

2014

Skepticism About Deterrence

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Recommended Citation

Thomas S. Ulen, *Skepticism About Deterrence*, 46 Loy. U. Chi. L. J. 381 (2014).

Available at: <http://lawcommons.luc.edu/lucj/vol46/iss2/6>

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Skepticism About Deterrence

Thomas S. Ulen*

In this Essay I first review the standard law-and-economics model of how rational potential criminals decide whether to commit a crime, and how rational criminals might be deterred from committing crime by raising the expected costs of crime. I also show how that model has had a deep impact on criminal-justice-system policy in the United States since at least 1980. I then express deep skepticism about the continued effectiveness of this model and its policy implications. First, I show how modern empirical research on deterrence argues that we have gone much too far in our use of incarceration; in brief, we incarcerate far too many criminals and for too long with no discernible social benefit and substantial social costs. Second, I cite evidence from behavioral law and economics to demonstrate that the rationality that the standard deterrence model assumes is highly unlikely to characterize the behavior of those who are committing crimes. Finally, I consider some recent developments in human genome studies to suggest that human behavior generally, and criminal behavior specifically, are likely to be far more complex than the standard deterrence model contemplates.

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INTRODUCTION

This brief Essay is, in a way, a *mea culpa, mea maxima culpa* for my many years of toiling away with the blunt tool of a simplistic law-and-economics model with respect to criminal justice issues. Wielding that tool, I, like most economically-minded law professors, perceived the principal social goal of the criminal justice system to be that of deterring crime—up to the point at which the social cost of further deterrence was exactly equal to the social benefit of the last unit of crime deterred. While I have no particular qualms about that goal, I now have a somewhat different view of the abilities of the standard tools upon which we have relied as being suitable explanations of the causes and consequences of the varying levels of crime and of the ability of incarceration, fines, and other sanctions to deter people from committing crimes.

Why the change of view? I would like to believe that with age has come some wisdom, but perhaps it is true that being trained as a professional economist simply delayed that acquisition of wisdom, and what I am really doing is just catching up to the rest of many of the attendees at this conference. But that factor is almost certainly not as important in my change of view as is the remarkable new scholarship on crime that has emerged in the past twenty or so years. There is progress in human affairs and even in legal scholarship, and that progress does not come, as Max Planck memorably said, only after the funerals of older scholars.¹ As I hope will become evident in this Essay, new empirical evidence—both directly about the deterring effects of criminal sanctions and about the decision-making and judgmental errors to which potential criminals (and the rest of us) are prone—has persuaded me that we need to look afresh at criminal justice system policies of deterrence.

Here is how I proceed. I begin with a very brief review of the standard law-and-economics view of criminal law and punishment. I recount both the Beckerian theoretical account of the rational choice, theory-based decision to commit a crime and some of the early empirical evidence that sought to examine whether the theory accurately described and predicted actual criminal behavior. Then, in Part III, I turn to a consideration of a newer empirical literature, based principally in economics, that persuasively holds that we are imprisoning too many

1. See ALEX ZHAVORNOKOV, *THE AGELESS GENERATION: HOW ADVANCES IN BIOMEDICINE WILL TRANSFORM THE GLOBAL ECONOMY* 11 (Palgrave Macmillan 2013) (attributing the quote, "Science advances one funeral at a time," to Max Planck).

people and that we can lower incarceration rates without substantially increasing crime rates. Then, in Part IV, I give a brief overview of some theoretical and empirical insights from behavioral economics and cognitive and social psychology that raise, I believe, some very big questions about the foundations of the deterrence possibilities of criminal law. And finally, I take wing and discuss some remarkable new developments in genomic biology that may someday, perhaps someday soon, give us an entirely different way of talking about why some people commit crime, and what might be done to deter them from doing so.

I. THE STANDARD LAW-AND-ECONOMICS ACCOUNT OF CRIME, SENTENCING, AND DETERRENCE

The standard law-and-economics account of the decision to commit a crime and of how to deter crime is well known. So, let me just summarize the heart of the account.

Following the famous theory of the late Professor Gary Becker,² economists and law-and-economics scholars assume that potential criminals are rational calculators like the rest of us. Criminals know their preference orderings; that is, they know what goods and services give them pleasure and which do not. They seek to allocate their time, wealth, and mental and physical efforts so as to maximize their well-being. So, in deciding whether to commit a crime, they compare the expected benefits of successfully completing the crime with the expected costs. Those expected costs include the product of the probabilities of detection, arrest, conviction, and the value of the sanction that the criminal will face if he or she is found guilty.³ The expected benefits include the material and psychic well-being that will come from, say, stealing the large-screen TV and either enjoying it at home or selling it (at a discount).

