, drug use, drug abuse, drug markets, and drug law enforcement, the agencies and the scholarly community remain ill-informed about the complexities and nuances of drugs-crime interrelationships.

She emphasized the need for a focused research agenda in which researchers target specific questions and the most effective methods. Researchers who work for Federal agencies need to know how scarce public funds will be spent to make the most significant contributions in this area. All Federal, State, and local policymakers and practitioners need to know which policies and programs will be effective in producing healthier and safer communities. Dr. Hillsman pointed out that NIJ and NIDA have played essential and complementary roles in creating a solid scientific foundation for informed policies and practices, and that with the help of forum participants, the two agencies will take up the challenge posed by NRC. That challenge is clearly echoed by policymakers and practitioners throughout the country, who are turning to the research community to contribute sound and relevant knowledge to the Nation's deliberations about drugs and crime.

Dr. Brownstein commented that the early and mid-1980s and through the early 1990s had seen a great deal of interest in drugs and crime research. Then, in the mid- and late 1990s, research seemed to have focused on particular applied or practical areas. He suggested there is a need for more theoretical research and assimilation of the knowledge accumulated during the 20th century. He noted that the methods and technology to make this possible are now available.

Dr. Erinoff noted that Dr. Brownstein designed the framework for the forum and obtained the funding for it. He made certain that the public health perspective was included and took a hard look at previous research, including the *tripartite model,* which he and Dr. Paul Goldstein had developed. Dr. Erinoff expressed hope that all forum participants would emulate Dr. Brownstein in critically reviewing current research. She noted that when NIDA staff had to choose someone to write the forum paper that presented the public health perspective, they asked Dr. James Anthony to do so and to look "outside the box." She appealed to the attendees to do the same: to move outside their own frameworks.

"At the Intersection of Public Health and Criminal Justice Research on Drugs and Crime"

James C. Anthony with Valerie Forman

The recent focus of Dr. Anthony's research has been on influences that take a user from initial use of a drug toward drug dependence and on factors that account for that transition. In discussing some of the directions in which the field of drugs and crime research should be headed, he noted possible genetic vulnerabilities to drug abuse, how those vulnerabilities might influence drugs-crime relationships, and cognitive science applications of current interest to NIDA.

Dr. Anthony noted his work in developing a conceptual framework for identifying future research in this area. The framework consists of a matrix that presents the *rubrics,* or the main questions asked, in epidemiology or public health research: quantity, location, causes, mechanism, and prevention and control. These rubrics are placed along the vertical axis of the matrix. The five rubrics were discussed in relation to the ecological concept of scale, which defines the level at which a subject is studied from the microcosmic to the macrocosmic; that is, from genes at one end to policies regulating nations or global relationships at the other. Scale is placed across the horizontal axis. Each location on the matrix where rubrics and scale intersect represents an area of past or current research. Some units are filled, indicating past or current research; others are empty, indicating that little research has been done. Evidence that crosses several cells is termed *broadband research;* that is, research that cuts across domains and levels of scale.

Discussion: Most helpful ideas

Scale: A concept or a method? Dr. Anthony was asked to elaborate on the concept of scale and how he interpreted it as applying to the biological and social aspects of his work.

Dr. Anthony responded with an example from the field of ecology. For ecologists, scale is the way one thinks about *geocoding,* in which trends are followed in a census tract or a metropolitan area. Using a technique called two-dimensional and three-dimensional wavelet analysis, the ecologist allows the data to evoke the scale. When studying migratory birds, for example, ecologists infer the scale from the migration pattern of the birds. Ecologists tend to work upward and outward from the smaller level or scale of the organism toward the larger level or scale of the forest or the continent. In Dr. Anthony's own approach, he worked inward, in the direction of methods microscopic in scale. This is in the spirit of the ecological concept of scale, but is a twist on that concept, which has been used in studies of delinquency in relation to such neighborhood characteristics as social cohesion.

When asked whether scale should be viewed as a methodology, Dr. Anthony responded that it should be viewed as a concept. Although scale is not strictly methodological, it can guide researchers toward methodologies. He applied it in the context of drugs and crime to provide guidance on how NIDA and NIJ can work together to foster the next generation of research.

NIJ, Dr. Anthony suggested, should not establish the kind of biobehavioral laboratories required for research on the genetics of the relationships between drug use and crime. Rather, it may be wiser to reinforce NIDA's investment in those areas, with the two agencies coming to some agreement. He recommended the same approach for directing, controlling, and planning research on the pharmacological effects of drugs on aggression and on the cognitive functions. Arrangements should be made for research where substantial investment has already been made in biobehavioral laboratory domains. With respect to national and global policies, however, NIDA's research agenda has not been strong. NIJ can fill this gap. NIDA has supported organizations and operations research on drug dependence for correctional officers, police, and postrelease juvenile justice programs. In this area, the agendas of the two agencies overlap, and it is an area in which they both should be working.

Genetics of drug dependence. Dr. Anthony was asked how much progress has been made in identifying genes or constellations of genes that might predict dependence. He was also asked whether he thinks researchers will discover an overall genetics of dependence, as opposed to highly specific genetic links that predict dependence on particular drugs, each involving different genes or sets of genes and their protein products.

Dr. Anthony responded that in the immediate future, genetic polymorphisms[3] would be examined one at a time for effects on drug dependence, but it will probably be 5 to 10 years before researchers understand the covariation of specific polymorphisms in a way that will allow them to measure shared diathesis[4] with respect to drug dependence. He expects researchers to find that different genes regulate responses to different drugs. He cited as an example the finding that genes regulating the liver's metabolism of alcohol do not appear to have much of an effect on cocaine metabolism.

One issue to be addressed in this context is whether polymorphisms sort people into different latent classes of vulnerability rather than arraying them on an underlying dimension of genetic vulnerability. Dr. Anthony expressed hope that new interventions in areas like obesity, where the array of known genes and polymorphisms is much broader than those for drug dependence, will open up the possibility of studying gene-environment interactions in a way that can guide NIDA's research agenda on genetics and drug dependence.

A forum participant suggested that the distribution of drug use in society is wide enough that genes could in fact play a major role in drug use. However, looking at acquisitive crimes, violent crimes, and, in particular, the intersection of drug use and crime and the types of people most likely to be involved in both, we do not see those activities distributed throughout society in a way that suggests such a role. It was further suggested that NIDA should not place a lot of emphasis on genetic research. Rather, social science research should be emphasized because that is where researchers are more likely to find answers.

Costs versus benefits of genetic neuropharmacology research. The intersection of the genetic neuropharmacology

and social behavioral components of drug use was seen as a key element of Dr. Anthony's paper. A key issue is whether and how funding for this research can be improved. Researchers who seek funding from NIJ or NIDA to conduct sophisticated urine specimen tests, such as those using gas chromatography/mass spectroscopy (GC/MS), know the cost is about $56 per drug tested per GC/MS test. They also know the cost of genetic testing is much higher, at about $500 per specimen. Given the huge price differential, the cost-benefit balance becomes an important consideration, making it difficult to decide whether to conduct a social science survey in combination with biological data collection and genetic testing. Dr. Anthony was asked to comment on the implications of these issues for funding.

He responded by encouraging the participants to think about this problem the way they would think about the evolution of computing speed and costs. Researchers now are able to use multilevel models in their research due to the always-increasing inexpensive computing speed available today. Because change is occurring at a similar rate in assays for genes, advances made by microarray technologists will cause the prices of these tests to fall. The time this change will take is part of the reason Dr. Anthony projected it will be 5 to 10 years before researchers are able to understand covariation between polymorphisms in the areas of drug dependence and complex behavior such as criminal offending. Ten years might even be an optimistic projection of the amount of time needed because, ultimately, researchers want to identify the environments that modify the expression of the genes. This calls for both observational studies and experiments. For example, it took approximately 10 to 15 years between identification of apolipoprotein-4 for Alzheimer's disease and recent work on interventions.

Types of crime to be addressed. One participant commented on Dr. Anthony's statement that criminal behavior and drug use both affect a person's social standing. The questioner inferred from Dr. Anthony's statement that the effect is negative and suggested that there are probably situations in which it is positive. Furthermore, an implicit assumption made at the forum is that in discussions about the drugs-crime relationship, researchers are dealing with one kind of crime. However, that relationship (if there is one) may exist in a correlate sense, involving economic crime, financial crime, cybercrime, and other types of crime. The consequences of that relationship, which researchers in their current analyses imply exists, cannot be proven. The question posed was whether the forum was focusing on a particular type of crime, such as street crime. If so, it should have been specified, because it would influence the kind of research agenda that participants would want to shape.

Drs. Brownstein and Erinoff responded that, for the purposes of the forum, they were not defining crime in any narrow sense. They wanted forum participants to think more broadly and include the effects of alcohol in the discussion. Forum participants were urged to keep in mind that the basis in biological science for a relationship between alcohol and aggression is the strongest for any drug.

Further comment by participants focused on the millions of episodes of drug use that are not associated with crime. How, it was asked, could these be reconciled with the framework suggested by Dr. Anthony? The discussion also addressed whether drug-related violence is instrumental; that is, whether it serves a purpose that promotes the perpetrator's interests. Transcripts of interviews with drug sellers, which a participant had reviewed before the forum began, contained descriptions of violent activities that indicated the

violence is instrumental. Most of the actions described in these transcripts, which were not taken from a random sample of drug dealers, did not appear to be the result of impaired functioning or intoxication. Rather, they were quite deliberate, instrumental acts. One participant noted that in discussing crime, the forum was addressing property crime or violent crime and not including other acts that society also defines as crime, such as the use of the drug.

Impact of IRBs on social science research. The impact of institutional review boards (IRBs) on some lines of research recommended at the forum were discussed in the context of potential to stifle social research, especially research on juveniles. A participant suggested that researchers would know less about drugs and crime than they do now if current human-subject standards had been in effect in the past.

Understanding the roots of misbehavior. Dr. Anthony was asked about integrating the micro and macro levels of research, specifically their effects on funding, policies, and research on biological influences on drugs and crime.

He responded by characterizing misbehavior as a phenomenon rooted in the origins of the human species, family heritage, and social structure. The more researchers understand about these factors, the more they can use that understanding to shape policies and perhaps foster a more civilized society.

Growth trajectories and the ecodevelopmental trajectory model. The section of Dr. Anthony's paper that dealt with temporal relationships and growth trajectories raised the question of the degree to which interventions affect growth trajectories. Changes observed lately in drug markets, and in the crack markets in particular, indicate a growth area only among senior citizens. This growth trajectory, which begins at age 60, is not what would normally be found. Another observed trajectory involves young men who were well behaved between ages 18 and 25 who begin to misbehave when they are between 30 and 40 years old. The questioner asked whether those trajectories are outcomes produced by attempts to intervene and if so, what this says about growth trajectories.

