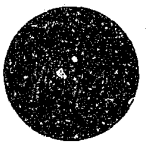

Relations between Increases in the Certainty, Severity and Celerity of Punishment for Drug Crimes and Reductions in the Level of Crime, Drug Crime, and the Effects of Drug Abuse

Conducted for

The Office of National Drug Control Policy

15 May 1993

BOTEC Analysis

CORPORATION

Relations between Increases in the Certainty, Severity and Celerity of Punishment for Drug Crimes and Reductions in the Level of Crime, Drug Crime, and the Effects of Drug Abuse

by:

David P. Cavanagh, Ph.D.

with assistance from

David Boyum, Ph.D.
and
Jyothi Nambiar

TABLE OF CONTENTS

EXECUTIVE SUMMARY

There can be no question that increasing the certainty, severity, and celerity of punishment for drug crimes by a great enough amount would dramatically decrease the extent of these crimes and their impact upon the community. However it is questionable whether there is some plausible increase in the certainty, severity, and celerity of punishment for drug crimes which would appreciably and cost-effectively reduce the extent of drug crime, drug related crime and the impact of drug abuse.

In order to analyze this question it is necessary to examine the United States' current corrections and criminal justice systems, the theoretical relation between punishment and crime, and the research literature on the relation between increases in the certainty, severity, and/or severity of punishment and changes in the levels of crime.

The key fact about the United states' corrections system is that it is over-burdened and becoming more so. Prisons and jails are over-crowded despite the fact that nearly three-quarters of all convicts under correctional supervision are on probation or parole rather than being incarcerated. Probation and parole systems are so over-burdened that they provide minimal supervision and control of those in their supervision. Current projected growth in the corrections system is unlikely to change this state of affairs.

Any attempt to increase the certainty, severity, and/or celerity of punishment in the United States must not only consider that the nation's corrections system is over-burdened but must also respect the fact that the criminal justice system is composed of a set of independent actors, all of whom are themselves operating within sharp resource constraints and all of whom are aware of the over-burdened nature of the corrections system. The main actors in the criminal justice system are police, prosecutors, and courts. Any attempt to increase the certainty, severity, and/or celerity of punishment must take cognizance of all these actors or it will fail.

Punishment affects criminal behavior through three primary mechanisms: deterrence, incapacitation, and rehabilitation. Deterrence is the reduction in criminal behavior due to fear of punishment. Incapacitation is the reduction in crime that results when punished criminals are controlled and thereby prevented from committing crimes during the term of their punishment. Rehabilitation is the reduction in criminal behavior that occurs when punishment permanently alters a criminal's behavior patterns and converts him to a more-or-less law abiding citizen.

Furthermore, current research is ambiguous whether increased penalties for drug-related crimes would, in fact, have a significant impact upon the number of these crimes. Economic analyses of illicit drug markets, ethnographic research, and case studies of policies which were intended to increase the certainty, severity, and/or celerity of punishment for drug crimes all suggest that marginal increases in punishment will have little impact.

With this background the following conclusions seem inevitable: Increasing the certainty, severity, and/or celerity of punishment for drug-related crimes would require large additional investments in all parts of the criminal justice system and corrections system, since all components of these systems are currently over-burdened. Attempts to create such increases by selectively strengthening one component of the corrections or criminal justice system are likely to fail since other actors within the system will react to these efforts in off-setting ways. Finally, even if it were possible to increase punishment levels, current research provides no clear answer as to whether this would ultimately reduce drug-related crime.

INTRODUCTION

There is an ongoing debate concerning whether various efforts to increase the certainty, severity, and/or celerity of punishment for drug-defined and drug-related crimes is worthwhile from a public policy perspective. A major focus of this debate is whether such increases significantly reduce the level of all crime, the level of drug related crime, and the extent of other detrimental impacts of illicit drug use.

The report begins with an analysis of the methods which are currently available in the United States for punishing and controlling criminal behavior. Special attention is given to the capacity of the United States' correction system and how that capacity is currently affected by drug crime convictions. The report then reviews the relations between punishment and control, and criminal behavior, and examines the reasons why the relation between punishment and the level of crime may be different for drug-defined crimes than for other crimes.

The report continues with a brief description of how the United States' criminal justice system actually operates to punish crime, arguing that criminal justice policies must be framed within the criminal justice system as a whole, taking into account the effects of changing, e.g., police procedures, sentencing policies, or corrections capacity will have on other parts of the system.

After presenting this framework, which is needed to understand current debates about the relation between certain, severity, and celerity of punishment and levels of crime, the report reviews recent literature in this area. The report concludes with a brief analysis of New York City's Tactical Narcotics Teams (TNTs) — a recent attempt to reduce drug related crime by increasing the certainty, severity, and celerity of punishment for drug dealing and possession.

CONCEPTUAL AND THEORETICAL BACKGROUND

Introduction

There can be no question that increasing the certainty, severity, and celerity of punishment for drug crimes by a great enough amount would dramatically decrease the extent of these crimes and their impact upon the community. If every city block were to swarm with police intent upon arresting drug offenders; if every person they arrested were subject to an immediate trial; and if every guilty defendant were sentenced to death and immediately executed, then soon only the very foolish would commit drug crimes. Quickly even foolish drug offenders would be a vanishing species.

Obviously, however, the United States could not stomach such a draconian policy, even if there were the resources and will to implement it. The question then becomes whether there is some plausible increase in the certainty, severity, and celerity of punishment for drug-defined crimes which would appreciably and cost-effectively reduce the extent of drug crime, drug-related crime and the impact of drug abuse.

An analysis of how increasing the certainty, severity, and celerity of punishment might affect crime levels reads as input information about what punishments for crime are currently available in this country, how such punishments affect crime levels, and how the criminal justice system works to impose punishment. The links between punishment and crime are not always obvious. The remainder of this section provides the conceptual framework and some numerical data which form the basis for the analysis of subsequent sections of this report.

Current Modes of Punishment and Control for Criminals

Punishment of crime and control of convicted criminals are often closely related. In the United States there are five basic modalities for punishing crime and all but one of these combine punishment and control. The five basic modalities of punishment are: the death penalty, incarceration in jail or prison, probation, parole, and financial punishments. In addition, newer, experimental forms of punishment and control combine and modify these basic modalities. The death penalty is extremely controversial, seldom imposed, and in the United States has, heretofore, never been used as a punishment for the simple import, manufacture, sale, or possession of illicit drugs; although it is worth noting that there has recently been serious debate on the federal level about imposing the death penalty on major, wholesale importers and traffickers of illicit drugs. One rough calculation suggests that no plausible number of executions would have any substantial impact on the drug market. (Kleiman, 1988) This report will exclude further consideration of the death penalty.

Punishment and Control

In theory convicted criminals could be treated in ways which involve pure punishment for criminal behavior or pure control to prevent future criminal behavior. For example, the colonial practice of flogging, which is still in use in many countries, is pure punishment. Once flogged the convict is free of any further control by the criminal justice system. The same is true of fines. Treatments for convicted criminals which involve pure control are also possible. A court mandated treatment involving only compulsory use of the drug Antabuse for a convicted drunk driver is a reasonable approximation to pure control. The Antabuse treatment primarily insures that the convict will not be able to consume alcohol in sufficient amounts to become dangerously intoxicated, without punishing the offender beyond depriving him the pleasures of alcohol and exposing him to the drug's modest side-effects.

This distinction between punishment and control is more than academic. In the United States all the commonly used modalities for dealing with convicted criminals combine punishment and control. This leads to a conceptual confusion which can cloud discussions about increasing the certainty, severity, or celerity of punishment. Incarceration, which is widely misperceived as being the fundamental modality for dealing with criminal behavior in the United States, combines a high degree of punishment with a high degree of control. Other currently available options for dealing with criminals, e.g. probation and parole, are perceived as providing both significantly less punishment and significantly less control.

Because American modalities for dealing with convicted criminals combine punishment and control, Americans are perceived as being punitive when devising approaches to dealing with convicted criminals. In fact, most Americans are probably at least if not more interested in controlling and preventing criminal behavior than they are in punishing criminals. However, under current circumstances in the United States any program which seeks to increase control over convicted criminals also of necessity increases punishment. We will return to this topic in section 2.1.6 below.

Jails and Prisons

The best known mode of punishment and control in the United States is incarceration in jail, prison, or an equivalent facility. Incarceration is commonly regarded as the standard form of punishment and control in the United States. In fact only about twenty eight percent of supervised criminals are incarcerated; most of the remainder are on probation or parole. (The Corrections Yearbook: Probation and Parole, 1992, page 4) This low rate of incarceration for supervised criminals is probably due in some part to a lack of jail and prison facilities.

Jails are local—frequently county-managed—facilities to hold detained suspects and incarcerate misdemeanants serving sentences of less than one year. Jails also frequently hold felons who would be in prison if prison space were available. Prisons incarcerate convicted felons serving sentences of longer than a year. Criminals can also be confined in

a variety of institutions besides prisons and jails. Such facilities include hospitals, mental institutions, and a variety of community-based and other types of special programs. About fifteen percent of all supervised convicts are confined in such facilities. (The Corrections Yearbook: Adult Corrections, 1992, page 1)

The federal government and every state maintains a prison system. Most of these systems are composed of facilities with gradated degrees of supervision and security. At one extreme maximum security prisons hold the most dangerous offenders under close confinement with extremely tight security procedures. At the other, community facilities are much like half-way houses where inmates may be released into the community for part of the day to work, attend counseling, or perform other required activities. In between these extremes are close or high security prisons, medium security prisons, and minimum security prisons. The latter are frequently not much more than fenced-in and patrolled buildings and grounds.

The critical fact about United States jails and prisons is that they do not have sufficient capacity to meet the current demands of the criminal justice system. In 1991 the average daily population of the nation's jails was 423,000 - one hundred and one percent of rated capacity. (1991 Sourcebook of Criminal Justice Statistics, Table 6.34, page 611) On 1 January 1992 the total prison population of the United States was about 776,000;.this population exceeded the total rated capacity of prisons by nearly sixteen percent. This was in spite of the fact that the nation's jails held approximately 39,000 inmates who would otherwise have been in prison. In 1992, thirty corrections agencies had court orders to limit their prison populations due to overcrowding. (The Corrections Yearbook: Adult Corrections, 1992, pages 1, 6, and 36)

This lack of capacity and overcrowding is likely to persist unless implausibly large investments are made in jail and prison construction. In 1991 the nation's prison capacity was increased by about three percent at a capital cost of nearly one billion dollars. Current and planned prison construction will increase the nation's prison capacity by over thirty percent in the next decade suggesting a planned investment on the order of ten billion dollars. (The Corrections Yearbook: Adult Corrections, 1992, pages 10 and 38)

However, even this massive investment will not match the current growth in numbers of convicted criminals who must be incarcerated. In 1992 corrections officials were projecting growth rates in prison populations of more than sixteen percent by 1994. If such rates persist to the end of the decade, prison populations will increase by nearly seventy percent. This suggests that on the order of twenty billion dollars must be invested in jail and prison capacity during the coming decade in order to meet the projected need for jail and prison cells.(The Corrections Yearbook: Adult Corrections, 1992, page 44)

One further point is worth making—particularly within the context of this report. A major reason for current and projected over-population of jails and prisons is incarceration for the possession, sale, and manufacture of drugs. The absolute number and relative

proportion of jail and prison commitments for drug-defined crimes is large and growing. Furthermore the sentences being served for drug crimes are lengthening.

In 1989 nearly one-third of all new commitments to state prison (65,541 commitments) were for drug offenses; while only about one-fifth of releases (13,910 releases) were for drug offenses. Furthermore drug offenders in state prisons are serving longer sentences. In 1989 newly released drug offenders served a median sentence of eleven months — about eighty five percent of the median sentence served by all newly released prisoners. In that same year newly admitted drug offenders were receiving a median *minimum* sentence of twenty one months — about eighty eight percent of the median minimum sentence to be served by all newly admitted offenders. A similar situation exists in federal prisons. In 1989 forty percent of all admissions to federal prisons (12,262 admissions) were for drug offenses; while only about thirty percent of releases (8,142 releases) were for drug offenses. (Perkins, 1992, Table 1-6, page 13; Table 1-8, page 15; Table 2-6, page 27; Table 5-2, page 53; Table 6-3, page 68)

While some drug offenders have prior histories of violence many currently incarcerated drug offenders are occupying jail and prison cells that could be used to hold convicted criminals posing much greater threats to the property and lives of law abiding citizens. Similarly to make space in prison for the dramatically increasing influx of newly convicted drug offenders, corrections officials must release dangerous convicts earlier than ever. There is no sign of these trends abating in the near future.

Probation and Parole

Most of the nation's supervised criminals are on probation or parole. The vast majority of supervised criminals—about sixty percent or more than two million persons—are on probation. Nearly an additional half million persons—about twelve percent of all supervised criminals are on parole. (The Corrections Yearbook: Probation and Parole, 1992, page 4, 19,48, and 50)

Probation is a punishment imposed in lieu of incarceration. It has a specified duration during which the probationer must meet conditions set by the court. These conditions usually include a responsibility to cooperate with some form of supervision, e.g. by reporting to a probation officer at regularly assigned intervals. Additional conditions are also possible. These conditions are usually intended to facilitate either supervision or rehabilitation. They might include requirements to participate in alcohol or drug treatment, to participate in various forms of counseling, to obtain and maintain regular employment, to pay fines and fees set by the court, to avoid certain areas or persons, to submit to drug testing on a regular or random basis, and other less common conditions.

An observed failure to adhere to probation conditions may result in a court hearing and possible incarceration for the length of the original sentence. Some courts are using "tourniquet sanctions" to punish probation violations. Rather than incarcerating a probation violator for the full length of his sentence, "tourniquet sanctions" allow the

court to incarcerate violators by an amount that escalates with each violation. First time violators might go to jail or prison for one day, second time violators for a week, and so on. This technique conserves jail and prison resources while putting teeth in probation enforcement.

Originally probation was an exceptional form of punishment and control given in unusual cases where incarceration would be counter-productive, e.g., a first time youthful offender who appeared extremely unlikely to ever commit another crime. Today an overwhelming number of criminal pleas and convictions coupled with a limited number of jail and prison resources has forced the courts to make probation the rule rather than the exception.

Parole is a conditional early release from prison. The length of parole corresponds to the remaining length of a prison sentence. If a parolee violates the conditions of his parole during this period an administrative hearing is sufficient to re incarcerate him for the remainder of his parole period. Parole conditions are similar to probation conditions. Often parole to a half-way house or community facility is used as a method of reintegrating convicts into society.

Parole was originally intended as a means of rewarding good behavior and granting early release in cases where rehabilitation seemed manifest. Today parole serves a number of additional functions. Besides disciplining prisoners by rewarding good behavior, parole provides a way of reintegrating prisoners into society, and a "back end" method of controlling prison and jail populations so as not to overwhelm these correctional facilities.

"Back end" methods of prison and jail population control affect prison and jail populations by restricting or easing the release of current prisoners. Easing or tightening the screening process for parole release, or shortening or lengthening the time to first parole hearing, is such a "back end" method. Many jurisdictions have chosen or been forced by court orders to use parole in this way as a means of controlling jail and prison population sizes.