Presumably, the rational potential criminal will commit the crime if the expected benefits exceed the expected costs and will refrain if the expected costs exceed the expected benefits.

There is one more significant element of the theory: the criminal justice system can influence the decision to commit a crime by affecting

2. See ROBERT D. COOTER & THOMAS S. ULEN, *LAW AND ECONOMICS* 454–84 (6th ed. 2012) (explaining the economic theory of criminal behavior). See generally Gary S. Becker, *Crime and Punishment: An Economic Analysis*, 76 *J. POL. ECON.* 169 (1968).

3. A more complete model might include an estimate of the present discounted value of lost future legitimate employment opportunities if convicted; the psychic costs of violating one's cultural, ethical, or religious proscriptions against committing a crime; and so on.

the expected costs of crime. And because, by assumption, criminals do not pay attention to the individual elements of those expected costs but only to the summary product of the underlying calculations, the criminal justice system (on behalf of society as a whole) can choose to raise those costs in four ways: (1) by increasing the probabilities of detection, arrest, and conviction; (2) by increasing the value of the sanctions, such as the length of the sentence; (3) by doing a little of both; and (4) by increasing the returns from legitimate work.⁴

Generally speaking, the early theorists of this rational choice theory of crime thought that the most effective ways to reduce crime were to increase the returns from legitimate work and to increase the sentences for all crimes. This would be done while still attempting to preserve relative differences between crimes that signal their relative social costs—for example, that battering another person is more socially costly than simply stealing her handbag and should, therefore, be punished more severely.

There is typically a small additional amendment to this deterrence theory. Raising the expected costs of crime by increasing the probabilities of detection, arrest, and conviction typically costs real money. One must, for instance, put more police officers on the streets or more cameras in public and private places (and monitor them) in order to increase the probability of detection. To increase the probability of conviction, one must have more courtrooms, more judges, more prosecutors and staff, more public defenders and staff, and possibly, more jails and prison space.

One can also increase the expected costs of crime and achieve greater deterrence by simply increasing the level of sanctions. Of course, the relative differences among those sanctions must be preserved, and potential criminals must be made aware of those increased sanctions. But if that is done, and on the assumption that increasing the level of sanctions raises the expected costs of crime and requires no real expenditures—other than the political costs of persuading the legislature

4. Interestingly, subsequent empirical work in the 1970s demonstrated that the deterrent effect of making legitimate work more certain and more rewarding had the greatest deterrent effect of all of the possibilities just listed. An implication of that finding (and of the theory) is that cyclical changes in the state of the economy and the labor market might have a counter-cyclical effect on crime—that is, that as the economy grows stronger (with employment increasing), crime should decrease, and vice versa. Empirical work has not confirmed this effect, with one notable (and contrary) exception: auto theft tends to be pro-cyclical. Auto theft increases as the economy grows and declines as the economy contracts. See COOTER & ULEN, *supra* note 2, at 485–531 (introducing crime rates and statistics and using that information to discuss the effects of various punishments on deterring crime).

to raise those sanctions—then raising the sanctions for crimes is, all else equal, one of the most efficient means of deterring crime.⁵

There is one other policy implication of this theory that is worth comment. Variance in the sentences for a particular crime is potentially confusing to rational potential criminals. One could well have made two arguments in favor of variance in sentencing. First, the particular circumstances or characteristics of the convicted criminal might vary to such an extent that justice demands leaving to the sentencing judge the determination of where in the distribution of possibilities to place any given convictee. Judges would, with the assistance of experience, determine where in the range of possibilities of this indeterminate-sentencing regime the circumstances most suitably placed the convictee. Second, one might well have argued that the greater the variance in the sanction for a given crime, the greater the uncertainty facing any potential criminal, and that increased uncertainty might have played havoc with the deterring effect of criminal sanctions.⁶

While one might plausibly argue that a rational potential criminal will focus on the mean or mode of the distribution, regardless of its variance, many of those who thought about these matters feared that the larger the uncertainty about the sanction, the less deterring any given sanction would be. Hence, these considerations made a case in favor of sentencing guidelines that reduced the variance of criminal sanctions by replacing discretionary ranges of sentences with determinate sentencing, thereby sending crisper and clearer signals to those contemplating committing crimes.⁷

That, at any rate, is the standard economic account of crime. Like all theories, it is only as good or as bad as its description of the world is accurate and of how well it explains the data and predicts real events.