Dr. Anthony responded that the sense in which he discussed growth trajectories was not related to the trends the questioner described. Rather, it was in the context of the ecodevelopmental trajectory model. Conceptually, this model cuts across the levels of scale. The characteristics of an individual, over time and over development, are modulated by the social characteristics of the peer group, the family, or society. Thus, there is reciprocity over time between the predispositions of an individual and the environment. An example is the growth of illegal income, or the proportion of annual income earned through criminal behavior, by the young men the questioner cited. One might ask, given one set of regulatory conditions, what those growth trajectories would look like under another set of regulatory conditions.

Dr. Anthony commented further that the paper presented by Dr. McBride noted that State-by-State variations in drug regulations give researchers opportunities for study. He had also discussed with Dr. MacCoun the contrasts between growth trajectories for marijuana involvement by young people in Amsterdam in contrast to young people in a comparable city in the United States. The more ready availability of cannabis might have an increased impact on the growth curve if the young people smoke more. With respect to the cannabis itself, the trajectory might

decline if the young people segregate into heavier or lighter users, in contrast to young people subject to the current regulatory scheme in the United States. These developments would guide researchers toward some crossnational research to look developmentally, over time, at the young people's dispositions. Those dispositions might be to maintain a flat trajectory in drug use, to shift from one drug to another, or to display a declining trajectory in drug use.

Turning to the question of which intervention would make a difference, Dr. Anthony commented that he had started off hoping to conduct policy analyses in this area but had decided that the observational data were not good enough for that kind of work. He questioned whether the time is right for social experiments that would allow researchers to contrast one regulatory condition with another. In addition, econometricians have convinced him that there may be problems even with randomized experiments, so researchers may not ever be able to collect definitive evidence in this area. Whether a researcher's stumbling on something might always be better than what can be designed in advance is a problem of constructivism.

Discussion: Problematic ideas

Mortality and morbidity due to drug-use-related injuries and diseases. A question was raised about the usual focus of public health research on interventions to reduce mortality and morbidity. Dr. Anthony's paper focused on crime as an outcome, but other forms of mortality and morbidity are also associated with the relationship between drugs and crime. One is injury resulting from the violence inherent in the drugs-crime nexus, and one can go beyond that to infectious diseases associated with use of drugs. It is possible to view the correctional system, where a great many drug users are incarcerated, as an opportune site for public health interventions. About 15 to 35 percent of all infectious disease cases, from HIV infection to tuberculosis, passed through a correctional institution in the past year. Dr. Anthony was asked whether these issues should be part of the public health focus on the drugs-crime nexus.

He responded in the affirmative, stating that NIDA has an active research portfolio in interventions in criminal justice environments and is likely to increase its investments in that area. He suggested that this would be another area in which NIJ and NIDA could coordinate.

Dr. Anthony commented on a point not included in his paper that relates to the pharmacological model for the tripartite approach. He thought that in the next 5 to 10 years researchers will see some interesting findings from longitudinal studies of cocaine-exposed children. These studies will demonstrate, he thinks, that it is not the children's drug use that leads to their aggressive behavior, executive dysfunctions, or subsequent criminal behavior. Rather, they will demonstrate that it is cocaine use by their parents or the lifestyle associated with cocaine use by their parents. This will be an interesting new line of research and a new way of thinking about that part of the tripartite model.

Evidence linking drug use to aggression. Dr. Anthony was asked about the nature of the experimental evidence linking the use of certain drugs to aggression and whether that evidence is as strong as the evidence linking aggression to alcohol use.

He responded that when studied under experimental paradigms, the use of drugs like methamphetamine, cocaine, and the amphetamines results in aggression under certain conditions. If one looks outside the laboratory and examines comorbidities,

one of the strongest co-occurrences is drug dependence and alcohol dependence. Cocaine dependence can be treated, for example, but if the subjects continue to drink heavily, they will still be involved in alcohol-associated criminal behavior. This is a complex problem in the societal environment, but that complexity should not blind researchers to the clear experimental evidence linking certain drugs, especially the psychostimulants and drugs like phencyclidine (PCP), to aggression revealed in laboratory studies.

Among the complexities of this issue is that the drugs have different effects at different doses. That is to be expected and does not contradict the causal inference based on effects that might be observed at specific doses. When violence is observed in people who are using PCP, it is generally seen in those who have ingested very large doses. A similar phenomenon is observed in methamphetamine users who have been on runs that lasted a weekend or longer. The resulting paranoia, suspiciousness, and other effects end in violence.

Dr. Anthony responded to a comment that violent drug users have typically also used alcohol by citing instances in societies where alcohol is not widely used and instances in which methamphetamine users who are not drinkers are arrested for aggressive behavior. Although the co-occurrence of methamphetamine and alcohol use is a palpable association, there are exceptions.

Drug-related corruption. A comment was made about important topics that appear to have been neglected in research conducted in the 1980s and 1990s. One such topic is drug-related corruption. It is a crime and it is related to drugs, but researchers do not write much about it. Examples cited included instances in which officials are involved in bribery, perjure themselves, or otherwise break the law to obtain convictions.

Time-lagged effects and crime. A second neglected issue is time-lagged effects. In applying the tripartite framework, researchers usually think in terms of crimes that occur relatively soon after the drug activity. However, people may also use drugs, become addicted, drop out of the labor market, and end up homeless. They may stop using drugs, but 2 years later they are picking pockets to buy food because they cannot find a job. It need not be the case that economic-compulsive crime means only stealing to obtain drugs within the next few minutes.

There also are children who suffer because of abuse or neglect at the hands of addicted parents. Researchers should consider not only the "cocaine babies" who were exposed in utero, but also children who were abused as 2-year-olds and commit crimes 20 years later. This issue has been neglected because of the focus on the activities of users and sellers proximate to the drug activity. Researchers should take a broader and more holistic view of the types of crime they should be thinking about in drug-related crime research. A suggestion was made to strike the word crime, because the parent who is inattentive to a child, for example, may not cross the line into criminality.

"Research on Drugs-Crime Linkages: The Next Generation"

Robert MacCoun, Beau Kilmer, and Peter Reuter

Dr. MacCoun acknowledged the importance of the need to define crime more broadly and to include the study of corruption in future research. He and his coauthors had focused on street crime and

proposed some consensus principles on causal directions that they thought would be widely accepted in the drugs and crime research community. He also acknowledged that the research reviewed represented enormous bodies of work.

Discussion: Most helpful ideas

Victimization and the tripartite framework. Dr. MacCoun offered a clarification of the victimization issue as it relates to the tripartite framework. Victimization was initially included in the framework as a subcategory within the category of psychopharmacology. But the concept of victims is difficult to establish in the real world. In one study, for example, participants in 40 percent of the violent events were classified as codisputants. The researchers could not determine who was a victim and who was a perpetrator.

The four-cell scheme for classifying drug markets. Reintroduction of the four-cell design for describing drug markets was considered a strength of the paper. In that design, markets are classified according to whether buyers and sellers live in or outside the area where drugs are sold. Although there has not been a great deal of research on the operationalization of markets and the consequences of each type of market, the approach was regarded as a useful policy paradigm. If researchers can work with local law enforcement agencies to identify the distribution of those types of markets and their locations, they will be one step closer to helping the agencies implement policies appropriate for the markets in particular communities.

Drug supply. Two comments were offered about drug supply. One addressed outdoor versus indoor markets. The suggestion was that if markets moved indoors, the ability of law enforcement agencies to drive down the supply of drugs would increase because the agencies could use such technologies as wiretaps. The other comment was that incapacitation is largely a function of supply. That is, eliminating dealers may reduce drug availability, although new dealers may take their place. The Federal antidrug effort does not make a large dent in the supply. One operation conducted in the 1980s that targeted a jungle laboratory seized several tons of cocaine but had no impact on the cocaine supply because the dealers had five or six other laboratories.

Clarifying legalization. Dr. MacCoun responded to a favorable comment about his raising the issue of legalization by clarifying his use of the term. It is very difficult, he said, to discuss alternatives to the current system because the debate tends to focus on two models that are at polar extremes: a free market in drugs and some version of prohibition. A range of possibilities exists between these ends of the spectrum, and in examining European models, researchers are looking at countries that have legal prohibitions yet are signatories to international agreements on drugs. The word legalization must be used cautiously because it implies commercialization. The Swiss model, for example, is an incremental model and is heavily regulated, thereby costly to apply.

Rather than studying the issue of drugs, crime, and their connections, more time could be spent on the connections among drugs, crime, and policy and the effect of their interaction. There are opportunities internationally to examine innovations in policy, which by no means constitute legalization in the sense of commercialization but are nevertheless more substantial than the policy variations typically observed in the United States. If one accepts the premise that drugs, crime, and policy all interact, researchers could learn from instances in which policy varies. They could, for example, conduct empirical data collection on experiments conducted in other countries in an effort to understand drugs-crime-policy links.

Dr. MacCoun offered an example of an opportunity of this kind that has not been addressed. In the 1970s, Italy depenalized (that is, removed the penalties for but did not legalize) personal possession of all drugs that are prohibited in the United States. Italy maintained depenalization until 1990, repenalized that year, then depenalized again in 1993. Researchers could conduct archival research to examine the effects of these policy changes.

A participant offered two examples of other kinds of opportunities for international research. One opportunity exists because of the externalities of U.S. drug policy in relation to drug use by young people outside the United States (in Latin America, for example). The United States has a global impact, because of what it does domestically. This has been neglected in research that focuses on the United States. The second example is societies where the use of intoxicating substances is common and the link to criminal behavior is absent. This presents another opportunity for international research. Although policy variations are more diverse outside the United States, other countries lack the data infrastructure we have here, which complicates research efforts.

Researchers are on the brink of being able to capitalize on research on the temporal sequencing of policy interventions. The analytic framework for drug policy pits the various components of policy against each other in a battle for resources. Conflicts about implementation can be found at the Federal, State, and local levels. But researchers can develop first-order models and simulations to anticipate epidemics and collateral problems that may be associated with epidemics, prevent epidemics, address epidemics early on in a cycle, and address them later on in a cycle. This would allow consideration of more dynamic policy/resource allocation.

Discussion: Problematic ideas

Flawed methodology. A general question about methodology was prompted by Dr. MacCoun's statement that the Swiss experiment is flawed methodologically. Dr. McBride had made a similar point in his paper, noting that research on interventions contains methodological problems, but that the treatments work nevertheless. The question for Dr. MacCoun was what policymakers should make of this discussion.