There is strong reason to suppose that the probation and parole systems currently operating in the United States are over capacity and do not properly fulfill their objectives of supervision and rehabilitation. In 1992 the average probation officer supervised 113 cases. Assuming a forty hour week this would mean that each officer could spend only twenty minutes a week with each client to provide supervision, guidance, and counseling. Actually these calculations greatly over-estimate the amount of supervision probation clients currently receive. Probation supervision requires a significant amount of record keeping and related duties. Most jurisdictions require that probation officers prepare this paperwork and related duties without assistance. This probably halves the actual time a probation officer can spend in supervising and counseling clients. (The Corrections Yearbook: Probation and Parole, 1992, page 24). In fact, on average probation officers have face-to-face contacts with each client about eighteen times per year. (The Corrections Yearbook: Probation and Parole, 1992, pages 22-24)

Probation officers in "intensive supervision probation" (ISP) programs supervise an average of twenty nine cases. So even "intensively" supervised probation clients could

receive an average of about one-and-a-half hours of supervision each week. In fact, the average client under ISP supervision has face-to-face contact with his probation officer between once and twice each week. (The Corrections Yearbook: Probation and Parole, 1992, pages 22-24)

In addition the majority of probation agencies do not provide support services to their probationers. Only forty six percent of these agencies provide drug abuse services. Forty eight percent provide employment assistance. Less than one third provide family counseling. Without such services the rehabilitative and crime reducing effects of probationary supervision are probably nugatory. (The Corrections Yearbook: Probation and Parole, 1992, page 31)

Despite, or perhaps because of, this low level of supervision and lack of support services a significant number of probationers are detected violating parole and punished accordingly. On 1 January 1992 over two million persons were under probation supervision. During the preceding year about 350,000 probationers, or about fifteen percent of those under probation supervision, had violation hearings and were removed from supervision — presumably to be sent to jail or prison. Since probationers spend an average of about two years under probation supervision, this annual violation rate of fifteen percent suggests that between fifteen percent and thirty percent of probationers violate their probation and are caught. Given the low level of probation supervision, it is reasonable to assume that a significantly larger proportion of probationers commit one or more crimes or violate probation in some other manner during their period of probationary supervision. (The Corrections Yearbook: Probation and Parole, 1992, pages 19, 25, and 26)

The situation for parole supervision is similar. The average caseload of parole officers in 1992 was seventy five parolees. Even in the absence of paperwork and other duties this means that the typical parole officer can supervise and counsel an average client for less than a half hour per week. Parole officers in "intensive supervision" programs supervised an average of twenty eight parolees. This suggests they could provide about an hour of supervision per client per week. (The Corrections Yearbook: Probation and Parole, 1992, page 33)

A very large fraction of parolees violate parole. On 1 January 1992 approximately 475,000 persons were under parole supervision. During the preceding year approximately 155,000 parolees were returned to incarceration for cause. Thus every year about one-third of those on parole are returned to incarceration. Since the average length of parole supervision for new parolees in 1991 was about two years, this suggests that somewhere between one-third and two-thirds of all parolees ultimately violate their parole and are caught. As is the case with probation, some additional fraction violate parole and are never detected doing so.(The Corrections Yearbook: Probation and Parole, 1992, pages 48, 55, and 56)

Probation and parole were originally intended as adjuncts to incarceration. In the United States' criminal justice system the lack of incarceration capacity has resulted in probation and parole becoming the major modes of punishing and controlling convicted criminals. In

fact, the criminal justice system uses probation and parole primarily as means of reducing the pressure on jails and prisons. But this very process has sapped the ability of probation and parole to punish and control.

In order for probation and parole to work, probationers and parolees must be closely supervised and provided with support services. The sheer number of convicted criminals who instead of being incarcerated are put on probation or parole has made serious probation and parole supervision and client assistance an impossibility. Even good ISP programs which are supposed to provide intensive supervision usually provide less than five hours of actual supervision and support per week.

Furthermore, the power of probation and parole to control probationers and parolees ultimately is based on the ability to coerce cooperation with the threat of incarceration. Because the nation's jails and prisons are already over capacity this threat must either be an idle one or an incarcerated felon must be removed from prison to make way for a "violated" probationer or parolee.

Financial Punishments

Various financial punishments may be assessed against convicted criminals. Among these are:

- Fines;
- Seizure and forfeiture of money, property, and real estate which has been used in or obtained as the result of criminal activity;
- Victim restitution payments (since these are not applicable to drug crimes, in which the buyers do not appear in court to complain, they will not be considered further in this report);
- Payments for services such as drug testing, drug treatment programs, and other probation and parole services which are part of the convict's sentence.

Usually these are collateral punishments which are inflicted in addition to incarceration or probation. Ultimately payment of monetary punishment, like obedience to the strictures of probation and parole, must be enforced by the possibility of imprisonment. Unfortunately there is little published information on the extent of these financial punishments in the United States.

In 1988 federal courts imposed fines in about ten percent of all cases in which a sentence was imposed. Only about 80 cases for drug offenses, or less than one percent, received fines. In state courts in 1988 thirteen percent of all convicted felons and seventeen percent of felons convicted of drug trafficking were required to pay fines as a collateral punishment. (1991 Sourcebook, Table 5.18, page 503; Table 5.51, page 546)

Courts in the United States usually impose fines as a part of a composite probation sentence. Because there is no formal fine structure courts frequently establish a fine that

the "lowest common denominator" of offender can pay. This is usually quite low. A survey of recent studies found that fines imposed by a variety of lower courts tended to cluster around one hundred dollars in the early 1980s. The same survey found felony courts imposing larger median fines ranging from five hundred to one thousand dollars. (Hillsman, 1990, footnote, page 63)

Courts seem very aware of the ability of convicted persons to pay fines. Indigent persons and persons without steady employment are much more likely to receive other terms of probation or short jail sentences than fines, while persons with the likelihood of paying a fine are much more likely to receive a fine as part of their sentence. Courts also appear to have great success in collecting fines. They encourage payments by establishing installment systems and surcharges and interest for late payments. They can enforce payments with enforced work programs or paid community service, civil procedures including property seizure, and ultimately the threat of imprisonment. As a result it is estimated that municipal courts alone collect over 700 million dollars in fines annually. (Hillsman, 1990, pages 65-73)

Various court systems have independently incorporated procedures for levying and collecting fines into the armamentarium of punishments they can apply to convicted offenders. In the process they have made fines both a significant punishment modality and a lucrative source of public revenue. Courts have done this in the absence of explicitly formulated criminal justice policies and programs. This suggests that the potential of fines for punishing criminals has not been considered seriously enough by state and federal policy makers.

Cash and property forfeiture is a punishment which has recently been applied extensively to persons violating the drug laws. Unlike fines, forfeitures are intended to prevent crime as well as punish it by depriving dealers of working capital. In 1988 the Drug Enforcement Administration, United States Customs, and various state agencies combined seized approximately one billion dollars of cash and assets.

During this same year there were over one million arrests for drug abuse violations. (1989 Sourcebook, Table 4.1, page 418). Thus the average financial impact of seizures was a substantial $1,000 per arrestee. This figure, of course, is somewhat fanciful. Most arrestees had no property or money seized, some forfeitures do not involve arrest or prosecution. In addition a significant amount of seized property is eventually not forfeited and is returned to its owners. However, this figure is useful in providing an order of magnitude estimate of how much punishment is currently being meted out to drug law violators by seizure and forfeiture.

Courts can also financially punish convicted criminals by making them pay for court-required services such as drug testing, drug treatment programs, and other probation and parole services which are part of the convict's sentence. Some convicts have even been made to pay room and board for their jail or prison cell. All the strictures which apply to other types of financial punishments also apply to these court-assessed service charges, e.g. it is difficult to assess them against indigent convicts who lack the resources to pay

them, at least in the absence of a system of "community services" (punitive labor) under which fines could be worked off at so much per hour or day.

There are several important side issues relating to fines and seizures in drug cases which we will mention here. To many the imposition of financial penalties for criminal activity seems inherently unfair. It seems similar to allowing the purchase of opportunities to commit criminal behavior. Also fines are inequitable in the sense that the impact of any given fine will always be greater for a poorer offender than a richer one. There are civil rights concerns with seizures, since in many states seizure hearings are civil procedures which impose a lower burden of proof on the state than do criminal proceedings. Seizure income is frequently distributed to law enforcement agencies. This potentially rich source of agency income may cause these agencies to target law enforcement in ways that are lucrative to the agencies but less beneficial to the public than would be other uses of agency resources.

New and Experimental Modes of Punishment

Electronic monitoring and house arrest are two related forms of punishment which are becoming more common in the United States. Electronic monitors are devices which allow supervisory agencies to ensure that convicted criminals under their supervision are in required locations at required times. Such devices greatly increase the control that can be exercised over probationers and parolees.

House arrest is the sentencing of a person to remain in one place for an extended period of time. Usually house arrestees are required to remain within their residence or on the grounds of their residence. Frequently house arrestees will also be allowed to work and commute to work. Experience suggests that house arrestees begin violating their house arrest after relatively short periods of time. Thus house arrest is a useful alternative to short-term jailing but not to imprisonment. It's value also depends either on a high level of vigilance by the authorities or on substantial motivation to comply and self-control on the part of those confined. Even the most highly disciplined and motivated offenders can probably not be supervised longer than about six months under house arrest. (Petersilia, 1987, page 35) Electronic monitoring devices are obviously useful in monitoring compliance with house arrest. The use of these devices in conjunction with house arrest is becoming more common.

As of 1 January 1992 twenty-three states were monitoring probationers electronically while twenty-five were monitoring parolees electronically. A total of 5,000 probationers and 2,200 parolees were being monitored electronically. Nine of the twenty three states monitoring probationers electronically were monitoring so few as to suggest that their electronic monitoring programs were experimental. Seventeen of the twenty five states that were monitoring parolees electronically appeared to have only experimental electronic monitoring programs. (The Corrections Yearbook: Probation and Parole, 1992, pages 20, 21, 49, and 50) Based on past trends the use of electronic monitoring as a control device should continue to grow. (Renzema and Skelton, 1989)

It is hard to come by information on the extent of house arrest as a punishment and control mechanism. No figures are available for the number of persons under house arrest, although Joan Petersilia of the Rand Corporation estimates that as of 1987 it had been used with fewer than 25,000 persons nationwide. The vast majority of house arrests in this estimate were from Florida which instituted a house arrest program in 1983.

Boot camps and shock incarceration are alternative forms of punishment and control which are often used with first time and/or drug law offenders. Both boot camps and shock incarceration programs subject selected inmates to a short but intensive dose of incarceration and supplement this with counseling and rehabilitation that are integral parts of the programs. The theory behind these programs is that for convicts who are carefully selected for indicators of rehabilitative potential, such as youth and a lack of serious prior criminal behavior, a small dose of incarceration along with counseling and post-incarceration support is more cost-effective and less likely to harden criminal tendencies than long prison terms.

The main differences between shock incarceration and boot camps seem to be their location and daily routine. Shock incarceration programs are located within prisons and their daily routine is that of a prison except for added counseling and guidance sessions. Boot camps are usually separated from standard prison facilities. Their daily routine resembles that of military basic training along with counseling and guidance sessions. The basic training aspects of these programs are intended to instill self-discipline, self-respect, and confidence.

In 1991 twenty one states were operating shock incarceration programs which enrolled over 10,000 inmates during that year. In 1991 thirty nine boot camps were operating in twenty five states and these states planned to open an additional twenty three boot camps by 1993. At the start of 1992 the operating boot camps contained over 5,000 inmates. (The Corrections Yearbook: Adult Corrections, 1992, pages 52, 53, and 60)

Because shock incarceration and boot camps are novel methods of punishment and control it is worthwhile to describe one of the best of these programs in some detail. New York State has developed one of the largest and most carefully designed shock incarceration boot camp programs in the country and has carefully evaluated this program. (New York, 1993) The New York program is actually much more like a boot camp program with separate incarceration facilities and a program involving rigorous physical activity and discipline.

The New York Department of Corrections selects candidates for shock incarceration from among newly admitted prisoners between the ages of sixteen and thirty four, eligible for release within three years, not convicted of violent crimes, and not having special medical, psychiatric, security, or criminal history classifications. Selected candidates are offered the opportunity to join the program which comprises six months of disciplined living within a structured, therapeutic inmate community, drug abuse treatment for all inmates who require it, mandatory academic education, participation in professional and peer counseling, and participation in community service work.

Inmates of the program are released into intensive parole supervision. They are required to obtain work, enroll in an academic or vocational education program, and to continue drug abuse treatment and other forms of required counseling. Two parole officers supervise no more than thirty eight program parolees. Thus New York's program is a model of a well-designed program with after-care and intense supervision.

The main justification for New York's shock incarceration program is not the improved control of participants' criminal behavior, but rather the purported financial savings it engenders and the number of prison beds it frees for incarcerating more dangerous convicts. Those who are successfully released from the shock incarceration program have recidivism rates that are not significantly different than a comparable group of prisoners who are imprisoned and released to parole. (New York, 1993, Table 33) However, although the daily per inmate cost of New York's shock incarceration program is higher than the daily per inmate cost of imprisonment, shock incarceration is less than half the length of other forms of imprisonment. Thus the total per inmate cost of shock incarceration is considerably less than that of imprisonment. In fact New York estimates the net saving per shock incarceration to be on the order of $35,000 per inmate. (New York, 1993, Table 14)

Unfortunately these calculations do not factor in the costs of new crimes which may be committed by shock incarceration participants because their duration of imprisonment is less than that of comparable convicts who serve a standard sentence of incarceration. In New York shock incarceration inmates serve almost a year less time than comparable convicts who are imprisoned. (New York, 1993, Table 14) Since recidivism is occurring, it is safe to assume that some newly paroled shock incarceration inmates are committing crimes while comparable convicts who are still imprisoned cannot be. The cost of these crimes which newly paroled shock incarceration inmates are committing may be quite high. By some estimates these costs may outweigh the savings which New York has calculated by a factor of fifteen to fifty. (Cavanagh and Kleiman, 1990, Table 9, page 27)

Thus the only advantage to New York's shock incarceration program may be that it frees up beds to imprison more dangerous convicted criminals. It has no discernible rehabilitative impact on participants and any apparent cost savings the program generates may be illusory. Seen in this light, even the most widely admired shock incarceration/boot camp program in the country is essentially not much more than another "back end" method for reducing prison overcrowding.

Considering all these alternative forms of punishment and control — electronic monitoring, house arrest, and shock incarceration/boot camps — several things become clear. First, they represent only a very small fraction of the nation's punishment and control capacity. In 1991 no more than 35,000 persons were being punished and/or controlled by any combination of these programs. This is less than four percent of the total prison population. Second, they provide less control than imprisonment and therefore are of utility in controlling the criminal behavior only of a subset of all convicted criminals. Finally, when all costs are factored in, including the costs of crime not

prevented due to reduced control, they may not be as cost-effective substitutes for imprisonment as they first appear.

What Is Punishment

Michael Smith of the Vera Institute has pointed out that there is a perception among many criminal justice professionals that: "Some offenders must be punished and some must be incapacitated, and for these offenders we have no alternative but to lock them up ... the ones we don't lock up don't need to be punished and their behavior doesn't need to be controlled." (Smith, 1983, page 4) This perception equates punishment and control with incarceration. As a corollary probation, parole, and other alternatives to incarceration are regarded as providing neither real punishment nor real control. Furthermore, this attitude serves to ensure that alternatives to incarceration are not augmented in ways that would suit them for offenders who need punishment and control but not incarceration.