5. See COOTER & ULEN, *supra* note 2, at 508–09 (explaining how a fine system could be more efficient than imprisonment).

6. There is a well-developed economic theory of decision making under uncertainty that might apply. However, that theory's predictions about how potential criminals would have reacted to any given level of variance in the sanction for a given crime depended in large part on the criminal's taste for risk. The more risk-preferring a potential criminal, the greater the likelihood that he or she would commit a crime as the uncertainty increased. The more risk-averse a potential criminal, the lower the likelihood that he or she would commit a crime as the uncertainty of a given level of sanction increased. Surely there must be differences in the risk attitudes of potential criminals. Yet, I assume that most students of the subject would have been reluctant to assume risk-aversion among most real potential criminals and far more likely to assume risk-seeking attitudes. But to my knowledge, this is a topic that is under-investigated.

7. See *An Overview of the United States Sentencing Commission*, U.S. SENT'G COMM'N, 1, http://www.ussc.gov/sites/default/files/pdf/about/overview/USSC_Overview.pdf (last visited Nov. 11, 2014) (discussing the overall goals of the sentencing commission).

Economists and lawyers in the 1970s and early 1980s undertook many empirical investigations to test the descriptive and predictive accuracy of the Beckerian theory of crime. Many of those investigations found support for the deterrence theory (as the Becker theory was frequently called). There are far too many of those to canvas here,⁸ but one should be aware that the empirical support for the deterrence theory ran from relatively minor felonies, such as evading the military draft as a protest against the Vietnam War,⁹ to more serious felonies, such as manslaughter and theft or destruction of property.¹⁰

While most studies were done using U.S. data, some scholars—noting that the theory would seem to apply to human beings anywhere and at any time—studied the relationship between sanctions and crimes in different countries and in different historical periods. Those studies, like the contemporary ones, tended also to find a deterrent effect between the level of sanctions and the quantity of crime.¹¹

By far the most famous of the early empirical studies was the outgrowth of a doctoral dissertation done by Isaac Ehrlich, now himself a distinguished scholar, under Gary Becker at the University of Chicago. Ehrlich's hypothesis was that if sanctions deter, then the most severe sanction—capital punishment—is likely to have a deterrent effect.¹² In a very clever econometric study, Ehrlich found that one execution deterred between seven and eight subsequent murders.¹³ In the years after the publication of Ehrlich's work, other scholars have

8. For a brief summary of the empirical evidence on crime and deterrence of the 1970s and 1980s, see COOTER & ULEN, *supra* note 2, at 485–531. See generally Steven D. Levitt & Thomas J. Miles, *Empirical Study of Criminal Punishment*, in 1 HANDBOOK OF LAW AND ECONOMICS 458–59 (A. Mitchell Polinsky & Steven Shavell eds., 2007) (introducing the authors of the various economic models of crime).

9. See Alfred Blumstein & Daniel Nagin, *The Deterrent Effect of Criminal Sanctions on Draft Evasion*, 28 STAN. L. REV. 241, 259 (1977) (discussing the morality of the Vietnam War and the public opinion's influence on sentencing draft dodgers).

10. See Levitt & Miles, *supra* note 8, at 470–76 (using the scale of imprisonment and capital punishment rates to evaluate and test the economic model of crime).

11. See, e.g., Kenneth I. Wolpin, *An Economic Analysis of Crime and Punishment in England and Wales, 1894–1967*, 86 J. POL. ECON. 815 (1978); Kenneth I. Wolpin, *Capital Punishment and Homicide in England: A Summary of Results*, 68 AM. ECON. REV. 422 (1978).

12. See Isaac Ehrlich, *The Deterrent Effect of Capital Punishment: A Question of Life and Death*, 65 AM. ECON. REV. 397, 397 (1975) [hereinafter Ehrlich, *Deterrent Effect*] (“[P]unishment and law enforcement deter the commission of specific crimes”).