Dr. MacCoun addressed his skepticism about interventions, specifically about the Swiss experiment with heroin maintenance. He noted that the Swiss results were ambiguous because they lacked true random assignment and because heroin maintenance was confounded with provision of other forms of treatment. However, the Swiss experiments demonstrate that heroin maintenance is logistically feasible and provide at least tentative evidence for its benefits.

A forum participant asked whether the Swiss heroin maintenance experiment serves as a lever for getting addicts into treatment and, if so, how the Swiss measure treatment outcomes. For example, is success measured strictly in terms of abstinence, or is rehabilitation a positive outcome? Dr. MacCoun responded that as a researcher he criticizes the confounding of heroin maintenance with other interventions in the Swiss study. However, on humanitarian grounds, he might celebrate that weakness because it implies that the heroin maintenance program encouraged Swiss addicts to seek other needed treatments.

Failed interventions. The results of a National Academy of Sciences (NAS) study suggest that researchers have not done a good job documenting which interventions work, but they can scientifically document those that do not work. In the

last quarter of the 20th century, one of the most important interventions has been to lock up drug offenders and "throw away the key." Research projects that use this kind of intervention as a control almost always indicate better results for treatment. Foreign interdiction is another failed intervention, as price and purity data indicate. Data are also available on 25 other interventions that do not prevent youths from starting drug use or other deviant behaviors. A key element in a research agenda may be to develop a list of interventions that are popular politically but do not work.

Successful interventions? At times in recent history, source-country interdiction has been reported as effective. Examples are the Turkish opium ban and the so-called French Connection. There have also been spikes in prices to which the market adapted immediately. These observations gave rise to the question of whether data indicate reductions or increases in crime correlating with the price fluctuations. Impulse-response analyses of these events, exemplified by an NAS review, indicate that little is known about the suggested correlations.

Lack of direct measures of deterrence. Measurement of the effects of deterrence on retail operations is also lacking. Researchers primarily use price fluctuations as their core index, and that measure is weak. There is no probabilistic sample and researchers rely on Drug Enforcement Administration (DEA) data, which are designed for a different purpose. This calls into question the usefulness of studying price fluctuations as they relate to crime in drug markets.

Are drug epidemics cyclical? The dynamics of the drug scene and the constantly changing nature of drug markets raise the fundamental question of whether drug epidemics are cyclical. The time course over which researchers have studied this phenomenon is 1.5 cycles, which is not long enough to attempt a fit with any cyclical model. If drug epidemics are cyclical, researchers should examine what has occurred before the next cycle.

Event dynamics of the tripartite framework. The tripartite framework could be applied to research on why a drug user becomes violent in one circumstance but not in another and under what conditions violence does or does not ensue during episodes of drug use. One study borrowed methods from symbolic interactionism and game theory to examine drug transactions. Researchers have tried to understand the sequence of potential to motivation and motivation to action. In other words, they tried to observe a cascading effect in which drugs may take the user from a stable state to an aroused state and then to an aggressive state.

This particular study of drug transactions revealed that drugs have strong psychoactive effects. The researchers examined the mediating mechanisms through subjects' own narratives, in which they disclosed how they would change their behavior in a confrontation. When they were under the influence of drugs, they said, the stakes would rise: They would become more boastful, their language would change, and they would misread perceptions of danger or the cues from another person. This research demonstrates that thinking about event dynamics as a framework in which causal factors unfold over time is a promising method for examining this issue.

Limitations of the tripartite framework. Researchers need to be aware of problems in applying the tripartite framework as a measurement tool. Although this framework is still important, it was designed to explain connections between drugs and violent crime. In examining

relationships between drugs and nonviolent crime, we need to transcend the framework and also use it to understand particular events. With respect to the latter, multidimensional has been the most important category of analysis because things rarely fit neatly into any of the others.

Researchers who apply the tripartite framework also need to go beyond New York City to locations throughout the country to identify a reliable source of data on the drugs-homicide link. The Arrestee Drug Abuse Monitoring (ADAM) instrument contains a drug market section that addresses the characteristics of markets over time, by location, and by comparing indoor with outdoor. Another potential data source is a NIDA-funded international study of the psychoactive and sociobehavioral effects of marijuana use in Amsterdam, San Francisco, and Melbourne.

Decriminalization and the link between drug use and crime. What is the link between drug use and nondrug crime? Because drug possession is itself a crime, various types of decriminalization (which are not necessarily the same as free access) will be needed to sever the link between drug use and crime. This point is important from a research perspective because the illegality of drugs is a constant in all research conducted in the United States. Various models address the implications of illegality, such as corruption and market-oriented violence. Opportunities for comparative research should be sought in countries that have decriminalization policies, countries where some drugs are part of the culture and used freely, and in historical work on periods when drugs were legal in the United States. Other research opportunities include the study of legal drugs, such as alcohol, to see how society manages the effects of these widely used substances.

Researchers' impact on State-level policies. Researchers' results can influence policymakers and State budgets. Delaware, for example, actively tried to introduce drug treatment into its prison system in the late 1990s. Delaware's attempts were closely associated with drug courts, which are based on the premise that offenders who have extensive criminal histories and signs of addiction will commit less crime if their addiction can be halted. By making treatment part of corrections, the State has changed the definition of crime.

An example of the way the definition of crime can change involves urinalysis conducted among offenders on probation to test for drug use. A positive test counts as a technical violation for which probationers may be returned to jail. With the introduction of the therapeutic approach into prisons, Delaware's Department of Corrections and judges have become sensitive to the implications of positive urinalysis results. Although classified as relapses, positive urinalysis results have become the equivalent of crimes. In this way, research has affected policy as the corrections system introduced treatment and changed the way crime is defined.

Corruption in models of drug distribution. A comment was made about corruption in connection with models of distribution. It is essential, in the view of the participant who made the comment, that these models address street-level ethnographic research that found some police on the street to be involved in the drug trade to the extent of having a dramatic impact on how the trade operates. Police corruption plays a dramatic role in the drug trade on both the micro and systemic levels. One reason is that public policy sometimes permits seized assets to devolve to police departments on the basis of their own enforcement activities. A related issue is the way in which police

affect or do not affect particular drug markets depending on how they choose to enforce the law.

Reports and feedback from the roundtable discussions

Methods, measurements, and datasets

There is a need for integrated data collection and better measures. Suggested areas for further research include identifying particular local areas for saturation testing of multiple measurement methods and determining how current measures overlap. In the National Household Survey on Drug Abuse (NHSDA), data are gathered from the general population, but other data collections, such as Monitoring the Future and ADAM, are more narrowly targeted. We do not fully understand how the methods used in these surveys overlap. The ADAM program has attempted to include questions in the survey instrument that enable analysts to link ADAM data to data in other surveys.

The validity of self-reports of both crime and drug measures is a significant issue for research. Such issues as subjects' recall and telescoping are addressed in parts of larger studies, but funding enables the testing of the validity of self-reports in only a few studies. The wording of questions, the order in which they are asked, and the effects of the urinalysis itself (in the ADAM program) are possible areas of investigation. Experiments involving random assignment of survey questions offer an opportunity for study as does altering the sequence of urinalysis and survey administration. Interviews with study subjects might produce different results depending on whether the urine specimen is taken before or after the interview.

How DEA data on such elements as price, purity, quality, and signature information can be folded into programs like ADAM is a key issue. Apparently signature analysis can be conducted as easily on urine specimens as on actual samples of drugs. If so, it would enable additional information to be integrated with the ADAM data.

Ethnicity and race

Family and genetic issues as well as race and ethnicity are important for future study. The Human Genome Project may provide data relevant to studying drugs and crime. Researchers must do a better job of articulating the importance of these factors. The public should not be led to believe, for example, that there are single genes related to poverty or violence. The need for more attention to diversity within and among ethnic and racial groups was recognized as a priority. Acknowledging that caution must be used in analyzing the concept of race in scientific research, participants recommended the study of ethnic variation, learned behavior, and culture. The addition of discussions of culture to the three forum papers was also recommended.

We can expect diversity in drug use among different groups, such as Hispanic Americans and blacks. An example of diversity within groups is the drug use patterns of Mexican Americans in the Hispanic American population. Diversity raises complex issues that involve conceptualization in measuring environmental circumstances, conditions, and processes. These issues affect research on ethnicity and on gene-environment interactions. The research community must address the sensitivity of the combination of the issues of genes and race, possibly through formation of a NIDA-NIJ working group.

Several specific issues or phenomena involving ethnicity and drugs offer opportunities for study. An example is the National Development and Research Institutes study of the "blunt generation," which revealed that black youths in New York City are shifting from crack to marijuana and tobacco. This research can be used as a model to study whether the same transition is occurring outside New York City.

Researchers should be mindful of the factor of religion because, like ethnicity, it has different levels of importance for different ethnic groups and a bearing on criminal behavior as well as drug use. Another area for study is the differential effects of methamphetamine on different ethnic communities. There are few examples in which blacks are represented among either methamphetamine users or casualties of its use. However, research has revealed users and casualties among members of other ethnic groups, particularly Pacific Islanders.

Two research design issues were raised in the roundtable discussion. One had to do with the false belief that there is variation by ethnic group in the extent to which information from self-reports differs from bioassay results. Recent research might be developing evidence that will contradict some of these false beliefs. The other involved IRBs, protection of human subjects, and the differences in the confidentiality certificates issued by NIJ and the U.S. Department of Health and Human Services (HHS). Discussions between NIJ and HHS about checks and balances in the IRB processes would allow researchers to learn more about pressing social problems that do not necessarily fit the HHS biomedical research model.

Policy issues

Researchers need to examine policies other than those specifically directed at drugs, such as economic, social, and health policies. NIJ and NIDA could consider commissioning a series of multidisciplinary review papers that focus on the potential impact of policies on outcomes. The policy community would be the target audience. Currently, no mechanisms are available to examine policies at the Federal, State, and local levels. We need a database that would enable researchers to examine variations in policy among jurisdictions.

Another important and related area for research is the development of models that transcend econometric models in examining the impacts of policies on outcomes. Researchers have not developed models that examine the impact of public policies on behavioral outcomes and the relationship between drugs and crime. Input from practitioners about the impacts of policies on their constituents may advance this line of investigation.

Drug markets

How do researchers define and measure drug markets? Among the issues considered in the roundtable discussion were the usefulness of such measurements and the benefits to law enforcement agencies from this kind of research. The discussion covered how researchers might measure the harmful effects of drug markets and how to detect changes in those harmful outcomes over time. For example, how would researchers compare the effects of crack markets that proliferated 10 years ago with the effects of the blunt generation today? Nonharmful outcomes and the need to examine how they change over time were also considered. Social control mechanisms operating in markets, the question of whether market stability is desirable, and health issues associated with market stability were also suggested as topics for research.