The situation is particularly acute since evidence is accruing that many offenders today, particularly inner-city drug abuse offenders, may not regard incarceration as a truly unpleasant punishment. Joan Petersilia has noted: "This country bases assumptions about 'what punishes' on the norms and living standards of society at large." She goes on to point out that for many of today's repeat offenders incarceration, far from being stigmatizing, is status-enhancing. Neither does incarceration affect these persons future opportunities. In addition incarceration provides many repeat offenders with opportunities for socializing not much different than those they experienced on the street. Finally the quality of life in jail or prison may match or exceed the quality of life many habitual criminals experience when free. (Petersilia, 1990)

As a result many criminals may not regard incarceration as a very unpleasant experience. Proof of this is found in the fact that many offenders, when given a choice between three to six months of imprisonment and two years of intensively supervised probation, which by middle class standards requires not very onerous restrictions, will choose imprisonment. In these cases, intensively supervised probation, which is cheaper than incarceration and which forces participants to participate in drug treatment and other rehabilitation programs that would be voluntary if they were incarcerated, is regarded by convicts, if not criminal justice professionals, as being more punitive than incarceration. Particularly apropos for this report is the observation that a large proportion of the groups offered this choice were chronic offenders of the drug laws. (Petersilia, 1990)

Considering all this it may be that attempts to increase the certainty, severity, and celerity of punishment for drug crimes should not focus upon ensuring that more drug offenders are incarcerated for longer periods of time. Incarceration may not be as severe a punishment for these offenders as it appears to the middle-class professionals who legislate and implement drug enforcement laws. Furthermore, while incarceration provides short term control over the behavior of these persons, such control lasts only for the period of their incarceration and ceases once they are on the street again.

An extended period of truly intensive probationary supervision with constant monitoring, employment requirements, drug testing and treatment, other forms of required counseling, and occasionally required payments of fines and service fees would seem a much more severe punishment to many drug law offenders than would the typical sentence to jail or prison which courts are currently meting out. Furthermore such a program of lengthy monitoring would provide an extended opportunity to control and modify the behavior of drug crime violators. Such extended control is vital if drug treatment programs are to wean drug law violators from the addictions which frequently drive their criminal behavior. Further benefits of such a program would be to free up jail and prison space for other criminals from whose incarceration society is more likely to benefit, e.g. career burglars and thieves, habitual assaulters, and violent sexual offenders.

The Links between Punishment and Crime: Incapacitation, Deterrence, Rehabilitation, and Criminogenesis

There are four mechanisms by which punishing and controlling criminals can reduce the level of crime in a community. These are: incapacitation, general deterrence, specific deterrence, and rehabilitation. In addition some criminologists have argued that punishment may act to increase, by "negative rehabilitation" Criminogenesis. In this section we will discuss in turn each of these theoretical links between punishment and control and the level of crime.

Incapacitation

Incapacitation occurs when a criminal's punishment restrains him from committing crimes. Thus incapacitation is a direct function of the degree of control over criminal behavior is implicit within a given mode of punishment. For example, imprisoned criminals can no longer easily commit crimes against the general public although they may still victimize fellow prisoners or prison guards, and have occasionally operated various telephone scams. Parole and probation supervision should also make it more difficult for parolees and probationers successfully to commit crimes, although the extent of incapacitation will depend very much on the degree of supervision provided.

At first glance it might appear that imprisoning a criminal will reduce the level of crime by the number of crimes that criminal would be committing if he were on the street. However, the actual crime reduction effects of incapacitation may differ considerably from this naive conclusion. Incapacitation can be negated by the substitution of new offenders for those imprisoned or multiplied if the imprisoned offender was a key facilitator of the crimes of others. Criminal teamwork, the relation between sentence and criminal career length, and age and delayed career effects can all affect the calculation. Market effects such as substitutability are particularly important in "transaction crimes," such as drug dealing, gambling, and prostitution, where there is a market with a demand for and supply of criminal activities(Cook 1986).

There may be a high degree of substitutability for certain imprisoned prisoners: an arrested or imprisoned criminal is replaced on the street by someone who begins committing the same crimes for which the criminal has been arrested or imprisoned. This situation is very common in high intensity drug markets where quick money for an easy, unskilled job attracts new dealers to replace those who have been arrested. (Sviridoff, et. al., 1992, pages 75-76) On the other hand the incapacitation of certain "key figures" may prevent or inhibit far more crime than these criminals themselves commit. As examples: the incapacitation of a major "fence" or "chop shop" dealer may greatly reduce shoplifting or motor vehicle theft by certain criminal elements and the incapacitation of a major drug importer may at least temporarily interfere with the street level drug sales and purchases of literally hundreds of drug dealers and consumers.

If criminals operate in teams then incapacitating one criminal reduces crime by a lesser amount than the number of crimes that criminal would commit if free. In fact it if criminals commit λ crimes each year — λ is the symbol that criminologists commonly use to represent the number of crimes committed annually. When used by criminologists in this manner it may represent a particular crime and/or criminal or an average estimated over all crimes and/or criminals — and operate in teams of n members then arresting one criminal will reduce the amount of crime not by λ crimes but by only λ/n crimes. Reiss has found that on average crimes in the United States involve about two perpetrators. (Reiss, 1980) Thus this teamwork effect reduces the average effectiveness of incapacitation the United States by about fifty percent.

Incapacitation can also be affected by the relation between the length of an average criminal career length and the length of an average sentence. If the sentence a criminal serves extends beyond the time he would have ceased criminal activity, then no incapacitation occurs during that excess sentence time. The result is to reduce the incapacitative effect of the criminal's sentence. If the criminal commits 20 crimes each year during his active career and is imprisoned 10 years, then naively one would expect his imprisonment to prevent him from committing 10x20 or 200 crimes. However, if the criminal's career would only have lasted three more years then his imprisonment is actually preventing only 3·20 or 60 crimes. Thus, counter-intuitively, increasing the severity of punishment may occasionally serve to reduce the incapacitative effect of punishment.

Incapacitation may also be considerably reduced if the incapacitating effect of punishment just delays rather than reduces criminal behavior. Blumstein and Cohen have argued that the length of an individual's criminal career may be somewhat fixed. (Blumstein and Cohen, 1987) If they are correct then imprisonment may just delay rather than partially eliminate criminal acts. In this case the incapacitative effect of prison will occur only if imprisonment is long enough to age a criminal out of his most efficient years of criminality.

The relation between age and crime may also effect the incapacitative effect of punishment. It has been widely observed that young males are much more crime prone than any other element of the population. Rates of property crime offenses peak in the teen-age years, while rates of crime against the person peak in the mid to late twenties. If

this is the case then imprisoning young male offenders may have more pronounced incapacitative effects than imprisoning any other demographically defined group of criminals—particularly if Cohen is wrong, criminal career lengths are not fixed, and the criminal careers of most youths are limited to their teen-age years or early twenties. On the other hand, it is worth noting that there is a tendency in this country not to imprison on the first—or even second, third, or fourth—offense, and this reduces the likelihood of truly incapacitating punishment for teen-age and young adult males, and encourages them to disrespect the criminal justice system.

Certain crimes, such as drug crimes, prostitution, and gambling, are "transaction" crimes. These crimes supply a product to consumers in a market which obeys the laws of economics. This has major implications for estimating the impact of incapacitation upon crime. When a street level drug dealer is incapacitated by arrest and imprisonment many otherwise unemployed persons may be available to take his place and earn the money he had been earning.

In addition if the street level demand for drugs remains constant while the street level supply of drugs is reduced because drug dealers are being incapacitated then the street level price of drugs will rise. This will mean an increased income for street level dealers. This increased income may encourage persons who otherwise would not have considered it to become street level drug dealers. Thus the incapacitation of a street level drug dealer may not only not reduce crime but may also recruit new street level drug dealers.

Deterrence

Deterrence is the inhibitory effect which punishment has upon persons who are considering whether to commit a crime. In theory such persons should consider punishment as a cost which they must pay for committing a crime. If the cost of committing a crime exceeds its rewards, then persons considering whether to commit the crime should decide not to. Thus increased certainty, severity, or celerity of punishment should decrease the impulse to commit crime by increasing the discounted cost of crime. Such calculations are generally not made consciously and are based on subjective estimates of the probability and cost of punishment and the rewards of the contemplated crime.

It is worth noting that the deterrent effect of a given punishment may vary widely both by crime and among individuals. The rewards of some crimes may be such that relatively higher levels of punishment are needed to deter the criminally inclined from these crimes than from other relatively less rewarding crimes. Likewise some individuals may give much more weight to the immediate gratifications of criminal behavior and much less weight to the delayed costs of punishment than would the average person. These individuals will be less deterred than the average by any given level of punishment.

Deterrence comes in two flavors: specific and general. Specific deterrence is based upon an individual's unique past experience of punishment. Individuals who in the past have

experienced a higher probability of being punished for committing a certain crime and/or have experienced more severe punishment for committing this crime will, based on their individual experience, be less likely to commit that crime than an otherwise identical person who has experienced a lower probability of punishment and/or a lower level of punishment. Specific deterrence may be increased or decreased by an individual's idiosyncratic reactions to punishment For example, a jail term that to a middle class youth might be traumatic enough to permanently convince him that crime is too costly to be worthwhile, might prove not much worse than his daily life on the street to an under-privileged, inner city youth.

General deterrence is deterrence based upon an individual's observation of community-wide levels of the probability and severity of punishment. An individual contemplating the commission of a crime is less likely to commit that crime if his observations lead him to the conclusion that punishment for those who do commit the crime is likely and/or severe. General deterrence is probably affected by individual experience. A criminal who knows persons who have committed many burglaries with impunity may experience far less general deterrence against burglary than another person, just as criminally inclined but knowing few burglars, who assumes that the probability of punishment for burglary is rather high.

Rehabilitation and Criminogenesis

Increased punishment may also reduce crime through rehabilitation. Properly designed and implemented punishments may change the values, attitudes, skills, and/or behavior of convicts in such a way as to reduce or eliminate their criminal propensities. If punishment actually has rehabilitative effects then increased punishment will lead to increased rehabilitation and hence to decreased crime.

It is important to distinguish the deterrent effects of punishment from the rehabilitative effects. Deterrence affects criminal behavior by modifying the cost-benefit parameters which criminals take into account when deciding whether or not to commit a crime. Rehabilitation affects criminal behavior by changing the criminal rather than the economic environment within which he operates.

There are a variety of mechanisms by which rehabilitation may modify the criminal in ways that reduce or eliminate his criminal propensities, e.g.:

- altering criminals' attitudes towards crime - in a sense altering the internal algorithm which criminals use to compute and compare the costs and benefits of committing a crime
- providing a criminal with job skills that permanently shift his cost-benefit computations towards favoring legal employment over criminal acts
- providing criminals with various types of counseling to overcome personality flaws leading to criminal behavior

- providing criminals with treatment for various conditions that lead to criminal behavior.

The latter two rehabilitative mechanisms are particularly crucial for drug crime offenders and, in fact, for any criminals with a history of drug or alcohol abuse, since research shows that drug and alcohol abuse are causally related to criminal behavior and in addition that the vast majority of prison and jail inmates have histories of alcohol and drug abuse.

It is important to note that if prisons and jails are to have rehabilitative effects they must have various rehabilitative programs in place, e.g. job training programs, drug treatment programs, and counseling programs. Furthermore these programs must be supplemented by support programs outside of prison and jail lest newly released prisoners relapse into their previous behavior patterns of unemployment, drug abuse, and other destructive behaviors. The generally poor quality of such inside and outside rehabilitative services may explain the general inability of researchers definitively to find aggregate rehabilitative effects in the United States' correction systems.

It is worth noting that although the majority of imprisoned felons recidivate within five years a large minority do not. If this lack of recidivism is regarded as proof that imprisonment has "treated" and "cured" these non-recidivating convicts of their criminal propensities then current prison and jail punishments do in fact have rehabilitative effects. An anti-smoking program that eventually helps twenty percent of participating smokers not to smoke for five years would be regarded by most as an effective program indeed. Although a cynical observer might wonder how many of this twenty percent would have ceased their criminal careers whether or not they went to prison.

Some criminologists have argued that punishment may have a criminogenic rather than a rehabilitative effect. Imprisonment places a criminal in contact with other criminals who may teach him skills that enhance the benefits of crime, e.g. lock picking, selecting victims for robbery and burglary. In addition imprisonment may provide criminal contacts, e.g. fences for stolen goods and skilled accomplices for team crimes such as bank robbery. Finally, extended contact with other like-minded persons may affirm a criminals anti-social value system and confirm him in his beliefs and behavior. If this is the case then the decreases in crime which increased punishment causes by incapacitation, deterrence, and rehabilitation may be offset to some extent by increases in crime due to Criminogenesis.

Some Special Considerations on the Links between Punishment and Crime in Illicit Markets

The crimes of buying and selling drugs are often referred to, along with offenses like prostitution, pornography, and gambling, as "crimes without victims." (Schur, 1965) These crimes involve the purchase and sale of commodities that society has chosen to prohibit; so it can be said that the parties involved generally view the proscribed transactions as mutually beneficial. This distinguishes them from the other two basic categories of crime: "crimes against the person" (e.g., assault, rape, murder) and "crimes against property" (e.g., vandalism, burglary). (Reynolds, 1985)

Policy analysts, politicians, and judges do not question the wisdom of laws against burglary and murder; they do not ask whether such laws are "justified" or whether they "do more harm than good." Drug laws, in contrast, are a perennial subject of debate. This is partly because drug laws place a liberal society, premised on a strong bias in favor of individual freedom, in the uncomfortable position of punishing citizens for actions that do not directly harm others. The discomfort is particularly great when it comes to punishing drug users (as opposed to sellers), for many see them as victims needing treatment, and not criminals deserving punishment. The deeper concerns, however, generally center on the costs engendered by the enforcement of drug laws, costs that some believe outweigh any benefits.

Drugs are bought and sold in illicit markets. The enforcement of drug laws interferes with these markets, imposing costs (in the form of punishment) on those who do business in them. This makes drugs more difficult and expensive to purchase, thereby shrinking the size of the market. Smaller drug markets, one assumes, means less drug consumption and abuse.

That the enforcement of drug laws reduces drug consumption in this manner is widely accepted. Yet this good comes at great cost. Drug laws are expensive to enforce, especially when hundreds of thousands of offenders are incarcerated. Higher drug prices—the principal goal of enforcement—are also costly. If, as commonly assumed, the demand for illicit drugs is inelastic with respect to price, then higher prices will increase total expenditures on drugs, and in turn the revenues of those involved in the drug trade. Worse, this may escalate crime as well; not only do users need more money to support their habits, but the criminal organizations that escape enforcement grow in wealth and power.

How these costs weigh against the benefits of lower drug consumption is not clear. What is clear is that a central issue is the nature of the connection between drug use and crime. Those who oppose anti-drug laws argue that one causal relationship predominates: drug users commit crime to get money to buy drugs. But there is clearly another causal relationship at work as well: drug users commit crimes because of the psychological and sociological effects of drug use. Indeed, if alcohol use is any indication, this may be the more significant drugs-crime connection. Although alcohol is inexpensive in comparison to illicit drugs, more than half of those arrested for felonies have high levels of alcohol in their blood and report that they were drinking prior to the crime. (Moore, 1983, page 127)

From a policy perspective, it matters greatly which of these drugs-crime relationships is more significant. If drug users commit crimes primarily to support their habits, then there is a strong case for reducing drug law enforcement: cheaper drugs would mean less crime. If, on the other hand, drug users mostly commit crimes because of their drug use, then lower enforcement would have damaging consequences. In this case, the increased consumption brought about by lower prices would cause more crime.

Implementing Increased Certainty, Severity, and Celerity of Punishment within the Criminal Justice System

Changes in law and policy which are designed to increase the certainty, severity, or celerity of punishment for crime and control of criminals are mediated by the criminal justice system. All the actors within this system - police, prosecutors, defense attorneys, courts and judges, corrections officials - have significant autonomy. As a result the intended consequences of law and policy changes can be considerably distorted within the criminal justice system. The final outcomes can be quite different than envisioned by legislators, executives, and policy makers. In order to understand how this can occur it is necessary to have a basic appreciation of how the United States criminal justice system administers punishment to criminals.

Even when simplified and generalized for illustrative purposes, the structure and operations of the criminal justice system in the United States are complex. This complexity means that in practice any attempt to decrease crime by increasing either the certainty, severity, or celerity of punishment usually requires far more effort, coordination, and expenditure of resources than naive policy makers would expect. This section provides a simplified and general description of criminal justice operations in the United States to illustrate this fact.