13. Ehrlich, *Deterrent Effect*, *supra* note 12, at 414; see Isaac Ehrlich, *Capital Punishment and Deterrence: Some Further Thoughts and Additional Estimates*, 85 J. POL. ECON. 741, 779 (1977) (using cross-sectional data from 1940 and 1950 and finding a stronger deterrent effect of executions on murder rates—with between twenty and twenty-four murders deterred by one execution).

published numerous articles that were critical of Ehrlich's finding that there was a clear deterrent effect of capital punishment.¹⁴

The Becker theory and the theoretical and empirical work to which it gave rise changed not only the academic study of crime, but also greatly changed criminal justice system policies. Consider two examples. In the mid-1980s, the federal government became persuaded that reducing the variance of criminal sentencing was a good thing. So, Congress provided for the creation of the United States Sentencing Commission ("Commission"), an independent agency of the U.S. Judiciary, as a part of the Comprehensive Crime Control Act of 1984.¹⁵ The Commission undertook a comprehensive review of federal sentencing for individual and corporate crimes and issued (and has since revised) the United States Sentencing Guidelines ("Guidelines").

A notable feature of the Guidelines, much remarked on by those at the *Loyola University Chicago Law Journal* Conference,¹⁶ was its reduction in the discretion allowed to federal judges in their sentencing. The central reason for that move toward more determinate sentencing was not any particular dissatisfaction with the federal judiciary in its role of imposing criminal sanctions. Rather, the articulated reason for the Guidelines was to reduce the variance in those sanctions as a means of conveying a clearer message about the consequences of being convicted of various crimes, and thereby to make the calculation of the expected costs of committing a particular crime easier and, therefore, more deterring.¹⁷

As a second example, consider the recent history of incarceration and crime. In 1980, there were approximately 500,000 prisoners in all state and federal prisons and local jails, and the U.S. incarceration rate (the number of prisoners per 100,000 population) was roughly equal to that of other countries in the developed world. By the early 2000s, the total number of prisoners in the United States was well over two million. That four-fold increase put the United States in the forefront of all

14. See, e.g., Levitt & Miles, *supra* note 8, at 474–76 (refuting the claim that capital punishment acts as an effective deterrent to crime); Peter Passell & John Taylor, *The Deterrent Effect of Capital Punishment, Another View*, 67 AM. ECON. REV. 445, 450 (1977) (concluding that one cannot properly reach the conclusion that capital punishment deters criminal activity based on Ehrlich's evidence).

15. See *An Overview of the United States Sentencing Commission*, *supra* note 7, at 1 ("The United States Sentencing Commission was created by the Sentencing Reform Act provisions of the Comprehensive Crime Control Act of 1984.").

16. The *Loyola University Chicago Law Journal* held its Symposium, entitled "Sentence Structure: Elements of Punishment" on April 4, 2014.

17. *An Overview of the United States Sentencing Commission*, *supra* note 7, at 1–3.

nations in terms of the rate of its incarcerated population. To put the matter dramatically, the United States has approximately 5% of the world's population but has about 25% of the world's prisoners.¹⁸

Because at about the same time that this remarkable increase in incarceration occurred the rate of crime fell dramatically, there was a natural inclination to attribute this decline to the increased use of incarceration. That is, the increase in the level and certainty of sanctions and the subsequent decline in the quantity of crime seemed to indicate the causal connection that the Becker theory had hypothesized. As we shall soon see, this causal connection may be too facile. The causes of the dramatic decline in crime since the early 1990s are complex and various.

II. RECENT LAW-AND-ECONOMICS LITERATURE ON CRIME AND PUNISHMENT

It would be remarkable if there had been no change in the law-and-economics literature on crime and punishment since the outpouring of scholarly literature on that topic in the 1970s. And, indeed, there has been much change. In this Part, I review the academic literature—principally empirical—that has appeared in the last twenty or so years and that has given me cause to reassess the academic beliefs of the inaugural period of law-and-economic scholarship on crime and punishment.