Treatment in the criminal justice system

The treatment roundtable focused on two measurement issues and two potential interventions. The first measurement issue was dropouts. When drug users undergoing treatment drop out of the program, this affects any evaluation under way because the numbers change. Other disciplines have dealt with the problem by using econometric and other statistical techniques. The participants thought some of these tools should be brought into the drug treatment literature.

They also recommended comparing the effectiveness of different types of treatments used in the criminal justice system, an undertaking for which there is currently no common measure. The Addiction Severity Index (ASI) was discussed, but using the ASI poses problems because of the "past 30-day" questions it includes. Opportunities provided by new technologies for detecting drug use, such as hair testing and sweat patches, were also considered.

Contingency management is an intervention examined in the Greenwood study, which revealed that paying students to finish high school is cost-effective. If this approach is applied to encourage treated prisoners to receive more treatment or to refrain from using drugs once they leave prison, it may offer opportunities for research.

The problem of treating drug-using offenders after release from prison is another intervention issue that could benefit from research. In addition to using contingency management, some States hire case managers to encourage prisoners to continue receiving treatment. Texas, among other States, makes such additional treatment a condition of parole. Research indicates that contingency management has not worked well in the long run because behavior starts reverting to baseline when rewards stop.

The impact of welfare restructuring on the drugs-violence nexus is also a topic for future research. Some inmates were receiving Medicaid benefits, which they were using to pay for drug treatment. Since they no longer receive Medicaid, corrections-based treatment plays a larger role. Outcomes other than refraining from drug use, such as payment of child support, family formation, employment stability, and residential stability, may also be useful as indicators that a former prisoner has addressed problems associated with drug use.

In assessing the effectiveness of treatment programs, the fundamental problem for researchers is obtaining the kind of post-treatment and postrelease data they need. A study under way in Florida is examining this issue in a nonprison treatment setting where researchers have access to measures of criminality and other data. However, these measures may not enable the researchers to effectively differentiate between the treatment programs in which the subjects were enrolled, which include most programs in Florida.

The reporter for the roundtable responded to a followup question about the possibility of requiring treatment providers to track data. He noted that the mandate for the Florida study came from the State legislature, which requires evidence that money spent on treatment produces a result that is more economically valuable to the State than the current expenditures. However, treatment providers cannot respond very effectively to the legislators' mandate because they do not have the resources to track all the data.

The facilitator told forum participants to imagine a situation in which they are approached by a philanthropist who claimed

that he could raise large sums of money if researchers could develop agreed-upon measures of outcomes that were valuable and whose cost was lower than the cost of producing the results. The participants were challenged to find out if they could do so with the interventions they had tested.

In response to the challenge, one participant noted that in some studies of the valuing of drug abuse treatment outcomes, people who are not drug users are asked how much it is worth to them to live in a drug-free and crime-free community. It is not possible to put a monetary value on such issues. Other studies examine outcomes like abstinence or a range of outcomes involving improvements in health, social functioning, and criminal behavior. To provide guidance on improving drug abuse treatment at the program level, NIDA has tried to shift the focus of the research to what the program does, what is unique about it, how it is organized and managed, and what is unique about the treatment delivery system. Another responder stated that if the philanthropist could find a way to support graduates from drug treatment programs who live either in prison or in the community and are otherwise unemployable, guarantee them jobs, and assure them of an income of about $20,000 per year, there would be much better results than those that researchers are seeing now.

In a followup scenario, the philanthropist is prepared to supply the money for whatever it takes to produce a graduate of a treatment program who was formerly a drug user and in prison and to assure him or her an income of $20,000 per year. The question for researchers is what is the value to society of 50 of 100 people leaving prison, acquiring job skills, and earning $20,000 per year 2 years after release? If researchers could specify for the philanthropist the value to society, backing it up with a defensible number, and tell him what it would cost to net 50 successes from the 100 released offenders, he would raise the money for those 50 people. He would have to know and be able to tell his donors, however, the numerical value of those 50 successes.

One participant who responded commented that for almost any intervention, researchers could produce a calculation indicating that the resultant number is better than doing nothing, although there probably is no drug control intervention for whose effectiveness researchers could provide definitive proof 20 years hence. This approach, however, is not a constructive way to make practical managerial decisions and is not the way that businesses, for example, think about such matters. Another responder pointed out that a similar question is not asked about dialysis treatment for end-stage renal disease or liver transplants for people with cirrhosis, although they might persist in behaviors that promote their diseases. Thus, researchers are imposing a standard on drug treatment that they do not impose on other medical treatments.

"The Drugs-Crime Wars: Past, Present, and Future Directions in Theory, Policy, and Program Interventions"

Duane C. McBride, Curtis J. VanderWaal, and Yvonne M. Terry-McElrath

Current drug policies have not always been in effect and may not always be in place, and some policy changes have been dramatic. Dr. McBride discussed the historical context in which drugs-crime relationships should be examined. In the 19th century, drug policies in the United States varied enormously. Distribution was relatively open: Imports were regulated but domestically there was some access

and even commercialization. Drugs, needles, and syringes were available through the Sears-Roebuck catalogue. In reaction to this openness, many States began to heavily regulate drugs. Officials from some States complained that other States openly sold drugs that they themselves were trying to regulate. The labeling of drug content was instituted and States made many changes in their laws and policies.

Discussion: What ideas from the paper are most helpful?

Cause and effect in the drugs-crime relationship. The section of the paper dealing with the cause- effect relationship of drugs and crime suggested an interesting line of inquiry. The forum discussions had looked primarily at the relationship in terms of drug use preceding crime. From that perspective, interventions were assessed on the basis of the effects they might have on drug-related crime that immediately follows drug use. There was no consideration of the early antecedents of drug use and criminal behavior.

Study findings on the antecedents of drug use and criminal behavior reviewed in Dr. McBride's paper, as well as research conducted by Dr. Anthony on aggression in first-grade students, were cited as examples of areas where further research is needed. Evaluation of classroom interventions revealed that addressing conduct and aggression problems reduced the risk of future drug use, which suggests that deviant behavior may precede drug use.

History of drug policy. Participants identified the attention given to the history of drug policy as a strength of Dr. McBride's paper. The conflict between the puritan and libertarian traditions, which he cited, is played out in current drug policy discussions.

Collaboration among agencies. As States develop comprehensive systems to address drug problems in their criminal justice systems, collaboration among agencies becomes more crucial to policy formulation. For example, in the California Department of Corrections' treatment system, which currently has 7,000 beds, the treatment providers and the corrections unit that operates the system have been meeting regularly for years. Parole officials began attending the meetings only in the past 6 months, however. Parole is an essential policy element because the program includes an aftercare component.

Using graduated rewards and clients' strengths in drug treatment. Suggestions were made that graduated rewards, as well as the graduated sanctions mentioned in the paper, should be studied for their use in drug treatment programs. Further, more attention should be paid to the clients' strengths in addition to their needs, problems, and resources. Dr. McBride agreed that inclusion of a strengths-based case management system is crucial to treatment.

Comorbidity issues. The comorbidity issues covered in Dr. McBride's paper were considered relevant to the forum discussions of policy and of treatment in the correctional system. As a result of high rates of comorbidity and of deinstitutionalization in the mental health field, some prisons are the major mental health service providers in large urban counties. This situation influences the effectiveness of treatment in correctional settings, and is a situation in which some medical care providers feel more like law enforcement personnel.

Ballot initiatives and research. Ballot measures such as California's Proposition 36 address drug policy, and are frequently supported by advocacy organizations that are also interested in research. Social scientists should try to gain currency with

these organizations and open an avenue through which the research community can examine these policy experiments and their outcomes. Researchers previously have not made strong connections to those who propose public policy reforms from the perspective of the political right, and the same may now be true for the political left.

Health versus criminal justice research funding. The Robert Wood Johnson Foundation is funding a study of Proposition 36 that may become a model for reporting that could affect public policy. The Robert Wood Johnson Foundation focuses on health issues, and its sponsorship of this project indicates that the criminal justice research community is underfunded because a health funding organization is implementing portions of the criminal justice research agenda.

Building collaborations between NIDA and NIJ to study drug enforcement would be an important part of a future research agenda. Such collaboration could address major policy issues, such as variations among States in the intensity of drug enforcement and how strongly they enforce drug prohibitions.

Researchers could also evaluate the effects of different kinds of enforcement, but would need to identify appropriate outcome measures to do so. State-level measures are being developed for NHSDA, but would be inadequate for these purposes because they focus on the prevalence of addiction. The ADAM sample frame is not suitable for this type of project, which would address how enforcement affects drug use. The relationship between drugs and crime, in and of itself, is not as useful as is research that will inform drug policy. NIJ is primarily a policy research agency that should be addressing such policy-driven issues as alternative enforcement strategies.

Publishing policy research. Studies of Proposition 36, changes in the Rockefeller drug laws, or the Swiss heroin experiment do not have perfect control groups and random assignment of subjects because they examine real-world situations. This may limit researchers' ability to publish in the better journals. In addition to providing funding, NIJ and NIDA could increase the demand for policy research by fostering publication outlets.

To obtain funding, grant applicants are required to address scientific design issues. Poor designs submitted to the National Institutes of Health (NIH) may not be acceptable to epidemiologists, but the *New England Journal of Medicine* has published comparative studies of the impact of handgun regulations on homicide and suicide rates in Vancouver and Seattle. Dr. McBride cited these studies, which compared different populations, as examples of flawed designs that would not have received NIH funding but were nonetheless published in a quality journal.

Funding for secondary data analysis. Dr. McBride's paper was praised for its list of suggestions for future research, particularly because of the proposal that secondary data analysis could provide a new empirical baseline for study of the drugs-crime relationship. Securing funding for the analysis of NHS data, to assess the extent of drug use or the gateway model has been difficult. The only sources of funding for analysis of ADAM data have been small grants from NIJ or organizations like the Robert Wood Johnson Foundation. Funding agencies spend large sums of money supporting new data collection and relatively small amounts supporting secondary analysis.

Discussion: Problematic ideas

Policy implementation and evaluation. Without effective enforcement and implementation, it does not matter which policies have been adopted. With respect to tobacco, there was a great deal of policymaking at the State level, but until there was enforcement, the policies did not make a difference. Dr. McBride's paper suggests that policies directed at club drugs (for example, changes in methamphetamine penalty structures) offer important research opportunities. Researchers have an opportunity to evaluate the effects of these laws and policies from both the criminal justice and the public health perspective.