The Magnitude Expenditures for the Criminal Justice System

The criminal justice system can be analyzed into three major components: police protection, judicial and legal services — which includes courts, prosecutors, and public defenders — and corrections — which includes jails, prisons, probation, parole, and all other systems of punishment and control. Increasing the certainty, severity, or celerity of punishment would necessitate increasing expenditures for one or more of these components. The potential size of such increases could impose considerable constraints on the ability to increase certainty, severity, or celerity of punishment.

Although the criminal justice system represents a relatively small component of all government expenditures, in the recent past expenditures on the criminal justice system have grown at an enormous rate which can probably not be sustained much longer. This rate of increase has been needed just to keep up with the growth in arrests, criminal processing, and punishment and supervision which has been occurring. In addition the criminal justice system, as it is currently configured, resembles an enormous funnel. Its largest and least expensive component to enlarge is police protection which is responsible for detecting and apprehending criminals.

Judicial and legal services have much less capacity to process arrestees than do police to arrest criminals, yet increasing the capacity of judicial and legal services costs relatively more than increasing the capacity of police protection. The narrowest and most expensive part of the criminal justice funnel is corrections. All components of the corrections system are overstrained to punish and control the criminals processed by the courts. Yet

increasing the capacity of the corrections system is a much more expensive undertaking than increasing either the capacity of judicial and legal services or police protection.

The foregoing discussion has significant implications for any attempt to increase the certainty, severity, or celerity of punishment. Any such attempt will require increasing expenditures in the criminal justice system, although, as has been stated, criminal justice expenditures have been growing at an unsustainable rate just to keep up with the growth in crime during the past decade. Finally any future increases in expenditure which are intended to increase the certainty, severity or celerity of punishment should be concentrated more on expanding the narrower components of the criminal justice funnel than the wider. Since the narrower components are more expensive to expand this implies that increased expenditures which are intended to increase the certainty, severity, or celerity of punishment will be relatively more expensive than increased expenditures which are evenly distributed through the criminal justice system.

To appreciate the magnitude of the governmental costs which programs for increasing the certainty, severity, or celerity of punishment may impose, it is necessary to grasp the absolute and relative magnitude of criminal justice system expenditures in the United States. In calendar year 1990 the total Gross Domestic Product of the United States was $5,514 billion while total federal, state, and local government expenditures were $2,219 billion dollars. (1992 Statistical Abstract, Table 673, page 428; Table 450, page 280) During fiscal year 1990 total expenditures on all parts of the criminal justice system were seventy four billion dollars. (Flanagan and Maguire, Table 1.1, page 2) Thus the criminal justice system budget accounts for just over one percent of gross domestic product and just over three percent of governmental expenditures.

Despite its small relative size in the budget the criminal justice system has grown enormously in the last decade. While GDP increased twenty nine percent between 1980 and 1990, and federal expenditures increased 131% during the same period, federal expenditures on criminal justice increased by 185%. (1992 Statistical Abstract, Table 673, page 428; Table 449, page 279; Flanagan and Maguire, Table 1.3, page 3) It is unlikely that such an absolute or relative rate of growth can be sustained.

The distribution of resources among the components of the criminal justice system is also relevant. Police protection receives forty two percent of criminal justice resources, the largest portion. Corrections, with thirty four percent of criminal justice resources, receives the next largest share, while judicial and legal services, with twenty two percent of criminal justice resources, receives the smallest share. (Flanagan and Maguire, Table 1.1, page 2)

This distribution is misleading since corrections capacity costs much more per unit than does judicial and legal services; and judicial and legal services costs much more per unit of processing than does police protection. Corrections capacity involves large amounts of expenditure on construction and maintenance, while judicial and legal services require expensive professional services. When these considerations are factored in it is clear that current expenditures on criminal justice pay for an enormous capacity to detect,

apprehend, and arrest criminals; a significantly lower capacity to prosecute, try, and convict them; and an extremely limited capacity to punish and control convicted criminals.

Increases in criminal justice expenditure during the past decade have obviously attempted to widen the funnel of the criminal justice system towards the corrections end. In the last decade direct expenditures for corrections increased by 313%, for judicial and legal services by 194%, and for police protection by 129%. (Flanagan and Maguire, Table 1.3, page 3) Yet considering the relative cost per unit of increased capacity it is possible this pattern of expenditure increase may actually have narrowed the criminal justice funnel, and reduced the ultimate possibility of meaningful punishment and/or control for convicted criminals. The cost to apprehend and arrest a criminal is relatively low; the cost to try and convict him relatively higher; the cost to incarcerate him for a year dwarfs the combine cost of both arrest and trial.

The Operation of the Criminal Justice System

The criminal justice process usually begins with the apprehension or arrest of a criminal suspect by the police. Apprehensions and arrests can occur as a result of a police response to a criminal complaint, the police apprehension of a suspect in the apparent commission of a crime, or a variety of other police operations and investigations. Police discretion plays an important role in whether arrests occur. This discretion may be particularly important in drug-related arrests.

Some larger police departments have established an informal policy that uniformed officers should not in the ordinary course of events arrest participants in drug deals or obvious drug users-at least in areas where illicit drug use is endemic. The theory behind this policy is that officers could spend a great deal of their time on such arrests and their sequelae, e.g. report writing and court appearances, to the detriment of their other duties. Furthermore the cumulative impact of such arrests will be either transitory or at best to cause a geographic shift in the drug market. Finally the sheer potential volume of such arrests could overwhelm prosecutors, courts, and correctional facilities and bring the wrath of these agencies down upon the police administration.

On the other hand police departments will occasionally make concerted efforts to attack certain entrenched drug markets. These efforts can include harassment of dealers and users by uniformed officers and carefully staged arrests of drug dealers and users by teams of detectives and undercover officers. Usually these efforts are coordinated with prosecutors, courts, and other players in the criminal justice system so as not to overwhelm the system with drug related arrests.

Usually prosecutors screen police arrests to determine whether charges should be filed and what these charges should be. In a 1988 sample of urban prosecutors' offices, prosecutors declined to prosecute eighteen percent of all felony arrests and diverted another 6% to special programs or courts. (Boland et. al., 1992, Page 3) In addition prosecutors undoubtedly used their discretion to alter the charges against at least some of remaining

seventy six percent of felony arrests, although detailed published information on these altered charges is not generally available. Finally prosecutors can choose to process a case through a lower court or present it directly to a grand jury which decides whether the case should go to a felony trial court.

It is important to note that prosecutorial discretion can have a significant influence upon policies which are intended to increase the certainty, severity, or celerity of punishment. In 1970, under Governor Rockefeller's initiative, New York State established draconian penalties for a variety of drug crimes. There is anecdotal evidence that as a result many prosecutors dismissed or reduced the charges brought against many arrestees in drug crime cases.

In the cases where they did this it was frequently because they felt that the penalties these arrestees were subject to under the new laws were grossly out of proportion to their offenses. Furthermore prosecutors felt that prosecuting these arrestees for high penalty crimes would more likely lead to expensive and time consuming trials that would drain away the resources needed to prosecute other serious crimes. Finally, even a successful prosecution would have adverse effects in that it would lead to a long term occupation of a prison cell that would thus be unavailable to hold other more dangerous offenders.

After charges are filed cases are usually processed through a two-tiered court system. Lower courts handle initial proceedings including arraignments, bail bond hearings, preliminary hearings, and disposal of felony cases which are reduced to misdemeanors. Lower courts can dismiss felony charges or reduce them to misdemeanors. In 1988 of the three quarters of all felony arrests whom prosecutors chose to charge with felonies twenty eight percent were dismissed in a lower court, leaving only about half of the originally felony arrests to be disposed of by plea or trial. (Boland et. al., 1992, loc. cit.)

Like prosecutors lower court judges can exercise considerable discretion in reducing and disposing of felony cases. Again anecdotal evidence suggests that New York judges reacted in a similar fashion as New York prosecutors to the Rockefeller drug laws. Their reasons for reducing and eliminating felony drug charges were the same as those of prosecutors.

Of the half of all felony arrests which are carried forward by lower courts ultimately ninety five percent or fifty two percent of all felony arrests end up being disposed by a guilty plea. Five percent of the felony arrests which are carried forward by lower courts- amounting to only three percent of all felony arrests -actually go to trial in felony court. Of the felony arrests which go to trial two-thirds, or two percent of all felony arrests, are found guilty; the remaining one percent of all felony arrests are found innocent. (Boland et. al., 1992, loc. cit.)

Ultimately fourteen percent of all felony arrests result in a sentence to incarceration for more than one year, eighteen percent result in a sentence of incarceration for less than one year, and twenty two percent result in a sentence to probation or other conditions. The

remaining forty six percent of felony arrests do not result in punishment. (Boland et. al., 1992, loc. cit.)

Plea bargaining is one of the major means used to expedite criminal justice processing in the United States. It is the process by which the criminal defendant and the state agree that the defendant will plead guilty to certain charges in return for some guarantee of a mutually agreed upon punishment. Prosecutors, defense attorneys and the judges of both lower and higher criminal courts are frequently active participants in the plea bargaining process and this process can begin and/or continue through almost all phases of the process from indictment through into felony court trial. The advantage to the criminal justice system is a reduction of trial time in an already overburdened system. The advantage to defendants is that they are usually guaranteed significantly less punishment than could result from a guilty verdict in a superior court trial.

After a criminal has been convicted and sentenced he will be remanded to the custody of probation, jail, or prison. As mentioned earlier the vast majority of convicted criminals are under the jurisdiction of probation and parole rather than in jail or prison. However, the figures on sentences for convicted criminals would appear to belie these statistics. Fifty four percent of all arrests brought by the police result in convictions; of those convicted one third are sentenced to less than a year of incarceration, approximately one-quarter are sentenced to incarceration for more than one year, and the remaining forty one percent are sentenced to probation. (Boland et. al., 1992, Page 3)

Clearly, the majority of convicted criminals are sentenced to incarceration, yet the vast majority of criminals under correctional—over two thirds as pointed out in section 2.1.2 above—are not incarcerated. The explanation for this apparent contradiction lies in the semi-autonomous character that corrections systems have within the criminal justice system. Prisons and jails do not have the capacity to incarcerate for the full lengths of their sentence all criminals who are sentenced to incarceration.

There are two ways to fit levels of incarceration to incarceration capacity. "Front end" controls manage the level of incarceration by controlling the proportion of convicted criminals who are sentenced to incarceration and the average lengths of their sentences. Increasing the proportion sentenced to incarceration or the mean lengths of their sentences will increase levels of incarceration and put further pressure on prison and jail capacity. Decreasing the proportion sentenced to incarceration or the mean lengths of their sentences will decrease levels of incarceration and reduce prison and jail crowding. "Back end controls" can accelerate the release of prisoners to reduce prison populations or slow it to increase them.

Unfortunately for corrections administrations "front end" control of incarceration levels is more or less beyond their control. Legislators set sentence guidelines, police choose the level of enforcement, prosecutors choose whom to prosecute and with what level of rigor prosecutions will be pursued, and judges finally determine who will go to prison and jail and for how long. Of course corrections administrators can lobby legislatures and convince prosecutors and judges through indirect channels that incarcerating more persons

will break the back of the corrections system. But, fundamentally, "front end" control of jail and prison population sizes is out of their control.

However, various legal and administrative procedures, and even occasional court orders, give corrections officials a variety of "back end" controls on jail and prison populations. One of these is parole. If corrections administrators feel that prisons are becoming more crowded they can schedule parole hearings earlier or ease the criteria for parole so that a greater proportion of parole hearings result in parole being granted.

There is an implicit understanding underlying this system of easing prison crowding, that parole and probation capacities are more flexible than jail and prison capacities. If jail or prison populations are increasing then at some point more jail and prison cells must be built. On the other hand the corrections system can increase probation and parole caseloads significantly without any obvious need or political pressure to increase the number of probation and parole officers. The damage this does to the control exercised over probationers and parolees is marginal and slow to be noticed. The potential dangers of this situation are obvious.

Two other sets of "back end" controls of jail and prison populations are open to corrections administrators. One set are based on sentence guidelines. Frequently prisoners are sentenced with a minimum and a maximum sentence. They may not be released before the minimum sentence has been served and they cannot be held longer than the maximum sentence. Prison administrators can ease crowding by releasing prisoners closer to their minimum sentence and they can increase prison populations by releasing prisoners closer to their maximum sentence.

Another set of "back end" controls of prison populations are based on administrative procedures. Frequently prisoners are granted automatic time off their sentence for every day they serve and even more time off for good behavior and participation in activities that corrections officials feel are beneficial to rehabilitation and prison discipline. Administrators have considerable control over how this time is doled out. Extremely lenient granting of credit for time served and time off for good behavior will reduce prison populations. Stringent controls over time off will increase prison populations.

Once again, however, prison administrators must exercise caution in their use of administrative "back end" controls. The granting of credit for time served and time off for good behavior are extremely powerful tools for maintaining order and discipline within prisons. Too much laxity or too much stringency in granting this time off prison sentences could pose a threat to the orderly operation of prisons. Corrections administrators are practically quite constrained in how they can use these "back end" controls for managing prison population levels.

A final set of "back end" controls on prison population are really outside the control of corrections administrators. Court ordered reductions in prison over-crowding are not uncommon. On 1 January 1992 twenty nine corrections agencies were operating under court ordered prison population limits, seventeen corrections agencies had court appointed

monitors or masters. (The Corrections Yearbook: Adult Corrections, 1992, page 7) Some state legislatures have even requested that corrections administrators use early releases to reduce prison over-crowding and the need for politically unpopular expenditures on additional prison space.

Implications for Increasing the Certainty, Severity, and Celerity of Punishment

As the preceding section suggests the criminal justice system is composed of a set of rather autonomous actors. Increasing the certainty, severity, and celerity of punishment requires that all these actors—police, prosecutors, courts, and corrections departments—work in a concerted manner. Furthermore, the constraints on increasing certainty, severity, and severity of punishment are least at the level of the police where the resources for obtaining such increases are both relatively cheap and plentiful. The constraints on increasing the certainty, severity, and celerity of punishment increase steadily as one moves through the criminal justice system from police, to prosecutors, to courts, and finally to the corrections system and its jails and prisons. Currently, jail and prison cells are perhaps the scarcest and most expensive resources in the criminal justice system.

Conclusions

Punishment and control of criminal behavior act to reduce crime in four separate ways: incapacitation, general deterrence, specific deterrence, and rehabilitation. There are a variety of theoretical reasons for thinking that all four of these links between punishment and control are weaker than intuition might suggest. This suggest that, although increasing the certainty, severity, and celerity of punishment to a great enough degree will, in fact, reduce levels of crime, these reductions may not be as great as one might naively expect.

Furthermore, as a practical matter, current conditions suggest that it would be an extremely costly and difficult task to meaningfully increase either the certainty severity, or celerity with which any crimes, and in particular drug crimes, are punished in the United States. Currently, the capacity of the United States criminal justice system is severely strained even by the current certainty, severity, and celerity with which we punish criminal behavior. Jails and prisons, the backbone of our corrections system, are currently over-capacity, and this situation is unlikely to change since investment in incarceration is hardly sufficient to meet the projected growth in prison and jail populations. Interestingly much of this projected growth is due to increased incarceration for drug crimes.

The pressure on prisons and jails has been transmitted through the rest of the corrections system. Probation and parole systems are too over-loaded to provide any meaningful level of punishment or control. The potential of various alternative forms of punishment and control, e.g. intensively supervised probation and parole, shock incarceration, fining systems, has yet to manifest itself. This may be partly because these systems require back-

up modes of punishment and control, i.e. the real threat of incarceration, to be effective, and current prison and jail capacity eliminates the possibility of such back-up.