There is one overwhelming reason that academic views of the criminal justice system might have changed. There have been nearly forty years of additional experience and evidence from which to learn about criminals' decisions to commit crimes and the deterrent effect of criminal sanctions. Demographics have changed, making the population older and, therefore, less prone to commit crime. There have been periods of moratorium in the application of the death penalty—nationally from 1972 to 1976, and in Illinois when Governor Ryan suspended the death penalty in 2000.¹⁹ The economy has altered in significant ways, not just in the patterns of boom and bust, but also in the continuing shift away from manufacturing and toward services. The technology of policing and of protection for properties and persons has altered.²⁰ The level of sanctions for such crimes as drug offenses has

18. I shall return to the deterrent effect of longer and more-certain prison sentences in the next Part.

19. Martha Irvine, *Illinois Suspends Death Penalty*, SANDUSKY REG., Feb. 1, 2000, at D-2.

20. See COOTER & ULEN, *supra* note 2, at 489 (explaining that private costs to prevent crime increased from \$65 billion in 1993 to \$100 billion in 2008).

increased and become more certain.²¹ The application of the death penalty and the number of executions have significantly decreased since 2000.²² The number of police per capita deployed in, principally, our urban areas, and the changing techniques for policing, such as the increasing use of statistical reports to identify “hot spots,” have also changed.²³ The discretion in sentencing violators to prison, noted above, has diminished.²⁴ And much else that might have an effect on the level and deterrence of crime has also changed. These changes are so many and so pervasive that it would be astonishing if careful analysis did not reveal some significant alterations in what we know about why, where, and when people commit crimes and whether they can be deterred.

One of the most notable changes of the recent past has been the decline in both violent and non-violent crime that began in the early 1990s and has continued through at least the first decade of the twenty-first century. “Crime rates fell nearly 30 percent between 1991 and 2001, and subsequently fell an additional 22 percent between 2001 and 2012.”²⁵

Scholars have sought to understand what factors might account for this prolonged and significant drop in crime.²⁶ As I noted above, an easy explanatory variable to point to is the increase in the number of violators who were incarcerated. This is based on the theory that those who are in prison cannot commit crime (leading to a drop in the amount of crime, unless they are quickly replaced by others), and that those not in prison, who are contemplating a crime, are deterred by learning of the sanctions imposed on those who were convicted of a crime. Because

21. MELISSA S. KEARNEY ET AL., *THE HAMILTON PROJECT: BROOKINGS INST., TEN ECONOMIC FACTS ABOUT CRIME AND INCARCERATION IN THE UNITED STATES* 9 (2014).

22. *See Death Penalty Facts*, AMNESTY INT’L 3, <http://www.amnestyusa.org/pdfs/DeathPenaltyFactsMay2012.pdf> (last updated May 2012) (noting that death sentences in the U.S. have declined since 2000 and that executions have fallen from ninety-eight in 1999 to thirty-seven in 2008, forty-six in 2010, and forty-three in 2011); *see also* Steven D. Levitt, *Understanding Why Crime Fell in the 1990s: Four Factors That Explain the Decline and Six That Do Not*, 18 J. ECON. PERSP. 163, 175 (2004).

23. *Id.* at 172.

24. *See, e.g., id.* at 178 (providing statistical analysis to claim that increased punishment and its transparency are active deterrents to future crime).

25. KEARNEY ET AL., *supra* note 21, at 4.

26. *See, e.g.,* FRANKLIN E. ZIMRING, *THE GREAT AMERICAN CRIME DECLINE* 120 (Oxford Univ. Press 2007) (stating that the decline in crime in the 1990s and early 2000s had multiple causes that are difficult to disentangle and that until we know why a similar decline occurred in Canada—which has a different criminal justice system from but similar demographics to the United States—we cannot be certain which factors explain the decline in crime).

my central point in this Essay is that I have grown skeptical of the simplistic “sanctions deter crime” hypothesis, let me mention a few pieces of recent scholarship that question that hypothesis generally and its particular role in explaining the drop in crime from 1991 to the present.

In a 2004 article, Steven D. Levitt, one of the most careful students of crime, suggested that, of ten plausible policies that might have accounted for the decline in crime in the 1990s and early 2000s, four of them have some explanatory power while six do not.²⁷ The four factors to which Levitt points as explaining the decline are the following: (1) increases in the number of police; (2) the rising prison population; (3) the receding crack epidemic; and (4) the legalization of abortion in 1973.²⁸ Note that Levitt includes an increase in the number of people incarcerated as one of those factors. In fact, he estimates that increases in expected punishment “can account for a reduction in crime of approximately 12 percent for [homicide and violent crime] and 8 percent for property crime, or about one-third of the observed decline in crime.”²⁹ This is a significant fraction of the explanation. But it is not as great as the explanatory fraction that he and his co-author, John Donohue, attribute to the final factor. In their famous article on that topic, Donohue and Levitt attributed 50% of the decline in crime to the legalization of abortion in January 1973,³⁰ in *Roe v. Wade*.³¹

27. Levitt, *supra* note 22, at 163–64.

28. *Id.*; see COOTER & ULEN, *supra* note 2, at 526–31 (explaining these four factors as well as the six factors that do not help explain the decline: (1) the strong economy; (2) changing demographics; (3) better policing strategies; (4) gun control laws; (5) laws allowing the carrying of concealed weapons; and (6) increased use of capital punishment).