Dr. McBride noted in his paper that model laws developed by the National Alliance for Model State Drug Laws have not been examined for their effectiveness. This indicates a need for studies of implementation and enforcement. One participant suggested that the forum should be open to the possibility that not implementing current laws might be advantageous in some situations.

References in the paper to the moral tensions surrounding drug policies illustrate how values affect assessment of those policies. An example of those tensions is the different standards of evidence used in assessing new pharmaceutical products and in evaluating controversial new drug policies, such as those based on relaxed enforcement. There is also a reciprocal relationship between drug policy and drug use, because the public, to whom laws and policies are directed, includes the voters who elect the legislators who in turn make the policy. Policy research must take into account that the consumers of policy, or the public, also influence policy.

Historical roots of current policies. In Dr. McBride's paper, the juxtaposition of libertarianism on one side and puritan morality on the other resulted in a lack of historical background needed for understanding the current situation. Missing elements include the harm that drugs cause, status battles among people who want their moral beliefs adopted as official policy, and the agendas of interest groups.

In citing an example of the effects of interest-group issues, one participant suggested that if asset forfeiture laws changed so that seized assets were spent on drug treatment rather than enforcement, the statistical portrait of drug use might change. A better understanding of the historical roots of current policies should be included in the research community's policy research agenda. Also suggested for inclusion in Dr. McBride's paper were more material about the racial dimensions of Prohibition, its 19th-century roots, and its current manifestations; and a reference to Tonry's *Sentencing Matters* in the paper's discussion of mandatory minimum sentencing.

Continuum-of-care treatment models. Studies of drug addiction as a chronic disorder have implications for treatment models, such as continuum-of-care programs. Current research has established the need for continuum of care, and future research could systematically address the elements of a continuum-of-care model rather than considering adaptation of current models.

In order to provide good continuum of care, medical and social services need to be linked. This would involve coordination among social service agencies, public health agencies, and corrections or other criminal justice agencies. Issues concerning the reintegration of treated drug users into the community should also be addressed in future continuum-of-care research.

Computer simulations. Dr. McBride suggested that researchers start thinking about computer simulations. A participant

interpreted this to mean creating broad models with many parameters, which would produce many research questions that could be used to generate useful policy analyses. The drugs-crime research field would benefit from a macro effort in multiple places, with multiple perspectives, which would examine policy concerns with research backing. Modeling would stimulate further work in all areas of drugs-crime research.

A comprehensive surveillance system. In his paper, Dr. McBride did not address the need for a comprehensive surveillance system that would enable researchers to detect when peaks in drug-related violence begin. Such a system would allow researchers to study the peaks as they form and also understand why they form. A big peak of violence occurred in the United States in the late 1970s and early 1980s, and another occurred in the late 1980s and early 1990s. Between those peaks was a valley, and a very deep chasm began in the 1990s.

Many explanations have been offered for the peaks, such as changes in drug markets, incarceration rates, community policing, and enforcement of quality-of-life offenses. Ethnographic field stations in high-risk communities, enhanced data collection by police, and a study of medical examiner data were proposed as research topics in this area. These enhancements should be incorporated into a routine surveillance system that would facilitate study of the next peak in violence. Such a system would allow analysis of qualitative observations in conjunction with overdose and arrest data.

Use of mild drugs is normative for adolescents. Developmental factors that affect drug use and its relationship with crime had been alluded to in previous forum discussions, but had not been a topic of discussion. Developmental literature on use of mild drugs (alcohol and marijuana, for example) indicates that this behavior is normative for adolescents. These drug-using adolescents do not commit many crimes other than using the illegal substance. If the drug use continues as they grow older and they also move on to using harder substances, problems with other kinds of crime are then observed.

The role of the family in shaping behavior. Another topic not adequately addressed was the critical role of the family in shaping behavior. In developmental psychology, interventions are family-based, rather than broad-based population interventions. (An example of the latter is keeping offenders in treatment.) The importance of interactive relationships within the family was illustrated by research on children who have attention deficit hyperactivity disorder (ADHD). When children with ADHD are medicated, the behavior of the parents changes, even if that of the children does not.

Changes in heritability. Quantitative-genetics research projects, such as twin-sibling studies, have revealed that changes in heritability occur over time and with respect to gender. Thus, if researchers identify a gene associated with substance use, the association may not hold for all age groups or populations. In addition, the concept of a single gene determining complex behaviors like substance use is unsound.

Missing data estimation. Many researchers are working with techniques for estimating missing data. These techniques may produce results more representative of reality than those produced by other methods. Biostatisticians use missing data techniques to model longitudinal data, such as tracking youth drug use and transitions through different stages of drug use. For example, researchers do not assume that dropping out of a study is a random phenomenon. They try to account for it by modeling the dropout process.

Many standard statistical methods are built on the assumption that missing data are random, thus young people who drop out would be no different from those who stay in the study. However, in studies of drug use, dropouts often may be incarcerated, in low-income families, or moving.

What do and don't we know about the relationship between drugs and crime? Reaching for consensus

The facilitator led a consensus-building exercise in which statements by forum participants about the drugs-crime relationship were accepted, amended, or rejected. Decisions were made according to an iterative process; only ideas on which there was unanimous agreement were approved. The statements concerned either what is known or what is not known about the relationships between drugs and crime.

Consensus statements on what we know about drugs-crime relationships

The complexity of drugs-crime relationships is widely accepted and means that the research tools we have been using to study that relationship cannot get us very much further in the next decade. The complexity of the drugs-crime relationship was accepted as fact. Forum participants arrived at a consensus on the need for new tools, which would include both paradigms and methods, if future research is to elucidate the relationship. The belief that 10 more years of the same type of research currently being conducted would not advance the understanding of the drugs-crime relationship was disputed because some progress has been made.

We know that we need to know more about the effects of child abuse and spousal abuse on drug use and drugs-crime interrelationships. The original statement was amended to eliminate a clause on intergenerational effects of abuse on crime and drug use because these effects have not been sufficiently characterized.

We know that trends in drug use do not parallel rates of incarceration. The number of people in the United States who are incarcerated has tripled since 1983. There was no consensus on whether most of the increase was due to enforcement of drug laws. The statement was amended to reflect the consensus that we do not know whether the increases in incarceration have resulted in decreases in drug use in particular or crime in general.

We know that drug use is neither a necessary nor a sufficient cause of nondrug criminal behavior. The statement was accepted without amendment.

We know that we need longitudinal data to sort out the relationships between drugs and a host of other causal factors. The participants could not arrive at a consensus on a statement that cause-and-effect questions can be addressed only by using longitudinal data. It was modified to read that longitudinal studies are important in making cause-and-effect statements. This modification was not accepted, however, and consensus was achieved only on the need for using longitudinal data to elucidate relationships between drugs and many causal variables.

We know that illegal drug choices tend to vary with social position. This proposition began as a statement that illegal drug preferences tend to vary with social position. A participant objected, saying that what is available in different markets may determine what options are available to be preferred. The statement was accepted after "preferences" was changed to "choices" and the meaning of the phrase "social position" was clarified. Social position may

be affected by, but is not synonymous with, either social class or ethnicity.

We know that we urgently need local as well as national data (on drug use patterns) to augment the utility of those data for practitioners. A participant proposed that data on drug-use patterns must be local to be useful because ethnographic and ADAM data show differences by site. For example, methamphetamine use is not a problem in most U.S. communities, but it is the major drug problem in Hawaii and southern California. The audience for data may affect their usefulness; thus, for example, national data may be useful to Federal policymakers. Crossnational data may also be useful in addressing some issues.

Modifications of the consensus statement to the effect that drug-use data need to be local to describe local markets, to be useful to practitioners generally, or to be useful to local practitioners were all rejected. Local data were deemed useful in detecting emerging trends in drug-use patterns. The idea that trends in national data, such as the decline in drug use identified by the Monitoring the Future Study during the 1980s, were not useful was seen as implausible. The statement was amended to reflect a need to augment national data with local data to maximize policy and practice utility. The statement was amended as shown above and accepted by the group.

We know that given arrest for a drug offense, an African-American is more likely than a white American to be prosecuted; and given conviction, an African-American is more likely to be incarcerated and for a longer time than a white American. These official results do not accurately reflect the racial differences in involvement with illicit drugs. There was general agreement that this is known to the research community but not to society generally. There is a need to disseminate the information among policymakers and the forum publication will be a means for doing so.

We know that a person's drug taking makes him or her more likely to be either a victim or perpetrator of a crime that otherwise would not be committed. The statement was accepted without amendment.

We know that incarceration of drug sellers is in large measure offset through replacement by other sellers. As originally proposed, the statement read that incarceration of drug sellers leads to recruitment of replacements for those sellers. There was no consensus on whether the replacement phenomenon is known to occur or not. One suggestion was to modify the statement to read that a consequence of incarceration of drug sellers is recruitment of replacements. This statement was considered too weak because there could be many consequences. Another proposal was to modify the statement to read that the incarceration of drug sellers is in large measure offset by the recruitment of additional sellers. The word "recruitment," which implied that superior sellers were seeking replacements, was eliminated in favor of "replacement," and the amended statement was accepted.

We know that the interdiction efforts that have been conducted over the past 20 years have not achieved their goal of substantially reducing street-level access to drugs. As originally proposed, the statement read that interdiction has had minimal effects on the availability of drugs at the street level. Researchers do not have a sense of the flow of drugs from source countries through transit and arrival zones to markets. Since there is little empirical evidence of how much drug traffic is actually interdicted and how interdiction has affected market availability, the statement was amended as shown above and accepted.

Consensus statements on what we do not know about drugs-crime relationships

Long-term, intergenerational studies are needed to generate and test causal hypotheses about drugs-crime relationships. A generation of grandparents as well as parents has been heavily involved with illegal substances and these people now have children or grandchildren. Thus, there are intergenerational subjects who could be studied, but such studies would not necessarily establish cause and effect. A suggestion was made that intergenerational data are needed to evaluate cause-and-effect statements and that they could be used to generate causal hypotheses. The proposed statement was amended accordingly and moved to the do-not-know category.

We do not know whether genes interact with the environment to make people more or less prone to illegal drug use or addiction. In the proposed statement, "We do not know how genes interact with the environment to make people more or less prone to illegal drug use or addiction," use of the word "how" implied that there is in fact a relationship between genes and drug use. The statement was therefore amended and accepted as shown above.

We do not know the extent to which the decline in rates of violence in the 1990s was related to changes in the crack cocaine market. In the proposed statement, "We do not know the extent to which the decline in rates of violence in the 1990s was related to maturation of the crack cocaine market," there was a risk of tautology in conveying the notion that a market is mature if it is no longer violent. The statement, amended to replace "maturation" with "changes," was accepted as quoted above.