An additional factor militating against the practical possibility of increasing either the certainty, severity, or celerity of punishment within the United States' criminal justice system are two related aspects of that system: the inter-relatedness of actors within the system and their paradoxical ability to act independently of one another. Attempts to increase the certainty, severity, or celerity of punishment by altering the functioning of one actor within that system will have consequences and impacts for all other actors within the system. For example, beefing up police responses to drug crimes will overload prosecutors, courts, and ultimately the corrections system.

Although all actors within the criminal justice system are inter-connected in this manner, they also act independently of one another to some extent. Thus prosecutors, courts, and corrections administrators can respond to overloads produced by increased police activity in ways over which the police have no control. Prosecutors can choose to nol pros. cases, judges to give reduced sentences and continuations, prisons to release current prisoners early to make way for new ones. The end result is that policies designed to increase the certainty, severity, or celerity of punishment within one branch of the criminal justice system may be totally offset by independent responses to these policies which are initiated in response by other branches of the criminal justice system.

Several special aspects of drug crime add to the difficulties in increasing the certainty, severity, and celerity of punishment for these crimes. First, drug crimes are market crimes. Increased punishment for drug dealing may paradoxically, through the operation of market laws, increase the number of people who deal drugs. Second, some theorists and researchers are suggesting that many drug dealers and users do not regard current modes for punishing and controlling criminal behavior as being either terribly unpleasant or terribly intimidating. If this is the case increasing the probability or duration of these modes of punishment and control will have very little effect upon these peoples' criminal behavior.

LITERATURE REVIEW

Introduction

The research on how increases in the certainty, severity, and/or celerity of punishment affect crime is vast. Unfortunately, the research in this area provides no definitive answers as to whether reasonable and achievable increases in the certainty, severity, and/or celerity of punishment may cost-effectively generate reductions in drug crime, drug abuse, drug-related crime, and other related social problems. There are two reasons for this.

First, the research in this area is plagued by problems with data and methodology. No research results are immune from criticism that they may be wrong because of inaccurate data or imperfect methodology. Second, this research is pure rather than applied in the sense that the research does not provide accurate estimates of what percentage increase in certainty and/or severity of punishment will lead to a given percentage decrease in the level of crime. In the absence of such estimates no policy maker can estimate whether any given policy which is designed to increase punishment will have even a measurable affect upon crime.

This section will review some, but by no means all, of the more recent theory and research in this area. Furthermore theory and research on the relation between punishment and crime are conducted from many different perspectives and using many different methodologies. For our purposes we will organize this research into five broad areas:

1. modeling of criminal behavior,
2. psychological research on deterrence,
3. statistical analyses of the aggregate level relation between the certainty, severity, and/or celerity of punishment and the incidence of crime,
4. ethnographic studies of criminal behavior
5. analyses and case studies of criminal justice policies which were intended to reduce crime by increasing the certainty, severity, or celerity of punishment.

This remainder of this section is divided into seven parts. The first discusses literature where mathematical and economic modeling of criminal behavior is used to describe and delimit the effects which increasing punishment will have upon criminal behavior. The next section provides a methodological introduction to the psychological and statistical/econometric literature on the relationship between levels of punishment and levels of crime.

The two following sections consider the psychological and the statistical/econometric literature on the relationship between levels of punishment and levels of crime. The fifth section survey ethnographic research on criminal perceptions of and responses to punishment. The sixth section reviews analyses and case studies of criminal justice

policies which were intended to reduce crime by increasing the certainty, severity, or celerity of punishment. The final section summarizes the current state of research findings on the relation between certainty, severity, and/or celerity of punishment and the incidence of crime.

Modeling Criminal Behavior

Gary Becker's seminal article on the economic analysis of crime initiated a new era of criminological theory and research on the relation between punishment and crime. (Becker, 1968) In this paper Becker argues that criminal behavior is an economic activity, that punishment is a cost of such activity, and that those who are contemplating a criminal act will, ceteris paribus, be less likely to commit that act the more certain and/or severe punishment for that act is. Furthermore Becker develops a simple economic model for calculating optimum levels of certainty and severity of punishment.

Unfortunately the practical application of Becker's analysis is limited by his assumption that the main functions of punishment are deterrence and compensation of victims. Because Becker ignores the incapacitating effects of imprisonment and the possibility of correctional rehabilitation, he tends to denigrate the value of imprisonment. He seems to come to the conclusion that fines, generally speaking, are the most rational form of punishment.

In a subsequent article Isaac Ehrlich expanded upon Becker's theory in several ways. (Ehrlich, 1973) Most importantly he specifically considered the incapacitating effects of increased probability and/or length of incarceration. In addition Ehrlich attempted an empirical test of his model, which is discussed in section 3.4. Ehrlich's empirical test suggests that increased certainty and severity of punishment does reduce crime and, indeed, that "the effectiveness of police and court activity against felonies in 1965 indicate that such activity paid (indeed, 'overpaid') in the sense that its (partial) marginal revenue in terms of a reduced social loss from crime exceeded its (partial) marginal cost." (Ehrlich, 1973, pages 560-561)

The work of Becker and Ehrlich led to renewed interest in evaluating the crime reducing potential of increased certainty and severity of punishment. In a 1977 article Phillip J. Cook reviewed the outcome of this work. (Cook, 1977) As a preliminary to this, he points out that research pre-dating Becker and Ehrlich, and focusing on the rehabilitative and criminogenic effects of punishment upon crime levels failed to find such effects. Cook also suggests that a variety of economic mechanisms may reduce the incapacitative effects of punishment upon crime levels. He then deals with research that, motivated by Becker and Ehrlich, among others, focuses upon the impact of general deterrence upon crime levels. Cook's review of this research suggests that their is mild research support for the hypothesis that increased certainty and/or severity of punishment will reduce crime. We will discuss his research review in subsequent sections of this report.

In a subsequent article Cook provided a more general review and prospectus on research upon the deterrent effects of apprehension and punishment of criminals. (Cook, 1981) He enumerates a large number of studies showing that increased certainty and/or severity of punishment measurably reduces crime levels, but goes on to point out that the marginal impact of increased punishment levels is completely uncertain. Furthermore, criminologists have a number of cogent arguments against the model of rationally motivated criminals underlying economic models of deterrence.

Prominent among these arguments are: (1) that criminal behavior is most often not the result of rational action; and (2) that the general public and criminals actually have a poor knowledge of the certainty and severity of punishment associated with particular crimes. Cook points out that even in the absence of perfect rationality and information criminal behavior will be affected by levels of certainty and severity of punishment. Although the criminological viewpoint has validity, and economic models of criminal behavior are gross over-simplifications, increasing the certainty and/or severity of punishment will increase deterrence by some unknown degree, and increased deterrence will reduce crime by some other equally unknown marginal amount.

Cook argues that crime level is a function of the proportion of the population engaged in criminal acts and the rate at which this proportion commits criminal acts. Increased punishment levels can affect both these factors. Greater risks of punishment will altogether dissuade some persons from criminal activity. Persons who are going to engage in criminal activity are likely to reduce their activity, and hence their odds of being punished, when punishment levels rise. All this can happen even if individuals have only imperfect knowledge of changes in punishment levels and sharply differing propensities for engaging in criminal behavior.

Cook also reviews theory and research on whether increasing certainty of punishment has a greater deterrent effect than increasing severity of punishment. His review leads him to several interesting conclusions. First that when imprisonment is the punishment increased certainty of punishment has more impact on crime than increased severity, i.e. longer sentences. However, for monetary punishments such as fines the reverse seems to be true, in other words larger fines are more likely to reduce crime than smaller fines which have a lower probability of being imposed. Finally Cook presents a simple argument suggesting that the marginal deterrence of increased prison sentences diminishes rapidly past sentences of about ten years. (Cook, 1981, pages 231-233)

Two other issues Cook deals with in his review of the literature are substitution effects and complementarity. Frequently policies which increase the certainty and/or severity of punishment will be selective in that they will target particular crimes for increased prison sentences or particular neighborhoods for increased police presence. Cook points out that both theory and research suggest that the result of such targeted strategies is to rechannel rather than eliminate criminal behavior. Criminals will substitute criminal behavior with lesser punishments for targeted criminal behavior, change the nature of their criminal activities, or move their criminal activities to less well patrolled areas. (Cook, 1981, pages 234-236) As an example, increased sentences for adult drug offenses and increased police

response has led many adult street-level drug dealers to recruit children to hold and deliver their drugs.

Complementarity occurs in criminal activities with some type of structure, e.g. drug markets or professional car theft which requires thieves, fences, "chop shop" operators and persons to coordinate the activities of these various actors. (Cook, 1981, pages 235-237) Increases in punishment for one set of actors within such structured criminal activities will increase the difficulties for those actors, cause complementary problems for other actors in the criminal enterprise, and to some extent disrupt all criminal activity within the enterprise. The difficulty for criminal justice policy makers is to determine the weakest link in the criminal enterprise and devise cost-effective increases in the certainty and/or severity of punishment that will optimally affect that link. For example, are drug markets most impacted by a constant stream of arrests and short jail terms for street-level dealers or by long prison terms meted out to high-level wholesale drug distributors as the result of extended investigations, prosecutions, and appeals.

In a 1986 paper on the demand and supply of criminal activities Cook discusses "criminal opportunity theory" and its implications for punishment policy. (Cook, 1986) This theory is based on several simple propositions: (1) criminals tend to select criminal activities and targets that provide high rewards at little risk; (2) potential victims respond by taking defensive measures; (3) the interaction between these two processes creates an "equilibrium" level of criminal activity; (4) the criminal justice system institutes policies to set an "equilibrium" with lower crime levels than would exist in a "free market" of criminal activity.

Cook's theory has implications for the impact of punishment upon crime. If punishment is increased a combination of deterrence, incapacitation, and rehabilitation may reduce the number of active criminals or their level of criminal activity. However, this will eventually result in a reduction of perceived risk by victims and a decrease in the defensive measures they take. This may well provide opportunities that will encourage new criminals and increase levels of crime by some amount. In the case of drug markets, removing current dealers from the street will allow opportunities for new dealers. If new dealers cannot be recruited, the desperation of addicts for drugs may raise drug prices which will allow drug wholesalers to recruit new street-level dealers at a higher wage that will attract persons who before would not have considered dealing drugs.

In a 1986 paper Peter Reuter and Mark A. R. Kleiman were among the first to conduct an economic analysis of the effects of various enforcement strategies against illicit drug markets. (Reuter and Kleiman, 1986) They point out that between 1980 and 1984, despite substantial increases (nearly 300%) in arrests for heroin and cocaine possession or sale, abuse of these drugs increased dramatically while street level prices remained relatively constant. Reuter's and Kleiman's analysis attempts to explain this anomaly.

They first point out that most of the increase in the value of illicit drugs occurs during the stages in distribution after the drugs are in the United States and before they reach the streets. Therefore, assuming that costs imposed upon the drug market by law enforcement

are additive, law enforcement efforts aimed at crop eradication, interdiction, and the destruction of smuggling rings will have relatively little effect upon drug prices and hence retail level drug markets.

This still does not explain why the enormous increase in street level drug enforcement efforts apparently had so little effect upon the heroin and cocaine markets in the early 1980s. Reuter and Kleiman suggest that the major reason for this is that their is a discontinuity in dealer utility functions. The largest part of costs and rewards associated with current drug dealing are assumed by dealers when they make the decision to deal. Among current drug dealers and users the marginal impact of increased certainty and severity of punishment is relatively small. They suggest that the scale of cocaine and marijuana markets in the United States precludes great enough increases in certainty and severity of punishment to cost-effectively reduce these markets. The more limited heroin and "synthetic" drug (methamphetamine, PCP, etc.) markets may, however, be more susceptible to increased certainty and severity of punishment.

In two later papers Kleiman expands upon this earlier analysis. In the earlier of these two papers Kleiman uses marijuana abuse to illustrate his argument that there are three economic theories about how enforcement reduces drug markets and drug crime by raising drug prices. He goes on to present a fourth theory which is a hybrid of two and appears to better describe the effect of enforcement upon marijuana use . The three economic theories that Kleiman initially describes relate increased enforcement to decreased drug crime through three different mechanisms: (1) the removal of drugs from commerce; (2) the reduction of through-put capacity; and (3) the increase of drug prices and costs of drug marketing.

According to the first theory enforcement captures drugs and removes them from the market place, thereby increasing drug price and therefore reducing the demand for drugs while, at the same time, increasing the costs of dealers and lowering incentives to deal drugs. Kleiman notes that this argument ignores the fact that increased drug prices will raise the profits to be made from supplying and dealing drugs. This in turn will encourage new suppliers and dealers, thus counteracting the effects of enforcement.

The second theory is based on the idea that drug markets are structured. Targeting one element of this structure, e.g. wholesale smugglers, may radically reduce the supply of drugs. Empirical evidence suggests that, at least with marijuana, this is not the case. The third theory which Kleiman refers to as the "risks and prices" model is based on the idea that enforcement by increasing the risks of drug dealing, and hence the price of drugs, will reduce the demand for drugs. In a sense enforcement is a tax imposed upon drug illicit drug manufacture and distribution. However, in the case of marijuana the price paid for marijuana seems much higher than cost alone , including the costs imposed by enforcement, would seem to account for.

Kleiman goes on to suggest that the "risks and prices" model is essentially correct but fails to take account both of entry costs, which may be extremely high for persons considering whether to set out on a career of drug dealing and of the costs associated with

inexperience, which again can be particularly high for illicit enterprises. When these costs are taken into account it may be the case that the very enforcement policies which eliminate newcomers to the illicit drug trade raise drug prices in a way that causes existing drug dealers to prosper.

It is worth noting here that Kleiman (and Reuter) in all these papers are concerned with an economic analysis of the effects of enforcement upon drug markets and drug crime. This analysis assumes that enforcement affects drug crime solely by raising the prices of drugs and the costs of marketing or retailing drugs. It ignores the impacts of increased incapacitation, deterrence, and rehabilitation upon drug crime except insofar as these impacts affect drug markets by increasing prices. To this extent they may misrepresent the relative effectiveness of various strategies intended to increase the certainty and severity of punishment.

Blumstein and Nagin created a simplified mathematical model of the relation between increases in the certainty and severity of punishment and changes in the level of crime. (Blumstein and Nagin, 1978) This model assumes a homogeneous criminal population committing one type of crime, assumes that the proportion of the population which will commit crimes is a monotonically decreasing function of severity and/or certainty of punishment, and assumes there are limits to the severity and certainty with which any society will punish. Although this model assumes a great deal it is it leads to some interesting conclusions.

Blumstein and Nagin's model suggests that as either the certainty or severity of punishment increases the proportion of the population which is punished will rise to a peak and then decline to a low level. This makes intuitive sense. If there is no punishment then no one will be punished. As the certainty and/or severity of punishment rises a greater portion of the population will be punished. At some point the increased certainty and/or severity of punishment will deter enough punishable offenses to offset the growth in the population which is punished because of increased certainty and/or severity of punishment. Beyond this point the deterrent, incapacitation, and rehabilitation effects of increases in the certainty and/or severity of punishment will outweigh the tendency of such increases to extend punishment to a greater portion of the population. Further increases in certainty and severity of punishment will cause decreases in the proportion of the population which is punished.

From a policy maker's perspective this would seem to suggest that extremely high levels of certainty and/or severity of punishment are desirable. Such levels of punishment would reduce crime to such a degree that very little punishment would have to be imposed. Thus the costs of such a policy would be minimal while the crime reducing effect would be large.