29. Levitt, *supra* note 22, at 177–78.

30. John J. Donohue III & Steven D. Levitt, *The Impact of Legalized Abortion on Crime*, 116 Q.J. ECON. 379, 382 (2001). Of that 50%, Donohue and Levitt attribute half to what they call the “cohort size” effect and half to the “cohort quality” effect. The cohort size effect holds that the decline in the births of young men and women because of the significant increase in the number of legal abortions throughout the 1970s led to there being many fewer eighteen-year-old young men, beginning in 1991 and continuing thereafter. Because young men are disproportionately responsible for crime, the fact that there were fewer of them as a result of *Roe v. Wade* accounts, the authors say, for 25% of the decline in crime that began in 1991. The cohort quality effect arises, Donohue and Levitt claim, because the availability of legalized abortion allows women and their partners to make situation-sensitive decisions about when to have their children. If, for example, a woman becomes pregnant at a time when she has no health insurance, or no job, or no one to help her in child-rearing, she might choose to have an abortion and postpone child-bearing until her circumstances improve. There have been some questions raised about the statistical techniques by which Donohue and Levitt reached their conclusion. See generally William Anderson & Martin T. Wells, *A Bayesian Hierarchical Regression Approach to Clustered and Longitudinal Data in Empirical Legal Studies*, 7 J. EMP. L. STUD. 634 (2010); Christopher L. Foote & Christopher F. Goetz, *The Impact of Legalized Abortion on Crime: A Comment*, 123 Q.J.

Another factor that does not apparently deter serious crime—and contributes to skepticism about the earlier law-and-economic models—is the death penalty. There has been a plenitude of recent scholarship on this matter.³² Recently, John Donohue and Justin Wolfers published two remarkable articles attempting to evaluate the more recent empirical studies of the deterrent effect of the death penalty. Their more recent article concludes:

The important arithmetic of the death penalty is that it can only have a possible useful effect on a very small number of individuals—those that would not be deterred by the prospect of life without possibility of parole but would be deterred by the presence of the death penalty. In other words, if we look at New York—a state with no capital punishment (as of 2004), a large population (19,300,000) and a relatively low murder rate (4.77 per 100,000 people)—we find that 921 murders occurred in 2006. Assuming that 921 roughly represents the number of murderers in New York in 2006, then this represents the maximum number of individuals whose behavior could have been changed in a socially acceptable manner by the presence of a death penalty law (at least under a rational actor model). But against these 921 murderers who might potentially have been deterred by capital punishment, there were about 19,299,000 individuals in New York who were not deterred by the threat of capital punishment (since it was nonexistent and yet they still did not kill). This number is roughly 20,000 times as great as the number of murderers in New York in 2006. If the death penalty has a brutalization effect, then we at least have to think about whether any of the 19,299,000 current nonmurderers might be subject to a malign influence of capital punishment that would work in opposition to any possible benign influence that could potentially influence only 921 individuals.³³

ECON. 407 (2008).

31. 410 U.S. 113, 167 (1973).

32. See, e.g., John J. Donohue III & Justin Wolfers, *Uses and Abuses of Empirical Evidence in the Death Penalty Debate*, 58 STAN. L. REV. 791 (2005); Lawrence Katz et al., *Prison Conditions, Capital Punishment, and Deterrence*, 5 AM. L. ECON. REV. 318 (2003). In a recent op-ed piece, Justin Wolfers notes that the likelihood of actually being executed once a prisoner is on death row is remarkably low. There were, for example, only forty-five executions in 2013 from a nationwide death-row population of approximately 3000 prisoners.

If a death sentence puts you at the back of the queue of 3,000 prisoners to be executed, and only 50 people are executed each year, then it would take you, on average, 60 years to reach the front of the line. Not surprisingly, many die of natural causes while waiting their turn.