We do not know about community involvement with and orientation toward drugs, or how and why those change. "Community orientation" means what the community thinks of the issue: For example, whether the community cooperates with or opposes the police. The community is divided into subgroups and subsystems that do not interact well. However, New York City today enjoys a collective consensus reflecting dislike and intolerance of heroin injection, crack sales, and crack use. This consensus was absent a decade ago. Inner-city youths in particular routinely register disgust at intravenous drug use and drug selling.

We do not know the effect of street enforcement on drug market violence. The proposed statement, "We do not know whether some forms of street enforcement actually increase drug market violence," was accepted as amended to read as shown here. The phrase "some forms of" was removed.

We do not know how best to match treatment approaches to the individual needs of offenders. As originally proposed, the statement read that researchers do not know how to determine which type of drug treatment is appropriate for which type of drug-abusing offenders. It implied that there is always an appropriate treatment. The person who proposed the statement responded that most studies do show a length-of-time-in-treatment effect, regardless of type of treatment. Another objection cited the many drug-dependent and alcohol-dependent persons who mature out of their addiction without formal treatment: Researchers do not know why this happens. Many people arrested as dealers falsely claim that they are users and are offered treatment. In these cases there clearly is no appropriate treatment. The statement was amended to propose matches of treatment services or approaches to the individual patient and was accepted.

In the aggregate, we do not know if increases in incarceration have resulted in decreases in illegal drug use by the persons incarcerated. The initial statement, "We do not know if increases in incarceration have resulted in decreases in illegal drug use or crime," was considered too broad. It appeared to mean that there is no class of persons researchers can describe for whom incarceration results in a decrease in subsequent criminal behavior or illegal drug use. Specific deterrent effects reported in the literature would contradict such a statement. If the statement were more specific, referring only to particular deterrence effects for drug use, it could be true. The statement also appeared to be an assault on U.S. policy, which is to "lock them up and throw away the key."

A proposed modification narrowed the statement to make it read that researchers do not know if increases in incarceration have resulted in decreases in illegal drug use by those incarcerated. It was intended to include postrelease drug use by people incarcerated and then released without treatment. There was general agreement that outcomes for individual drug users cannot be predicted, but in the aggregate, postrelease recidivism and relapse rates return drug use to roughly the levels it had been before incarceration. The statement, as clarified and amended, was accepted as reflecting the group's consensus.

We do not know enough about the co-occurrence of alcohol and other drugs in the drugs-crime relationship. There is a great deal of statistical evidence for this kind of co-occurrence, but a lack of understanding of its effects on criminal behavior.

We do not have accurate price or sellers' income data for illegal drug sales. The statement was accepted without amendment.

We do not know how the different policies implemented in various jurisdictions have produced different outcomes. Policies vary nationally and by State, and researchers need to know how those variations produce different impacts.

We do not know what etiologically differentiates drug-using offenders from other offenders. The statement was accepted as representing the group's consensus.

Statements for which consensus was not achieved

A statement to the effect that enforcement alone will not reduce drug use or related crime was rejected as uninteresting because few people claim that only enforcement is effective and treatment does not matter. The statement also failed to consider how much effort and resources would be applied to the problem. Given enough resources, law enforcement agencies could reduce drug-related crime.

The group rejected an assertion that crack sales/illegal transactions are among the most common offenses in the United States, although the assertion was supported by calculations indicating that they swamp other kinds of felony offenses. A participant pointed out that each sale produces at least one incident of drug use, so by definition there are at least as many cases of crack use as there are of sales. Another participant cited research in which crack metabolites were detected in ADAM samples. The data show that roughly 90 percent of the cocaine-positive urine specimens were positive for crack. If researchers could estimate the aggregate number of crimes, especially felonies, then the crack sales would probably swamp even thefts, and robberies would be negligible relative to the number of crack sales. Marijuana sales would not swamp crack sales because many crack users engage in 5 to 10 transactions each day. Other participants disputed these

contentions, citing work indicating that the entire universe of cocaine-related transactions would not account for the supposed large number of crimes.

Statements asserting that cause and effect can be determined only by using longitudinal studies, that current beliefs about the effects of drug policies are mainly expressions of ideological preferences rather than scientific evidence, and that development of low-toxicity substitutes for marijuana and alcohol are precluded by the Schedule I requirements in Federal law were also stricken.

Discussion of areas for future research

Discussion: What research in this area do you think is most important?

The following topics are areas of research that the forum participants considered the most important objectives for future study.

Long-range cost-benefit analyses. Long-range cost-benefit analyses of policies on drugs and crime are needed. Such work would address various interventions, including those that have already been attempted (such as incarceration). Inclusion of policy simulation studies was suggested because they could be used to simultaneously produce cost-benefit analyses as well as many other insights.

Secondary analyses of ethnographic data. Secondary analyses of ethnographic databases from different cities should be conducted to examine data collected during the peak years of the crack markets. These studies should include comparisons among drug markets in different neighborhoods or cities as well as prospective studies describing the criminal justice and public health impacts of illicit drugs on selling and using communities.

Effective, ineffective, and promising policies. Researchers should conduct studies that document policies that work, that do not work, and that show promise. Long-term incarceration was identified as the most significant policy among those that researchers believe do not work.

A multicity, multimethod surveillance system. Prospective approaches that combine ethnographic observations with arrest, drug pricing, and health data could be employed by using field stations in high-risk communities. An ongoing multicity, multimethod surveillance system should be set up. It would focus on drugs and crime by using police data, medical examiner data, and public health data (such as those documenting overdoses, deaths, homicides, and HIV and other sexually transmitted diseases). A suggestion that the crime data be limited to homicides (because the researcher can identify the endings of cases) was rejected because researchers would want to track changes in drug-use patterns in various places, including those where few homicides occur.

Ethical implications of genetics research. The ethical implications of policies based on genetics research in the areas of alcohol, drugs, and crime should be investigated. Scientists have not been responsible about addressing the ethical implications of their research; they should be proactive about the issues raised by genetics research. An agenda or process for bringing experts together to produce a consensus on ethical issues was recommended.

An example of such proposed research is identifying links between genetic susceptibility to drugs or alcohol abuse and various outcomes in the criminal justice system. Researchers need to think in advance about what the policy implications might be, and the ethical implications of those developments should be discussed.

Drugs, mental illness, and crime. More work should be done on the relationships among drugs, mental illness, and crime as well as the appropriate interventions. Cognitive dysfunctions were also suggested for study, making this a proposal to conduct research on mental illnesses, cognitive dysfunctions, and drugs (in combination) and their relationships with crime.

The structure of drug marketing in ethnic communities. Comparative research on the structure of drug marketing and its implications in different ethnic communities should be conducted at multiple sites. One of the implications to be studied is the extent to which drug marketing results in penetration of sales into the ethnic communities.

Operational research to improve treatment-outcome studies. Operational research should be conducted to bring more rigor to therapeutic-justice, treatment-outcome studies. Estimates indicate that up to half of hardcore drug users are nominally in the criminal justice system, either as parolees, as probationers, or in pretrial release status. This situation has significant implications for national policy and budget. However, the relevant research literature is inadequate because the programs vary significantly in characteristics and eligibility requirements; many studies measured recidivism rather than relapses, limiting their utility; and some studies are based on nonrandomized comparison groups, which results in data interpretation problems.

Randomized studies employing no-treatment arms are freighted with ethical, legal, and analytic problems that must be addressed within the context of the Code of Federal Regulations (CFR). Under CFR, with its minimal risk requirement, it might not be practical or feasible to conduct these experiments because international review boards (IRBs) will interpret mini-mal risk stringently with respect to no-treatment arms. However, there may creative, equitable approaches to these kinds of studies, such as conducting research in locations where scarcity of treatment slots and randomization may provide a fair way to allocate treatment. Random assignment to further treatment for previously treated subjects was suggested as an ethical approach to controlled studies of the effects of length of time in treatment.

Alcohol and marijuana: Complements or substitutes? Meta-analyses that assess whether alcohol and marijuana are complements or substitutes would be useful for modeling policy alternatives.

Drug "consumer price index." Methodological research on a so-called consumer price index for illegal drugs was suggested as an important research project. The proposed index would cover retail and wholesale prices and would complement the DEA's System to Retrieve Information from Drug Evidence (STRIDE) database. Reorganization of current data collection or expansion of STRIDE through random drug purchases may contribute to production of an index.

Survey policymakers. A survey of Federal, State, and local policymakers to assess their research needs was proposed. The survey would focus on questions that need to be answered in order to make better policy decisions. The survey could also help build bridges between the policy and research communities.

Relationships between distributors and consumers. Research on changes in the relationships between drug distributors and consumers was proposed. The attitudes and orientations of distributors would be investigated with an emphasis on how distribution affects consumption.

Event dynamics in drug markets. The event dynamics in drug markets should be

studied with an emphasis on the role of peer groups and associations. Peer associations may vary in different ethnic communities and thus affect drug-selling behaviors. The influence of ethnic communities may or may not affect sales in those communities and could be instrumental for marketing in other communities or cities.

The market research could focus on analyzing when drugs cause delinquents to engage in crime, rather than analyzing the actual buying and selling events. This approach would emphasize the drugs-crime relationship rather than the buyer-seller relationship. Drug-selling peer groups observed at different times have been observed first encouraging, then subsequently discouraging their members' violent activities. This indicates that peer relationships affect the types and frequency of crime.

Extending the focus of the proposed research beyond cocaine to, for example, the marijuana market, was suggested. Marijuana use has been an epidemic for 30 years in the United States but little is known about how it is sold.

Effects of felony disenfranchisement on minority communities. The political and social ramifications of felony disenfranchisement laws, which are driven by large numbers of drug-related felony convictions, should be examined for their effects on minority communities.

Effects of genes and the environment on drugs-crime relationships. Studies of interactions between drug-using and -selling environments and the psychopharmacological and genetic aspects of drug use should be placed on the research agenda. As genetics research becomes more important in the drugs-crime field, researchers may start touting "drug genes" without conducting research on how people with different susceptibilities function in different environments.

Drugs have certain physiological effects and there probably are certain genetic proclivities affecting susceptibility to those effects. However, the consequences of those proclivities differ according to interactions with the environments in which the drugs are used. The effects on crime and other behaviors may vary in different communities and subcultures within the larger society. There may be stigmatization and other consequences that result from interactions between people's genetic makeup and the environments in which they live, but people with similar drug genes may respond differently in different environments.