However, Blumstein and Nagin's model also suggests that it may be practically impossible to achieve such levels of punishment. They suggest that in the United States current levels of punishment are far below those which would cause the proportion of the population which is being punished to peak. Therefore, any increases in certainty or severity of

punishment would, at least temporarily, cause a rise in the proportion of the population which is being punished. Blumstein and Nagin suggest that these rises would increase the proportion of the population which is being punished beyond acceptable levels.

Thus Blumstein and Nagin's model suggests that there is a paradox in policies involving increases in the certainty and/or severity of punishment. High enough levels of certainty and/or severity of punishment will lead to both reduced crime and reduced punishment costs. But in order to achieve such levels of certainty and/or severity the criminal justice system must, at least temporarily, endure unacceptably high costs of punishment.

In consequence of this argument Blumstein and Nagin seem opposed to drastic increases in current levels of certainty and/or severity of punishment in the United States. It is interesting to note that they base this argument on the assumption that the constraint on punishment in the United States is that the incarceration rate not exceed 110 incarcerations per 100,000 population. (Blumstein and Nagin, 1977, page 395) In 1990 the incarceration rate was 282 incarcerations per 100,000 population. (US Department of Justice, 1992, page 1) It is clear that in 1977 Blumstein and Nagin grossly underestimated the levels of punishment which are acceptable to the American criminal justice system.

A Methodological Introduction to Psychological, Statistical, and Econometric Research on Punishment and Crime

Research on the relation between certainty, severity, and celerity of punishment and their affects upon crime levels is plagued by many methodological difficulties. Four major ones are:

- data measurement errors
- spurious index correlation
- identification in regression and simultaneous regression models
- inappropriate study populations in psychological and case study research

Much of the on-going research about the relation between punishment and levels of crime results from attempts to deal with these issues. Therefore it is necessary to have some understanding of these issues and how they may affect the validity of research in this area before one can properly study this research. This section is intended to provide an overview of these methodological issues.

Data Measurement Errors

Criminal justice data are fraught with potential measurement errors. As one example, it is clear that official figures on crime are lower than the actual amount of crime which occurs. Official figures on numbers of crimes occurring in the United States typically come from

the Federal Bureau of Investigation's (FBI's) Uniform Crime Reports (UCR) these reports are based upon complaints made to the police and arrests made by the police. However, victim surveys have shown that people suffer far more crimes than they report to police. In addition crimes may be committed with no one being the wiser. Examples are "inventory shrinkage" which is probably theft, unnoticed frauds and larcenies, missing persons who have actually been murdered, and, particularly important for this report, the literally hundreds of millions of illicit drug transactions that are unnoticed and unreported in this country.

Significantly, for research purposes, the degree of under-reporting varies over time, across jurisdictions, and by crime. Even more significantly the degree of under-reporting relates to factors that may influence the apparent relation between certainty, severity, and celerity of punishment and crime levels. These factors may include, socio-economic status, perceived level of police protection, perceived seriousness of the crime, and perceived likelihood the crime will be solved and/or properly punished.

Spurious Index Correlation

Many studies of the relation between certainty, severity, and celerity of punishment and their affects upon crime levels involves correlations between variables that are actually ratios with shared numerators or denominators. For example, some studies have measured the correlation between crimes per capita and arrests per crime to test whether there is a relation between crime levels and certainty of punishment. If **P** represents population, **C** represents crimes, and **A** represents arrests then these studies are examining the correlation between the two quantities **(C/P)** and **(A/C)**.

A problem arises if there are errors in the measurement of **C**, the number of crimes, as there certainly will be, since much crime is unreported and the degree of under-reporting varies drastically from one area to another. If the error in **C** is denoted $\mathbf{E_C}$ then these studies are actually examining the correlation between $\mathbf{((C+E_C)/P)}$ and $\mathbf{(A/(C+E_C))}$. If $\mathbf{E_C}$ is large then when one of these fractions is large the other must be small. This will create the appearance of a negative correlation even where one does not exist.

This effect was first noted by Carl Pearson at the beginning of the century and denoted by him as "spurious index correlation". Whenever errors in measurements of underlying variables exist, and ratios are constructed from these variables and then correlated, spurious index correlation can be a problem. Unfortunately, errors in measurements of numbers of crimes and other criminal justice variables such as reported arrests, reported convictions, and recorded sentence lengths are common. Furthermore the degree of these errors varies over time and across jurisdictions.

Therefore, when correlations suggest strong negative relations between certainty, severity, or celerity of punishment it is always necessary to consider the possibility of spurious index correlation. Unfortunately there is no agreement in current statistical literature either on how serious a problem spurious index correlation is or on how to

measure the degree of spurious index correlation or on how to control for the effects of spurious index correlation. For all these reasons studies on the relation between levels of punishment and levels of crime which rely on correlation analysis should be regarded with skepticism. The same is not true for studies using regression analysis, even though the calculations used in regression analysis use correlation coefficients. (Gibbs and Firebaugh, 1990) But, as the next section shows, studies on the relation between levels of punishment and levels of crime which use regression analysis have their own set of problems.

Identification in Regression and Simultaneous Regression Models

Correlation studies are flawed since they do not control for phenomenon which may create an apparent relationship between the correlated variables when in fact none exists. For example, even though research has found a negative correlation between per capita crime rates and per capita imprisonment rates across different jurisdictions, some theorists have argued that this correlation is partly a result of another phenomenon entirely. Cook, for example, has argued that this relation could be affected by population age distributions. (Cook, 1977, page 183)

Multiple regression techniques are most frequently used technique to deal with this problem. In multiple regression a linear equation is used to relate variations in one variable to variations in as many other variables as desired. Statistical procedures are then used to estimate the parameters of the equation and how much explanatory power the equation and individual variables within the equation have when applied to a particular set of data.

For example, Isaac Ehrlich used multiple regression to test whether the severity and certainty of punishment affected levels of crime. (Ehrlich, 1977, page 544) His regression model assumed that per capita offense rates (a measure of levels of crime) were a function of imprisonments per crime (a measure of certainty of punishment), average time served by offenders in prison (a measure of severity of punishment), several measures of average income, several measures of population composition, and several other measures of aggregate socio-economic status. He then used multiple regression analysis to apply this model to data from the individual states for 1940, 1950, and 1960. Ehrlich's analysis suggested that both the certainty and severity of punishment were negatively related to levels of crime, even when the effects of other factors which might contribute to raising or lowering crime rates were accounted for.

However, it is always possible to criticize multiple regression analyses such as Ehrlich's on the grounds that the regression model is mis-specified, i.e., that important factors which might contribute to raising or lowering crime rates have been left out of the analysis, or that unimportant factors have been included and are creating misleading results. For example, Ehrlich's model did not include measures of the stability of nuclear families. It is perfectly reasonable to argue that this might be a crucial variable that may contribute to reducing levels of crime. Therefore, without the inclusion of this variable

Ehrlich's model may be flawed. Obviously, until the cause of crime are clearly understood, multiple regression analyses will be subject to this criticism.

A more basic problem with simple linear regressions such as Ehrlich's is that it assumes the causal relationship between certainty and severity of punishment and crime levels, i.e. implicit in Ehrlich's model is the notion that changing the certainty and severity of punishment will change the level of crime. In fact, over-time the causal relation may be reversed. If crime rates are declining, local governments may save money by reducing criminal justice expenditures thus reducing the certainty and severity of punishment. In this case reduced crime causes reduced certainty and severity of punishment.

So that an analysis can examine this possibility and not just assume it away, simultaneous equation models are necessary. These models involve estimating two regression equations at once; one in which the certainty and/or severity of punishment are assumed to affect levels of crime, and another in which levels of crime are assumed to affect the certainty and/or severity with which crime is punished. The simplest form of such a model would be the two equation model:

$$C_t = \alpha P_t + \beta + e_t$$

$$P_t = \gamma C_t + \delta + u_t$$

Where C_t is the crime level at time t, P_t is the certainty and/or severity of punishment at time t, α and β are parameters which will be estimated from data and which measure the effect a change in the certainty and/or severity of punishment will have upon crime levels, γ and δ are other parameters which will be estimated from data and which measure the effect a change in crime levels will have upon the certainty and/or severity of punishment, and e_t and u_t are measurement errors at time t.

Unfortunately, it is impossible to estimate α, β, γ, or δ from any set of data. The detailed reasons for this are complex and a detailed description of them may be found in papers by Nagin and Franklin and Nagin. (Nagin, 1978; Fisher and Nagin, 1986) Essentially the statistical estimation of parameters for these equations reduces to the algebraic problem of solving m equations with n unknown quantities where n>m. There are an infinite number of solutions to such equations therefore it is impossible to select the correct solution without additional information.

The only way to create such additional information is to create a more complex model where assumptions are made about additional variables, besides the certainty and/or severity of punishment, which may affect crime. The equations above will then take the form:

$$C_t = \alpha P_t + \beta + e_t$$

$$P_t = \gamma C_t + \phi_1 X_{1t} + \phi_2 X_{2t} + \ldots\ldots \phi_n X_{nt} + \delta + u_t$$

where the X_{it} are phenomena at time t which affect crime levels, e.g. measures of criminal opportunities and socio-economic phenomena which may generate crime and the ϕ_i are parameters which measure the impact changes in these phenomena have upon crime levels. However, inclusion of such variables may lead to mis-specified models as described earlier. No researcher to date has discovered a way to avoid this impasse.

Inappropriate Study Populations in Psychological and Case Study Research

Many psychological studies use populations that may differ significantly from the criminal populations which punishment policies target. Frequently these studies use populations of high school or college students. These populations are likely to contain unrepresentatively low percentages of criminally inclined persons. Generalizing findings on the effects of punishment upon criminal activity within such unrepresentative populations is difficult if not impossible.

Similarly, many case studies, focus upon policies whose intent is to encourage otherwise law-abiding persons to observe laws whose violation is generally not regarded as a serious matter. Examples of such case studies include studies of increased enforcement against drunk driving and other traffic offenses. Drawing conclusions from such case studies about the impacts of policies aimed generally at felonious crimes is probably unwarrantedly optimistic.

Psychological Research on Deterrence

Montmarquette, Nerlove, and Forest conducted a 1988 study of deterrence in juveniles based on a survey administered to 3,000 Francophone, Montreal high school students in 1974. (Montmarquette, Nerlove, and Forest, 1988) They found that the perceived probability of arrest was negatively related to the frequency with which students in their sample used drugs, stole items worth more than fifty dollars, and shoplifted. However, a large part of the negative relation they note may be due to the low subjective probabilities of arrest which frequent offenders reported.

As previous researchers have noted, a prior inclination to criminality may generate these low subjective evaluations of the probability of arrest. Those who are not criminally inclined do not commit crimes and therefore may retain a high subjective evaluation of the probability of arrest. Thus Montmarquette, et. al.'s finding of a deterrent effect may be an artifact of the relation between criminality and a realistic appreciation of the chances of arrest. Furthermore Montmarquette, et. al. do not determine what relation their subjects' subjective estimates of the probability of arrest bear to criminal justice policies which are intended to increase that probability. Thus their findings have little applicability to criminal justice policy.

Paternoster used a three-wave, panel survey of high school students in a mid-sized southeastern city to study the affect of perceived and actual punishment upon marijuana use and petty theft. (Paternoster, 1988) Paternoster found that perceived probabilities of

being punished had a weak negative relation to marijuana use in the early years of high school. In later years of high school whether or not peers use marijuana becomes a more important factor in the choice whether or not to use marijuana. Furthermore those who use marijuana early eventually reduce their subjective estimates of the probability of punishment. This makes them more likely to be still using marijuana at a later time. Similar results were found for petty theft, although in this case peer influence played a much more powerful role than in the case of marijuana.

Klepper and Nagin used the survey responses of 163 students in a graduate public management program to assess the reasoning they would use in determining whether to cheat on an income tax return. (Klepper and Nagin, 1989) They found that perceptions of certainty and severity of punishment significantly reduced the likelihood that respondents would suggest they might cheat. Klepper and Nagin's study can be faulted on at least two counts: First, the sample is upper-middle-class and not at all representative of persons who are most likely to consider indulging in felonious behavior. Second, the responses are descriptions of how respondents feel they would behave in hypothetical situations not actual behavior in those situations.

In a 1992 study Horney and Marshall examined the relation between arrest history, perceived probability of arrest, and criminal history in a sample of over 1,000 incarcerated criminals. (Horney and Marshall, 1992) This study is particularly valuable since it focuses on the actual behavior of criminals. Horney and Marshall found that the more risky criminals perceived a given crime to be in terms of perceived probability of arrest the less likely they were to commit that crime. Furthermore, with the exception of assault and auto theft, they found that criminals evaluated the risk of punishment by their subjective experience, i.e. the ratio of times they were arrested for a particular crime divided by the number of times they committed that crime.

Most interestingly Horney and Marshall found that drug dealers in their sample had higher estimates of the likelihood of being arrested for drug offenses than did non-drug dealers. This suggests that other factors than fear of arrest may be deterring persons in this sample for drug dealing. In fact, Horney and Marshall conclude that the limited explanatory power of their model suggests that for all crimes a wide variety of factors besides punishment may be having deterrent effects upon the convicts in their sample. These factors may include informal sanctions, attachments to conventional others, belief in the legitimacy of laws, and stakes in conformity, e.g. having a career or family.

Statistical Analyses of the Relationship between Punishment and Crime

In a 1978 paper Daniel Nagin summarizes much of the research on the effects of general deterrence upon crime which had been done at the time of his review. (Nagin, 1978) Of the over twenty analyses which he examines all but one find significant negative relations between the certainty and/or severity of punishment and the level of crime. However, all these studies have serious methodological problems and not one is able to accurately quantify the effect a marginal increase in the certainty and/or severity of punishment would

have upon crime. For these reasons Nagin suggests that these studies are not of much use to policy makers.

Since Nagin's review work in this area has continued. In a 1988 study Trumbull used 1981 North Carolina aggregate county data and individual data on released prisoners to construct regression model estimates of deterrence effects. He used sophisticated econometric procedures to eliminate specification and identification problems from his regression analyses. His analysis suggests that in North Carolina in 1981 on the aggregate level certainty and severity of punishment were both negatively related to levels of crime, with certainty of punishment having a stronger effect than severity. On the individual level prisoners with longer sentences were less likely to recidivate than prisoners with shorter sentences.

Sampson and Cohen used data from 171 American cities with over 100,000 population in 1980 to analyze whether an aggressive police presence reduced crime. (Sampson and Cohen, 1988) The theory behind this research is that highly proactive police departments tend to increase the probability of criminals' being apprehended during the commission of a crime and thus tend to reduce criminal activity. Using two-stage least-squares regression they found that aggressive policing does increase the probability of arrest for robbery and burglary although the affect is much weaker on the probability of arrest for burglary. Furthermore police aggressiveness reduces burglaries and robberies both directly and through the impact it has upon probability of arrest.

Friedman, Hakim, and Spiegel, however, present evidence that while in the short term increased outlays on policing may reduce crime, in the long term crime will return to levels similar to those existing before the increased outlays. (Friedman, Hakim, and Spiegel, 1989) They used pooled cross-sectional data from forty seven states during the period 1970 to 1980 to examine how per-capita expenditures on police related to per capita non-violent crimes. They found that within their data, over time intervals considerably shorter than a decade, increased per-capita expenditures on crime seemed to reduce per-capita crimes. However, examining the same relationship using all data for the decade of their study, increased per-capita expenditures on police seem to increase crime. To explain these non-intuitive findings they present an economic model of criminal behavior which suggests that in the face of increased police presence rational criminals will respond by improving their skills and increasing their number of crimes.

In a 1990 article Gibbs and Firebaugh discuss the issue of "spurious index correlation" and to illustrate their statistical analysis conduct a correlation analysis of certainty of arrest versus crime rates using 1980 data from the United States' nine census regions. To circumvent the problem of index correlation they use odds of arrest rather than probability of arrest as their measure of certainty of punishment. In addition they use simulations to test for the existence of "spurious index correlation". As far as deterrence goes, the results of their analysis are ambiguous. Odds of arrest correlate positively with crime rates for larceny and assault and, although they correlate negatively for the five other crimes in Glenn and Firebaugh's analysis, for two of these five crimes the correlations are not significant.

Bursik, Grasmick, and Chamlin argue that studies using large geographic units and long intervals of time may fail to capture the effects of arrest patterns, i.e. the certainty of punishment, on crime rates . (Bursik, Grasmick, and Chamlin, 1990) They use 100 weeks of data from Oklahoma City in 1986 to analyze the relation between police clearance rates for robbery and numbers of robberies in five Oklahoma City neighborhoods. They found no deterrent effect in their data.

In a later paper Chamlin, Grasmick, Bursik, and Cochran use ARIMA models on Oklahoma City police data for robbery, burglary, larceny, and auto theft during the period from 1967 through 1989 to re-examine the link between police clearance rates and levels of crime. (Chamlin, Grasmick, Bursik, and Cochran, 1992) For robbery, auto theft, and larceny they find significant short term deterrence effects. No effect was found for burglary. Furthermore there were no long term deterrence effects for any of these crimes.

Grogger uses individual offender model based on combined arrest and earnings records for Californians whose first arrest occurred after 1972 to estimate an economic model of criminal behavior. (Grogger, 1991) His model suggests that a one-month increase in sentence lengths would reduce criminal activity by less than one percent while an increase of one standard deviation in conviction rates would decrease crime by nearly twenty percent. Grogger concludes that although increasing severity of punishment does have some small affect upon criminal behavior, increasing the certainty of punishment has a much stronger impact.

Ethnographic Analyses

Ethnographic studies use intensive field observation and both structured and unstructured interviews to gather data on criminal behavior directly from criminals on the street. The respondents or observed participants are generally selected non-randomly using purposive or snowball sample designs. Specially trained social scientists conduct ethnographic studies using the assumptions that the observed activities and recorded reflections of criminals, when properly analyzed and interpreted, can provide important and unique insight into and understanding of their behaviors.

Ethnographic interviews are usually far more open-ended than survey research interviews on the theory that this prevents the ethnographer from imposing alien (i.e.. the ethnographer's) cultural interpretations and world view upon informants' responses. Preventing this imposition in turn prevents distortions in the information which informants provide. It also allows ethnographers to analyze informant behaviors and language patterns within the cultural framework of the informant and to study that framework in a way that no other research methodology allows.

Because the materials ethnography produces — recorded interviews or transcripts, film and photographic materials, and other such artifacts — are not always amenable to the types of quantitative analysis typically used in survey research, ethnographers have

developed their own analytical procedures. It is also frequently the case that ethnographic analyses will be supplemented with quantitative analyses. These may be based upon various procedures for quantifying ethnographic data, e.g., word frequency analyses, content analysis of transcribed data, encoding of activities observed on film, and so on.

Ethnography is particular valuable in several areas of social inquiry including:

1. exploring new topics and areas of research, e.g. how strongly criminals actually fear various punishments and their subjective evaluations of the probability they will be punished for committing various crimes;

2. building lexicons of words and phrases and their meanings within a cultural milieu to aid in understanding that milieu and resolve apparent contradictions that are more real for the observer than participants in the culture, e.g. do people committing drug crimes really conceive of their activities as being punishable crimes or as business activities that are arbitrarily and randomly interfered with by police agencies;

3. inductive research where the researchers allow new data to help them frame hypotheses and principles rather than approaching the data with a preconceived framework of analysis, e.g. recent ethnographic research suggests that the relationship between use of illicit drugs and participation in criminal activities is much more complex than official statistics and survey data would suggest;

As several of the examples in the preceding paragraph suggest ethnographic research has played an important role in research on drug related criminal behavior. Among the researchers in this area are Hunt and Williams. (Hunt, 1990; Williams, 1989; Williams, 1992)

Because ethnographic research is qualitative it is difficult to summarize the findings of any one researcher within the confines of a summary report such as this. However, the general conclusions of ethnographic researchers among drug-involved criminals are consistent enough that we can provide a general account of their findings. These findings are not encouraging as regards the impact of increased certainty, severity, and/or celerity of punishment upon drug-related crimes, at least in the immediate future.

First, the inner-city youths involved with drug crimes, whom these ethnographic studies have focused upon, regard the operations of the criminal justice system as being capricious and random. They regard arrest, prosecution, and punishment as being more bad luck than the just and inevitable outcome of criminal behavior. Partly this is because arrest and punishment occur infrequently, partly it is because the community surrounding them supports and legitimates their criminal activities to a certain degree. Even the police enforcing the law are frequently on a first name basis with these

offenders and often do not have the time or inclination to arrest them for what are perceived by both sides as relatively minor infractions of the drug laws, e.g. dealing small quantities of drugs or unobtrusively using illicit drugs.

In addition the punishments which are available for dealing with these offenders are not perceived by these criminal youths as being very threatening. A stint in jail or prison may actually enhance their street reputations. Furthermore conditions in jail or prison may not be less comfortable and may, in fact, be safer than life on the street for these drug offenders. Given this attitude the threat of jail or prison is unlikely to deter these youths from drug-related crime. Furthermore, the perceived glamour and financial rewards of drug-related crime ensures that when one of these youths is incarcerated he will be replaced by another. Thus punishment also has little incapacitating effect for these offenders.

It is possible that some of these attitudes have arisen because the certainty, severity, and celerity of punishment are actually quite low for these offenders. Perhaps enormous increases in the certainty and/or severity of punishment would change these attitudes. But such increases will require time, money, and political will to implement. Lesser increases are unlikely to change the experiences or attitudes of today's inner-city drug-involved youths.

Analyses and Case Studies of Criminal Justice Policies

Cook cites several early case studies studying the impact of increased certainty or severity of punishment upon crime levels. (Cook, 1977, pages 196-203) A controlled experiment in Kansas City, Missouri from 1 October 1972 to 30 September 1973 found that increased police patrols had no apparent affect upon crime in the neighborhoods where they were instituted. However, this was probably because the patrols did not create an apparent increase in the certainty of apprehension and punishment.

In New York City, on the other hand, an increase in the size of the Transit Authority Police starting in April 1975 apparently caused a large and sustained drop in subway crime. Unlike Kansas City, the increase in New York's subway police apparently did increase the risks of apprehension, particularly for certain crimes such as toll booth robberies. However, the measured results of this police increase upon crime may be somewhat less than the actual results due to some purposeful mis-reporting by a senior police official and some subtler statistical effects.

An experimental increase in the number of police in New York City's Twentieth Precinct starting on 18 October 1986 provides a third case study which Cook examined. Two interesting results were observed. First "inside crimes" — those crimes which beat police are less likely to notice, like burglary — decreased while "outside crimes" decreased. Secondly, during the period of observation crime rates in the Twentieth Precinct remained constant while crime rates in the rest of New York rose. Both these effects suggest increased risk of arrest and punishment acted to reduce or at least control crime.

Finally Cook examined the British Road Safety Act of 1967. This act increased both the certainty of conviction for and punishments associated with drunk driving. The Act was highly publicized by the government. Immediately after the passage and publicizing of the Act road fatalities fell in ways that strongly suggested far fewer persons were driving under the influence. However, police actually did not rigorously enforce the provisions of the Act and when the public became aware of this road fatalities returned to their old levels. The fall in road fatalities and hence drunk driving was real and obviously occasioned by the Act, suggesting that perceptions of increased certainty and severity of punishment did indeed reduce the crime of drunk driving.

In a later paper Cook presents summaries for eleven other case studies studying policy interventions which were designed to increase the certainty and/or severity of punishments for a variety of crimes. (Cook, 1981) Seven of these studies found a resulting decrease in crime, one found a transitory decrease, and three found no decrease. In two of the three cases where policies were ineffective there is some evidence that actions by independent actors within the criminal justice system vitiated the intended effects of the policies and reduced the degree to which these policies increased punishment.

One of the most interesting case studies of a policy which was intended to increase the certainty of punishment for drug offenses was that conducted by the Vera Institute to evaluate New York City's Tactical Narcotics Teams (TNTs). (Sviridoff, Sadd, Curtis, and Grinc, 1992) New York City's TNT program was a carefully crafted attempt to dramatically increase pro-active police presence in high drug trafficking areas in New York City and to support police arrests with increased prosecutorial, public defender, courtroom, and jail and lockup facilities. The TNT program worked as planned, enormously increasing drug related arrests. However, the program had no noticeable impact on crimes of drug dealing, drug abuse, or ancillary crime.

Summary of Research Findings

Research on the effects of increased certainty, severity, and/or celerity of punishment upon levels of crime is inconclusive. Psychological, economic, and statistical research suggests that increased certainty, severity, and/or celerity of punishment does decrease punishment, but all studies of this type are flawed by serious methodological problems. Attempts to use more rigorous methods to eliminate these problems usually tend to weaken the observed relationship between punishment and crime.

Ethnographic research suggests that, given the current experience and attitudes of drug involved offenders, marginal increases in the certainty, severity, and/or celerity of punishment are unlikely to affect the behavior of these offenders. Case studies of policy interventions to increase the certainty, severity, and/or celerity of punishment provide some evidence that in particular situations these work. But the majority of case studies of such policy interventions which are particularly targeted at drug crimes are far less optimistic. In short, current research provides little guidance for policy makers in this area.

CONCLUSIONS

Currently the vast majority of convicted criminals in the United States are punished by either incarceration in jail or prison or probation, which usually provides very little supervision or control. Most prisoners serve only a fraction of their imposed sentences before being released to parole, which like probation provides little supervision or control. About three-quarters of convicted criminals who are under supervision are actually under probation or parole supervision.

It is true that the United States currently imprisons a larger proportion of its population per capita than most other countries. However, imprisonments per crime are in line with those of other countries. In fact, our corrections system is so over-burdened that the punishment a criminal can expect to receive for his crimes in the United States is probably much lower than in most other countries.

This situation is unlikely to change in the near future. Projected expansions of the corrections system are barely adequate to meet projected needs let alone allow room for the additional prisoners who would be added to the system if punishment were to become more certain or severe. Without such expansions, however, increasing the certainty, severity, and/or celerity of punishment for drug crimes is an unlikely possibility, since doing this would of necessity require decreasing the certainty, severity, and/or celerity of punishment for other crimes.

Furthermore, research is ambiguous, at best, about whether increased penalties for drug-related crimes would, in fact, have a significant impact upon the number of these crimes. Economic analyses of illicit drug markets, ethnographic research, and case studies of policies which were intended to increase the certainty, severity, and/or celerity of punishment for drug crimes all suggest that marginal increases in punishment will have little impact. Devising new modalities for punishing and/or treating drug-involved criminals or, more generally, developing wholly new approaches to drug-related crimes appears to be the only feasible approach for reducing the level of these crimes in the current situation.

BIBLIOGRAPHY

Anglin, M. Douglas and George Speckhart, 1988, "Narcotics Use and Crime: A Multisample, Multimethod Analysis," *Criminology*; 26:2.

Ashworth, Andrew, J., 1992, "Sentencing Reform Structures," in *Crime and Justice: An Annual Review of Research.* Volume 16, Michael Tonry and Norval Morris, editors, pages 181-241, The University of Chicago Press, Chicago, Illinois.

Barr, Robert, and Ken Pease, 1990, "Crime Placement, Displacement, and Deflection," in *Crime and Justice: An Annual Review of Research.* Volume 12, Michael Tonry and Norval Morris, editors, pages 277-318, The University of Chicago Press, Chicago, Illinois.

Becker, Gary S., 1968, "Crime and Punishment: An Economic Approach," *Journal of Political Economy*, 76:2, pages 169-217.

Bennett, William, 1990, "The Principal Goal of Our Strategy, However, Remains the Same: To Reduce the Level of Illegal Drug Use in America," 6 February 1990, the John F. Kennedy School of Government Social Policy Center Seminar Series, John F. Kennedy School of Government, Harvard University, Cambridge, Massachusetts.

Blumstein, Alfred, Jaqueline Cohen, and Daniel Nagin, editors, 1978, *Deterrence and Incapacitation: Estimating the Effects of Criminal Sanctions on Crime Rates*, National Academy of Sciences, Washington, DC.

Blumstein, Alfred, and Jacqueline Cohen, 1987, "The Effects of Imprisonment on Criminal Careers: Delay or Disruption," presentation at the annual meeting of the American Society of Criminology, Montreal, Quebec, Canada, 14 November 1987.

Blumstein, Alfred and Daniel Nagin, 1978, "On the Optimum Use of Incarceration for Crime Control," *Operations Research,* 26:3, pages 381-405.

Blumstein, Alfred, 1988, "Prison Populations: A System Out of Control," in *Crime and Justice: An Annual Review of Research*, Volume 10, Michael Tonry and Norval Morris, editors, pages 231-266. The University of Chicago Press, Chicago, Illinois.

Blumstein, Alfred, Jacqueline Cohen, Jeffrey A. Roth, and Christy A. Visher, editors, 1986, *Criminal Careers and "Career Criminals,"* Volume 1, National Academy Press, Washington, DC.

Blumstein, Alfred, Jacqueline Cohen, Jeffrey A. Roth, and Christy A. Visher, editors, 1986, *Criminal Careers and "Career Criminals,"* Volume 2, National Academy Press, Washington, DC.

Boland, Barbara, Paul Mahanna, and Ronald Sones, 1992, *The Prosecution of Felony Arrests, 1988*, US Department of Justice, Office of Justice Programs, Bureau of Justice Statistics, NCJ-130914, Washington, DC.

Brubaker, Stanley C., 1988, "Can Liberals Punish?," American Political Science Review, 82:3, pages 821-836.

Bursik, Jr. Robert J., et al., 1990, "The Effect of Longitudinal Arrest Patterns on the Development of Robbery Trends at the Neighborhood Level," *The Journal of Criminal Law and Criminology*, 28:3.

Chamlin, Mitchell, B., Harold G. Grasmick, Robert J. Bursik Jr., and John K. Cochran, 1992, "Time Aggregation and Time Lag in Macro-level Deterrence Research", *Criminology*, 30:3 pages 377-395.

Clark, Richard D., 1988, "Celerity and Specific Deterrence: A Look at the Evidence," *Canadian Journal of Criminology*, 30:1, pages 109-120.

Clarke, Ronald, V. and Pat Mayhew, 1988, "The British Gas Suicide Story and Its Criminological Implications," in *Crime and Justice: An Annual Review of Research*, Volume 10, Michael Tonry and Norval Morris, editors, pages 79-116, The University of Chicago Press, Chicago, Illinois.

Cohen, Mark, A., 1988, "Pain and Suffering, and Jury Awards: A Study of the Cost of Crime to Victims," *Law and Society Review*, 22:3. pages 537- 555.

Cohen, Mark, A., 1988, "Some New Evidence on the Seriousness of Crime," *Criminology*, 26:2, pages 343-353.

Colson, Charles and Daniel W. Van Ness, 1989, "A Conservative Perspective: Alternatives to Incarceration," *The Journal of State Government*, 62:2, pages 59-64.

Cook, Phillip J., 1981, "Research in Criminal Deterrence: Laying the Groundwork for the Second Decade," in *Crime and Justice: An Annual Review of Research*, Volume 2, Michael Tonry and Norval Morris, editors, pages 211-268, The University of Chicago Press, Chicago, Illinois.

Cook, Phillip J., 1986, "The Demand and Supply of Criminal Opportunities," in *Crime and Justice: An Annual Review of Research*, Volume 7, Michael Tonry and Norval Morris, editors, pages 1-27, The University of Chicago Press, Chicago, Illinois.