Not all drug users need treatment. Allocation of limited resources should be based on research that examines which drug users truly need treatment rather than those whose behavior should be addressed through law enforcement. Researchers should study methods to identify users who require treatment as a way to avoid the negative social consequences of drug use.

Drug hackers. Researchers need to investigate a growing group of sophisticated drug users and the more specialized substances available for their consumption. The cocaine problem may diminish substantially as more pharmacologically savvy drug users become more numerous. Amphetamine and barbiturate use has become commonplace; researchers may have to consult pharmaceutical manufacturers and experts in pharmacology to address this phenomenon.

A large segment of mainstream America is involved in using illicit drugs in new ways. Researchers need to change their paradigm of who drug users are and how they behave. A participant volunteered the term "drug hackers" to describe new,

pharmacologically savvy drug users. They are similar to computer hackers in that they use drugs in unintended ways, combining many different substances to mix effects.

Polypharmacy. Research on polypharmacy, with emphasis on the interactions of licit and illicit drugs, should be included in the research agenda. Studies of interactions between illicit drugs and alcohol are particularly important.

The dark side of drug enforcement. Research should be conducted on the negative aspects of drug enforcement. This includes studies of the flow of asset forfeiture funds across enforcement agencies and the degree to which that flow affects enforcement policies.

Enforcement-induced demand shifts. Researchers should examine the shift in demand from one drug to another as law enforcement focuses on particular drugs, and the degree to which that shift is helpful or detrimental. In other words, they should examine whether demand is shifting to drugs that are less or more serious in their marketing or crime potential.

Consequences other than crime. The research community should study consequences of drug use other than crime, such as mental health effects. The health effects of cocaine and methamphetamine have already been examined.

Early deviant behavior and drug use. Researchers need to study how parent monitoring, family cohesion, and family structure affect early deviant behavior and how that might in turn affect affiliation with drug-using peers and drug use. Examination of the onset of criminal behavior following the onset of drug use in monozygotic twins[5] would illuminate the links between drug use and crime. If there is a causal relationship, researchers should see crime starting earlier in the twin who starts drug use earlier.

Middle-class addicts. The criminal activities of middle-class addicts, and the social and legal consequences of those activities, should be studied and compared to the criminal activities of low-income addicts. This research would elucidate and deracialize the issues related to the consequences of drug use and crime. The differences between middle-income and low-income addicts in use-to-addiction levels and crime-commitment levels (for both undetected and detected crime) are not known.

Ethical issues and genetics research. In the forum on genetics research, participants expressed apprehension about ethical issues raised by genetics research and the need for further study of those issues. Stigmatization and labeling of drug users are major concerns. However, the ability to give patients a small dose of a prescription drug, measure a protein encoded by a gene whose expression is a secondary response to the drug, and use that measurement to predict whether the individual is likely to become dependent on the drug, would aid a physician working in a therapeutic context. Researchers should not oppose taking advantage of these kinds of benefits of the Human Genome Project. Ethical considerations are an important part of good research and should not be considered an impediment, but they also should not be the only consideration.

Effect of economic development on the drugs-crime nexus. A study of the effect of changes in the economy on drug use, drug trafficking, and the drugs-crime nexus would be useful. An example is the economic boom of the 1990s as an explanation for the decline of crime and violence during that period.

The developmental role of the family in shaping behavior. There is a need for more research with a developmental focus that assesses the influence of family

life on drug use and the drugs-crime relationship. One approach to understanding the role of the family in shaping behavior involves genetic influences on parenting. Some genetically influenced characteristics of children, such as their temperament, affect how their parents treat them. Thus, examination of genetic influences and family life are critical because these interactions are frequently dyadic.

Continuum-of-care treatment models. Treatment researchers think that the length of time drug users remain in treatment is the best predictor of treatment success as defined by recidivism or drug use. Many people drop out of treatment at some point in the process. Researchers should measure the impacts of continuum-of-care models on treatment effectiveness.

Racially disproportionate impacts of drug policies. The participants discussed whether the research community should address variations in the effects of drug policies on different racial and ethnic groups in American society. The incarceration rate is racially disproportionate, but whether the process leading to that impact involved race-influenced decision-making remains controversial and difficult to investigate. Race is often a covariate in analyses of ADAM data but it is not a powerful covariate in explaining dependent variables. Like gender, it frequently washes out when multiple-level controls are used.

Comparisons of data from incarceration or other criminal justice processes with drug-use data reveal gross racial disproportionality. However, it is by involvement in marketing, rather than in drug use, that people become involved with the criminal justice system. Research that includes controls for participation in drug-market activity would be useful in identifying the size of the disparity in racial impact, where it occurs, and what factors contribute to it. Income level, for example, is a strong covariate with race, and the way offenders are treated in the criminal justice system varies by income level. Researchers must separate a variety of race correlates from race itself as factors in racial discrimination in order to determine how much racial disparity is not due to racism and how much is a residual that is directly attributable to racism.

There are also difficulties in classifying people by race. For some research questions, what may be more important is how people are viewed by the police. For example, is their skin color dark enough to be viewed as black, regardless of how they self-identify culturally.

Underreporting by racial and ethnic groups. The disproportionate underreporting of drug use by members of some ethnic groups and how this affects research findings are important topics for future research.

Treatments whose effects differ by race or sex. Researchers need to know more about how the effect of treatment differs by race. They do not know if there are specific ways to administer treatments that are more effective depending on race or gender. Recent Federal Bureau of Prisons studies indicate that treatments that are effective for men are not working for women.

Intergenerational discontinuities in drug taking. Research on intergenerational discontinuities in drug-taking would be useful and would relate to such issues as the blunt generation phenomenon. Researchers are observing similarities in the degree to which new generations buck trends or defy expectations.

Discussion: What research in this area is urgently needed?

Forum participants were asked to describe areas of research that they think are most urgently in need of study.

Ethical issues in drugs and crime research. Theoretical studies of ethical issues are needed to address the impact of IRBs on drugs-crime research. Researchers must do some rigorous thinking about sound ethical models rather than slavishly borrowing from the clinical trial model used in medical research. That clinical model emphasizes autonomy and informed consent in ways that may not be realistic in drugs-crime research. The research community could convene a consensus-seeking meeting of social and medical scientists to discuss how existing IRB criteria should be modified for social science research.

More empirical research is needed to supplement the work of professional ethicists, whose background in philosophy may not reflect the values of ordinary people, including drug users, and the way in which the latter regard the ethical and moral implications of research conducted with or for them. Survey research could be conducted with the subjects and beneficiaries of drugs-crime research to increase researchers' understanding of the ethical perspectives of various stakeholders.

Social scientists should be included on Federal panels that produce regulations governing research. Although these panels consist of physicians and laboratory researchers, the regulations they formulate are applied inappropriately to social science.

New statistical methodologies. Advances in statistical methodology should be used more widely in drugs-crime research. They could be applied to such issues as whether researchers should conceptualize behavior problems as latent dimensions. This would involve arraying people along a continuum of problem behavior or as manifestations of different classes, such as drug users who do or do not commit violent or property crimes. The statistical tools needed to clarify uses of dimensions, classes, categories, and continua are evolving rapidly, and are interrelated with the missing data issue and selection bias problems. Approaches used by quantitative sociologists and psychologists are already becoming mainstream biostatistical methods.

Scientific justification for mandatory minimum sentences. Research on scientific justification for mandatory minimum sentences was suggested, with particular emphasis on studying different mandatory minimums by type of substance. Mandatory minimums have a direct bearing on the racial disproportionality of drug policy impacts. There is an urgent need for research on the marginal cost-effectiveness of mandatory minimums and whether there are sociological justifications for them. This research would involve factors such as the way markets are structured.

Discussion: What research in this area would be recommended to the best and brightest graduate students?

Participants were asked to think about areas of research that would offer direction to researchers just starting their careers.

Interventions for high-risk youths. Almost no research has been conducted on interventions for high-risk youths who have been arrested. Most treatment outcome studies focus on adult offenders who are already deeply involved in drugs and crime. A large body of evidence assembled over the past 20 years indicates a progression in drug use among arrested youths. At age 12, only a few

arrestees test drug-positive. At a slightly older age, drug tests might detect marijuana, and cocaine or heroin often are detected in older youths. Thus, there is a need for research on interventions for younger arrestees during their initial contacts with the criminal justice system. Developmental psychology literature on antisocial behavior, although not specific to drug use, may be a source of information about prevention strategies for intervention with early starters.

Linking policy interests with established disciplines. The difficulty in recruiting graduate students who are interested in policy research may be ameliorated by linking policy interests to the traditional concerns of existing academic disciplines, such as economics, psychology, and sociology. For example, research that affects policy might involve the study of labor markets and address such topics as the relationship between licit and illicit wages.

Policies that affect youth behavior. Students could study policies that affect young people's behavior, including their involvement in the macro-educational job market and labor opportunities available to them. One area of research to pursue is the possibility that economically, the job market may be better in the illegal than in the legal domain. Students could study policies ranging from economics to education as well as drug-education prevention. Various aspects of the research could be assigned to members of interdisciplinary teams.

Interdisciplinary or comparative research. Graduate study is typically individualistic, which is not consistent with the way research is conducted after graduation. Students should seek interdisciplinary work or the opportunity for comparative studies and not be overly concerned about the topic. They could work on these projects and still establish expertise in a specialized field by publishing some lead author or sole author articles in the journals of a particular discipline.

The criminal addict paradigm. Empirical studies of nonuse crimes committed by drug users would follow up on research that suggests the major crime committed by addicts is selling drugs. Researchers found that people who did not have a criminal history before becoming addicted did not adopt criminal behaviors other than drug selling after becoming addicted. The proposed studies may reveal that the amount of crime committed by drug addicts, other than drug use and drug selling, is dramatically lower than conventional wisdom would indicate. Hypothetically, the results would fit a bell curve, with a few people at one end who commit many crimes, a few at the other end who commit a small number, and most subjects in the middle only selling drugs. Researchers need to define this paradigm because of its policy implications.

The role of cognitive dysfunctions in drugs-crime relationships. The effects of cognitive dysfunctions (whether they precede or are induced by drug use) on drug users' decisions related to crime and their responses to interventions could be studied. Responses to interventions such as incarceration or treatment, for example, may be a function of cognitive deficits that either precede or follow drug use.

Rational choice models of drug use. Students should consult economists and others who study consumer choice behavior for assistance in developing research that examines drug use as a choice among various behaviors. Studies could address the degree to which a young person's decision to use, or not use, drugs is based on benefits to be obtained immediately or in the future.

Analyze ADAM data. In the new ADAM survey, large amounts of data have been

collected on drug treatment and crime; this information also is connected to census tract information. This valuable data collection presents an opportunity for students to conduct data analysis without collecting data.

Secondary data analysis. The best use of graduate students' time might be secondary data analysis using ethnographic or quantitative data. With mentoring and analytical experience, students could become accustomed to working with data and could gain experience with data collection after graduation.

The effects of moderating factors on accepted theories. When theories become established or findings are mixed, students should focus on the moderating effects or interaction effects. They should study conditions under which theories offer better or worse explanations for research findings. Moderating factors may cause existing theories to work in some settings but not in others.

Theory integration within or across disciplinary boundaries. Students should consider integrating theories within or across disciplinary boundaries by examining how their own theories fit with those of other drugs-crime researchers or theories formulated in other disciplines.

Methodological integration in drugs-crime research. Methodological integration, which employs techniques from other disciplines such as epidemiology or geographical information systems, may be useful in drugs-crime research.

Family and social networks in minority neighborhoods. The research community needs new models of what constitutes a healthy family. Development of such models could focus on family and social network protective factors for reducing crime and drug use in high-risk neighborhoods. For example, 35 percent of black households are headed by women, but the prevalence of lifetime drug use is lower among black Americans than among white Americans. The models and methods researchers use to study family structure are not useful for explaining drug use and crime in black or Hispanic-American communities.

Club drugs and crime. Almost everything researchers know about drugs and crime is based on past epidemics of cocaine, heroin, and marijuana use. Little is known about the relationship of club drug use to other kinds of drug use and crime. This potential epidemic involves mainly white, educated, 18- to 25-year-old users.

Club drugs and the Internet. People normally start using drugs in the context of their peer group. The Internet may influence use of club drugs.

Inhalants. Inhalants/huffing is another category of drug use that should be studied by young researchers.

Marijuana markets. Research on marijuana markets was suggested as a separate research topic.

Policy implications of research findings. Having investigators discuss the policy implications of their findings and addressing the implications of scaling up successful interventions were suggested as research topics.

History of drug policy. Study of the history of drug use and its relationship to crime was suggested as a way to provide perspective on the origins of current drug policies and acceptance of the fact that policies can change over time.

Comparative international research. Graduate students should develop fluency in one or more foreign languages, quantitative and methodological skills, and expertise in comparative research in order to conduct dissertation research in a foreign country. Examination of entire drug

enforcement regimes will require comparative international research and developing the capacity to conduct this kind of research will be advantageous.

Comparative research across drug types. Comparative research across drug types was encouraged. Focusing on the nexus of drugs, crime, and violence, the work would examine which aspects of drugs and their markets give rise to different levels of pharmacological and market-related crime. The ethnographic literature will be important in this kind of research.

Onset, popularity, and termination of markets for illicit drugs. Students could study various criminal career paradigms and use them to analyze the creation, duration, and termination of drug markets. This would include a study of the prevalence of drugs that suddenly appear on the market and would produce a history of a particular drug market. It would also extend the study to a number of markets to determine the factors that contribute to onset, popularity, and termination of markets for new illicit drugs.

The noncriminal drug user. A suggestion was made that students conduct research on noncriminal drug users.

Interdisciplinary work involving genetics. Interdisciplinary research encompassing fields such as genetics was suggested. The methods of other disciplines could be applied in novel ways in the drugs-crime field.

The effects of interdiction programs. Exhaustive analysis of interdiction programs and their effects may result in savings on interdiction expenditures.

Extradisciplinary knowledge. Graduate students should acquire some knowledge outside their discipline in fields such as pharmacology.

Prostitution and drugs. The study of prostitution as a criminal activity related to drugs was suggested as a research topic.

Future trends. Students should look beyond the issues that researchers have been studying for the past 20 years and try to assess future trends in the drugs-crime nexus.

The flexibility and mobility of drug markets. A study of drug markets could focus on their flexibility and mobility.

High-functioning drug users. Studies of drug users who live routine lives and are not involved in crimes other than taking illicit drugs would be an interesting research topic.

Models and simulations. Researchers should have graduate students create models and conduct simulations of the effects of alternative drug policies on crime. The work would be methodologically challenging because students would have to understand statistics, econometrics, and simulation software and conduct a literature review for each base estimate to determine whether it is high or low.

Closing remarks

Dr. Brownstein commented on the need to involve more researchers who are members of minority groups in future discussions of drugs-crime interrelationships. Practitioners and policymakers also could be more involved in the process; the forum would be the first of many discussions about these issues.

Dr. Erinoff thanked Roger Conner for acting as forum facilitator and reminded participants that they may submit additional comments on drugs and crime through an e-mail listserv. She and Dr. Brownstein will moderate the submissions.

Bennett Fletcher, research psychologist at NIDA, reminded the group that drugs and crime research has been important to NIDA since the agency's founding in 1974. He encouraged broadening the agency's criminal justice initiative and vigorous followup of the forum.

Dr. Hillsman was pleased that the relationship between NIJ and NIDA had been strengthened. She thanked the facilitator, organizers, authors, and participants for their efforts and then adjourned the meeting.

Notes

1. The summary was prepared by CSR, Inc.

2. Manski, F., John V. Pepper, and Carol V. Petrie, *Informing America's Policy on Illegal Drugs: What We Don't Know Keeps Hurting Us*, Washington, DC: National Academy Press, 2001.

3. Genetic polymorphisms are differences in DNA sequences among individuals, groups, or populations. Genes for blue or brown eyes are an example.

4. Diathesis is a condition of the body that makes tissues react in certain ways to certain external stimuli and thus makes them more than usually susceptible to other conditions.

5. Identical twins.

Appendix B: Forum Agenda

Thursday, April 19, 2001

8:30–9:00 a.m.	*Registration and Coffee Service*
9:00–9:30 a.m.	*Opening Remarks* Sally T. Hillsman, Deputy Director, National Institute of Justice Henry H. Brownstein, Director, Drugs and Crime Research Division, National Institute of Justice Lynda Erinoff, Health Scientist Administrator, Epidemiology Research Branch, Division of Epidemiology, Services and Prevention Research, National Institute on Drug Abuse
9:30–9:45 a.m.	*Facilitator Comments* Roger Conner, Director, Search for Common Ground in America
9:45–10:00 a.m.	*Group Exercise*
10:00–11:00 a.m.	*At the Intersection of Public Health and Criminal Justice Research on Drugs and Crime* James C. Anthony with Valerie Forman
10:00–10:15 a.m.	*Presentation*
10:15–11:00 a.m.	*Discussion*
11:00–11:15 a.m.	*Break*
11:15–12:15 p.m.	*Research on Drugs-Crime Linkages: The Next Generation* Robert MacCoun, Beau Kilmer, and Peter Reuter
11:15–11:30 a.m.	*Presentation*
11:30 a.m.-12:15 p.m.	*Discussion*
12:15–12:30 p.m.	*Discussion and Planning* Topics for lunch: "One-sentence statements"

12:30–1:30 p.m.	*Working Lunch—Roundtable Discussions* 1. Topic 1 2. Topic 2 3. Topic 3 4. Topic 4
1:30–1:45 p.m.	*Break*
1:45–1:55 p.m.	*Remarks* Richard A. Millstein, Acting Director, Division of Epidemiology, Services and Prevention Research, National Institute on Drug Abuse
1:55–2:15 p.m.	*Reports and Feedback From the Roundtable Discussions*
2:15–3:15 p.m.	*The Drugs-Crime Wars: Past, Present, and Future Directions in Theory, Policy, and Program Interventions* Duane C. McBride, Curtis J. VanderWaal, and Yvonne M. Terry-McElrath
2:15–2:30 p.m.	*Presentation*
2:30–3:15 p.m.	*Discussion*
3:15–3:30 p.m.	*Break*
3:30–5:00 p.m.	*Discussion* What don't we know about the relationships between drugs and crime? Reaching for consensus

Friday, April 20, 2001

8:30–9:00 a.m.	*Registration and Coffee Service*
9:00–10:30 a.m.	*Discussion* What research in this area do you think is most *important*? What research in this area do you think is *urgently* needed?
10:30–10:45 a.m.	*Break*
10:45–11:45 a.m.	*Discussion* What research in this area would you recommend to the best and brightest graduate students?
11:45 a.m.–12:00 noon	*Closing Remarks*

Appendix C: List of Participants

James C. Anthony
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Johns Hopkins University

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The Heinz School of Public Policy
Carnegie Mellon University

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National Institute of Justice

Jonathan Caulkins
RAND

Jamie F. Chriqui, Technical Vice President
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The MayaTech Corporation

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About the National Institute of Justice

NIJ is the research, development, and evaluation agency of the U.S. Department of Justice. The Institute provides objective, independent, evidence-based knowledge and tools to enhance the administration of justice and public safety. NIJ's principal authorities are derived from the Omnibus Crime Control and Safe Streets Act of 1968, as amended (see 42 U.S.C. §§ 3721–3723).

The NIJ Director is appointed by the President and confirmed by the Senate. The Director establishes the Institute's objectives, guided by the priorities of the Office of Justice Programs, the U.S. Department of Justice, and the needs of the field. The Institute actively solicits the views of criminal justice and other professionals and researchers to inform its search for the knowledge and tools to guide policy and practice.

Strategic Goals

NIJ has seven strategic goals grouped into three categories:

Creating relevant knowledge and tools

1. Partner with State and local practitioners and policymakers to identify social science research and technology needs.
2. Create scientific, relevant, and reliable knowledge—with a particular emphasis on terrorism, violent crime, drugs and crime, cost-effectiveness, and community-based efforts—to enhance the administration of justice and public safety.
3. Develop affordable and effective tools and technologies to enhance the administration of justice and public safety.

Dissemination

4. Disseminate relevant knowledge and information to practitioners and policymakers in an understandable, timely, and concise manner.
5. Act as an honest broker to identify the information, tools, and technologies that respond to the needs of stakeholders.

Agency management

6. Practice fairness and openness in the research and development process.
7. Ensure professionalism, excellence, accountability, cost-effectiveness, and integrity in the management and conduct of NIJ activities and programs.

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In addressing these strategic challenges, the Institute is involved in the following program areas: crime control and prevention, including policing; drugs and crime; justice systems and offender behavior, including corrections; violence and victimization; communications and information technologies; critical incident response; investigative and forensic sciences, including DNA; less-than-lethal technologies; officer protection; education and training technologies; testing and standards; technology assistance to law enforcement and corrections agencies; field testing of promising programs; and international crime control.

In addition to sponsoring research and development and technology assistance, NIJ evaluates programs, policies, and technologies. NIJ communicates its research and evaluation findings through conferences and print and electronic media.

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