Cook, Phillip J. 1977, "Punishment and Crime: A Critique of Current Findings Concerning the Preventive Effects of Punishment," *Law and Contemporary Problems*, 41:1, pages 164-204.

Decker, Scott H. and Carol W. Kohfeld, 1990, "Certainty, Severity, and the Probability of Crime: A Logistic Analysis," *Policy Studies Journal*, 19:1, pages 2-21.

DiIulio, John, J., Jr., 1990, "Crime and Punishment in Wisconsin," *Wisconsin Policy Research Institute Report*, 3:7.

Ehrlich, Isaac, 1973, "Participation in Illegitimate Activities: A Theoretical and Empirical Investigation," *Journal of Political economy*, 81:3, pages 521-565.

Farrington, David P., 1986, "Age and Crime," in *Crime and Justice: An Annual Review of Research*, Volume 8, Michael Tonry and Norval Morris, editors, pages 189-249, The University of Chicago Press, Chicago, Illinois.

Farrington, David, P., 1986, "Age and Crime," in *Crime and Justice: An Annual Review of Research*, Volume 7, Michael Tonry and Norval Morris, editors, pages 189-250, The University of Chicago Press, Chicago, Illinois.

Feeley, Malcolm M., and Jonathan Simon, 1992, "The New Penology: Notes on the Emerging Strategy of Corrections and Its Implications," Criminology, 30:4, pages 449-474.

Fisher, Franklin M. and Daniel Nagin, 1986, "On the Feasibility of Identifying the Crime Function in a Simultaneous Model of Crime Rates and Sanction Levels," pages 361-399 in *Criminal Careers and "Career Criminals"*, Volume 2, Alfred Blumstein, Jacqueline Cohen, Jeffrey A. Roth, and Christy A. Visher, editors, National Academy Press, Washington , D.C.

Flanagan, Timothy J., and Kathleen Maguire, editors, 1992, *Bureau of Justice Statistics Sourcebook of Criminal Justice Statistics* , U.S. Department of Justice, Bureau of Justice Statistics, Washington, D.C.

Forst, Brian E., 1976, "Participation in Illegitimate Activities: Further Empirical Findings," *Policy Analysis*, 2:3, pages 477-492.

Freidland, Nehemia, 1990, "The Combined Effect of the Severity and the Certainty of Threatened Penalties: Addictive or Interactive?," *Journal of Applied Psychology*, 20:16, pages 1358-1368.

Friedman, Joseph and Simon Hakim and Uriel Spiegel, 1989, 'The Difference Between Short and Long Run Effects of Police Outlays on Crime: Policing Deters Criminals Initially, But Later They May 'Learn by Doing', " *American Journal of Economics and Sociology*, 48:2, pages 175-191.

Garland, David, 1990, "Frameworks of Inquiry in the Sociology of Punishment," *British journal of Sociology*, 41:1, pages 1-15.

Gibbs, Jack P., and Glenn Firebaugh, 1990, "The Artifact Issue in Deterrence Research," *Criminology*, 28:2, pages 347-367.

Greene, Judith, A., 1989, *Staten Island Economic Sanctions Project: Preliminary Data Report Day-Fine Pilot Project*, Vera Institute of Justice, New York, New York.

Greenfeld, Lawrence A., and Patrick A. Langan, 1987, "Trends in Prison Populations," paper for the National Conference on Punishment for Criminal Offenses, November, 1987, Ann Arbor, Michigan.

Greenwood, Peter J., 1986, "Differences in Criminal Behavior and Court Responses among Juvenile and Young Adult Offenders," in *Crime and Justice: An Annual Review of Research*, Volume 7, Michael Tonry and Norval Morris, editors, pages 151-187, The University of Chicago Press, Chicago, Illinois.

Grogger, Jeffrey., 1991, "Certainty Versus Severity of Punishment," *Economic Inquiry*; 29:1, pages 297-309.

Haaga, John, and Peter Reuter, 1988, *Improving Data for Federal Drug Policy Decisions*, Drug Policy Research Center, RAND Corporation, Santa monica, California.

Heineke, J. M., 1978, "Economic Models of Criminal Behavior: An Overview," in *Economic Models of Criminal Behavior*, J. M. Heineke, editor, *Contributions to Economic Analysis*, Number 118, pages 1-33, North Holland Publishing Company, Amsterdam.

Hillsman, Sally T., 1990, "Fines And Day Fines," in *Crime and Justice: An Annual Review of Research*, Volume 12, Michael Tonry and Norval Morris, editors, pages 49-97, The University of Chicago Press, Chicago, Illinois.

Hillsman, Sally T., and Judith A. Greene, 1988, "Tailoring Criminal Fines to the Financial Means of the Offender," *Judicature*, 72:1, pages 38-45.

Horney, Julie and Ineke Haen Marshall, 1992, "Risk Perceptions among Serious Offenders: The Role of Crime and Punishment," *Criminology* 30:4, pages 573-594.

Hunt, Dana, 1990, "Drugs and Consensual Crimes: Drug Dealing and Prostitution," in *Crime and Justice: An Annual Review of Research*, Volume 13, Michael Tonry and Norval Morris, editors, pages 159-202, The University of Chicago Press, Chicago, Illinois.

Jacobs, James, B., 1988, "The Law and Criminology of Drunk Driving," in *Crime and Justice: An Annual Review of Research*, Volume 10, Michael Tonry and Norval Morris, editors, pages 171-229, The University of Chicago Press, Chicago, Illinois.

Kleiman, Mark A. R., 1989, "Four Theories of Drug Enforcement Effectiveness," Chapter 4 of Kleiman, *Marijuana: Costs of Abuse, Costs of Control*, pages 51-66, The Greenwood Press, New York.

Kleiman, Mark A. R., 1987, "The Changing Face of Cocaine," Working Paper 87-01-07, Program in Criminal Justice Policy and Management, John F. Kennedy School of Government, Harvard University, Cambridge, Massachusetts.

Kleiman, Mark A. R., 1988, "Dead Wrong," *The New Republic*, September 1986.

Kleiman, Mark A.R., 1991, *Modelling Drug Markets*, National Institute of Justice, Project No. 89-IJ-CX-0001, Program in Criminal Justice Policy and Management, John F. Kennedy School of Government, Harvard University, Cambridge, Massachusetts.

Kleiman, Mark A. R., 1993, "Enforcement Swamping: A Positive-Feedback Mechanism in Rates of Illicit Activity," *Mathematical and Computer Modeling*, January, 1983.

Klepper, Steven and Daniel Nagin, 1989, "The Deterrent Effect of Perceived Certainty and Severity of Punishment Revisited," *Criminology*, 27:4 pages 721-746.

Kramer, Samuel, 1990, "An Economic Analysis of Criminal Attempt: Marginal Deterrence and the Optimal Structure of Sanctions," Journal of Criminal Law and Criminology, 81:2, pages 398-417

Langan, Patrick A., and Mark A. Cuniff, 1992, "Recidivism of Felons on Probation, 1986-89," Bureau of Justice Statistics Special Report U.S. Department of Justice, Bureau of Justice Statistics, Washington, D.C.

Lily, J., Robert, 1989, "What About House Arrest?," *Journal of State Government*, 62:2, pages 89-91.

MacKenzie, Doris, Layton, 1989, "The Parole Performance of Offenders Released From Shock Incarceration (Boot Camp Prisons): A Survival Time Analysis," paper presented at the American Probation and Parole Association 14th Annual Training Institute, August, 1989, Milwaukee, Wisconsin.

Milner, Joseph M., 1990, "Estimating the Criminal Population and Offense Rates: An Examination of Methods," Internal Working Paper, National Institutes of Justice, 17 August 1990.

Miron, Jeffrey A., 1990, *Drug Legalization and the Consumption of Drugs: An Economist's Perspective*, National Bureau of Economic Research, Boston, Massachusetts.

Montmarquette, Claude, and Marc Nerlove, 1985, 'Deterrence and Delinquency: an Analysis of Individual Data', *Journal of Quantitative Criminology*, 1:1, pages 37-58.

Moore, Mark H., 1983, "Controlling Criminogenic Commodities: Drugs, Guns, and Alcohol," in *Crime and Public Policy*, James Q. Wilson, editor, pages 125-144, ICS Press, San Francisco, California.

Moore, Mark H., and Mark A.R. Kleiman, 1989, "The Police and Drugs," in *Perspectives on Policing*, U.S. Department of Justice, National Institute of Justice, Washington, D.C.

Nagin, Daniel S., and Raymond Paternoster, 1991, 'The Preventive Effects of the Perceived Risk of Arrest: Testing an Expanded Conception of Deterrence," *Criminology*, 29:4, pages 561-587.

Nagin, Daniel, 1978, "General Deterrence: A Review of the Empirical Evidence," pages 95-139 in *Deterrence and Incapacitation: Estimating the Effects of Criminal Sanctions on Crime Rates*, Alfred Blumstein, Jacqueline Cohen, and Daniel S. Nagin, editors, National Academy of Sciences, Washington, D.C.

Nagin, Daniel S., and Raymond Paternoster, 1991, "The Preventive Effects of the Perceived Risk of Arrest: Testing and Expanded Conception of Deterrence," *Criminology*, 29:4, pages 561-587.

New York State, 1993, *The Fifth Annual Shock Legislative Report*, State of New York, Department of Correctional Services, Division of Parole, Albany, New York.

Paternoster, Raymond, 1988, "Examining Three-Wave Deterrence Models: A Question of Temporal Order and Specification," *Criminology*, 79:1, pages 135-179.

Perkins, Craig, 1992, *National Corrections Reporting Program, 1989*, NCJ-138222, US Department of Justice, Bureau of Justice Statistics, Washington, DC.

Petersilia, Joan, (1987). *Expanding Options for Criminal Sentencing*, R-3544-EMC, The Rand Corporation, Santa Monica, California.

Petersilia, Joan, 1990, "When Probation Becomes More Dreaded Than Prison", *Federal Probation*, March, 1990, pages 23-27.

Petersilia, Joan, and Susan Turner, 1990, "Comparing Intensive and Regular Supervision for High-Risk Probationers: Early Results from an Experiment in California," *Crime and Delinquency*, 36:1, pages 87-111.

Petersilia, Joan, and Susan Turner, 1989, "Reducing Prison Admissions: The Potential of Intermediate Sanctions," *Journal of State Government*, 62:2, pages 65-69.

Petersilia, Joan, Susan Turner, and Elizabeth Piper Deschenes, 1992, "Intensive Supervision Programs for Drug Offenders," in *Smart Sentencing: The Emergence of Intermediate Sanctions*, James M. Burne, Arthur J. Luriglio, and Joan Petersilia, editors, pages 18-37, Sage Publications, Newbury Park, New Jersey.

Press, Aric, 1987, "Piecing Together New York's Criminal Justice System: The Response to Crack," *Bar Retreat*, December, 1987, pages 1-8.

Reiss, A. J., 1980, "Understanding Changes in Crime Rates", pages 11-17 in *Indicators of Crime and Criminal Justice: Quantitative Studies*, S. E. Feinberg and A. J. Reiss, editors, U. S. Department of Justice, Bureau of Justice Statistics, Washington, DC.

Reiss, Albert, J., Jr. (1988). "Co-offending and Criminal Careers," in *Crime and Justice: An Annual Review of Research*, Volume 10, Michael Tonry and Norval Morris, editors, pages 117-170, The University of Chicago Press, Chicago, Illinois.

Renzema, Marc, and David T. Skelton, 1989, *The Use of Electronic Monitoring by Criminal Justice Agencies (1989): A Description of Extent, Offender Characteristics, Program Types, Programmatic Issues, and Legal Aspects*, OJP-89-M-309, US Department of Justice, National Institute of Justice Washington, DC.

Reuter, Peter, and Mark A. R. Kleiman, 1986, "Risks and Prices: An Economic Analysis of Drug Enforcement," in *Crime and Justice: An Annual Review of Research*, Volume 7, Michael Tonry and Norval Morris, editors, pages 289-340, The University of Chicago Press, Chicago, Illinois.

Reynolds, Morgan O., 1985, *Crime by Choice*, The Fisher Institute, Dallas, Texas.

Roberts, Julian, V., 1992, "Public Opinion, Crime, and Criminal Justice," in *Crime and Justice: An Annual Review of Research*, Volume 16, Michael Tonry and Norval Morris, editors, pages 99-180, The University of Chicago Press, Chicago, Illinois.

Rogers, Joseph W., 1989, "The Greatest Correctional Myth: Winning the War on Crime through Incarceration," Federal Probation, September, 1989, pages 21-28

Sampson, Robert J., and Jacqueline Cohen, 1988, "Deterrent Effects of the Police on Crime: A Replication and Theoretical Extension," *Law & Society Review*, 22:1, pages 163-189.

Schur, Edwin, 1965, *Crimes Without Victims*, Prentice-Hall, New York, New York.

Sherman, Lawrence, W., 1990, "Police Crackdowns: Initial and Residual Deterrence," in *Crime and Justice: An Annual Review of Research*, Volume 12, Michael Tonry and Norval Morris, editors, pages 79-116, The University of Chicago Press, Chicago, Illinois.

Smith, Michael E., 1983, "Will the Real Alternatives Please Stand Up", Paper presented at The Colloquium to Examine the Prison Overcrowding Crisis and Priorities and Strategies for Reducing Prison Population, New York University Review of Law and Social Change, 25 March 1983.

Sviridoff, Michelle, Susan Sadd, Richard Curtis, and Randolph Grinc, 1992, *The Neighborhood Effects of Street-Level Drug Enforcement: Tactical Narcotics Teams in New York*, The Vera Institute of Justice, New York, New York.

Taylor, John B., 1978, "Econometric Models of Criminal Behavior: A Review," in *Economic Models of Criminal Behavior*, J.M. Heineke, editor, pages 36-81, North-Holland Publishing Company, New York, Amsterdam.

Tonry, Michael., 1992, "Mandatory Penalties," in *Crime and Justice: An Annual Review of Research*, Volume 16, Michael Tonry and Norval Morris, editors, pages 243-273, The University of Chicago Press, Chicago, Illinois.

Turner, Susan, 1992, *Evaluating Intensive Supervision Probation/Parole (ISP) for Drug Offenders*, The RAND Corporation, Santa Monica, California.

Turner, Susan, 1991, "The Implementation and Effectiveness of Drug Testing in Community Supervision: Results of an Experimental Evaluation," in *Drugs and the Criminal Justice System: Evaluating Public Policy Initiatives*, Doris L. MacKenzie and Craig Uchida, editors, Sage Publications, Newbury Park, new Jersey.

US Department of Justice, 1992, *The Case for More Incarceration*, NCJ-139583, US Department of Justice, Office of Policy and Communications, Office of Policy Development, Washington, DC.

von Hirsh, Andrew, 1992, "Proportionality in the Philosophy of Punishment," in *Crime and Justice: An Annual Review of Research*, Volume 16, Michael Tonry and Norval Morris, editors, pages 55-98, The University of Chicago Press, Chicago, Illinois.

Williams, Terry, 1989, *The Cocaine Kids: The Inside Story of a Teenage Drug Ring*, Addison-Wesley, Reading, Massachusetts.

Williams, Terry, 1992, *Crackhouse*, Addison-Wesley, Reading, Massachusetts.

Zedlewski, Edwin, W., 1989, "New Mathematics of Imprisonment: A Reply to Zimring and Hawkins," *Crime and Delinquency*, 35:1, pages 169-173.

Zedlewski, Edwin W., 1987, "Making Confinement Decisions," in *Research in Brief July 1987*, US Department of Justice, National Institute of Justice, Washington, DC.

Zimring, Franklin, E., and Gordon Hawkins, 1988, "The New Mathematics of Imprisonment," *Crime and Delinquency*, 34:4, pages 425-436