Justin Wolfers, *Life in Prison, With the Remote Possibility of Death*, N.Y. TIMES, July 18, 2014, <http://www.nytimes.com/2014/07/19/upshot/life-in-prison-with-the-remote-possibility-of-death.html>.

33. John J. Donohue III & Justin Wolfers, *Estimating the Impact of the Death Penalty on*

The other empirical evidence to which I want to draw attention has to do with the relationship between incarceration and crime. To review, the United States has the highest rate of incarceration of any country in the world. “The incarceration rate in the United States . . . increased during the past three decades, from 220 in 1980 to 756 in 2008, before retreating slightly to 710 in 2012.”³⁴ This rate is more than five times the global average of 130 per 100,000 and more than six times the average rate in the Organization for Economic Cooperation and Development (“OECD”) countries.³⁵ Because there are several things that can cause an increase in incarceration, such as an increase in crime rates, a greater proportion of convictions that result in incarceration than was the case before, and an increase in the average sentence imposed, it is important to note that the principal factor accounting for the four- to five-fold increase in the incarceration rate in the United States since 1980 is policy change. Namely, an increased likelihood that “an arrested offender will be sent to prison, as well as the time prisoners can expect to serve, has increased for all types of crime.”³⁶

We have already seen that Levitt attributed one-third of the decline in nonviolent crime in the 1990s to the increase in incarceration. But one wonders whether the further declines that have occurred since Levitt’s article—another decline of approximately 22%—can be causally linked to increases in incarceration. As we just saw, incarceration increased until about 2007 and has decreased since then. But even after 2007, the decline in crime has continued.³⁷ Could it be the case that at some point between the late 1990s and 2007 we passed the point at which further incarceration could deter crime? If so, that suggests that the

Murder, 8 AM. L. ECON. REV. 249, 296 (2009).

34. KEARNEY ET AL., *supra* note 21, at 9. The next three highest countries are Chile (266), Estonia (238), and Israel (223). An important question, of course, is why the U.S. rates are so much higher. Citing various other sources, Kearney et al. point to three factors: (1) the homicide rate in the U.S. is approximately four times that of other developed countries; (2) U.S. drug policies are much stricter than those in other countries; and (3) sentences, especially for drug offenses, are much longer than in other developed countries. *Id.* at 10.

35. *Id.*

36. *Id.* at 9 (citing STEPHEN RAPHAEL & MICHAEL A. STOLL, WHY ARE SO MANY AMERICANS IN PRISON? (Russell Sage Found. 2013); Steven Raphael & Michael A. Stoll, *Why Are So Many Americans in Prison?*, in DO PRISONS MAKE US SAFER? THE BENEFITS AND COSTS OF THE PRISON BOOM 27–72 (Steven Raphael & Michael A. Stoll eds., 2009)).

37. See *Uniform Crime Reports: Crime in the United States by Volume and Rate per 100,000 Inhabitants, 1993–2012*, FBI, http://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s/2012/crime-in-the-u.s.-2012/tables/1tabledatadecoverviewpdf/table_1_crime_in_the_united_states_by_volume_and_rate_per_100000_inhabitants_1993-2012.xls (last visited Nov. 11, 2014) (showing that the volume and rate of crime per 100,000 residents in the United States have changed significantly over the past twenty years).

relationship between deterrence and crime is more complex than we had imagined.

In a very recent article, Steven Raphael and Michael A. Stoll explored the deterrent effect of the high rate of incarceration in the United States.³⁸ The heart of their study is that there are diminishing returns to the crime-detering effects of incarceration and that the United States has pushed well past the point at which those diminishing returns have set in.³⁹ As a result, they argue, states and the federal government could release significant numbers of prisoners without causing a significant increase in crime.⁴⁰

Raphael and Stoll explore the impact of changes in incarceration on crime by comparing recent experiences in Italy and California.⁴¹

First, consider Italy's experience with sudden prisoner releases to relieve prison overcrowding. In 2006, the Italian Parliament, the Catholic Church, and Pope John Paul II grew concerned about the fact that Italian prisons were operating at 130% capacity, causing significant overcrowding. Parliament passed, on July 31, the Collective Clemency Bill, which "reduced the sentences of most Italian prison inmates convicted prior to May of that year by three years, effective the following day."⁴² As a result, there was a significant decrease in the prison population during August and September 2006, relieving the overcrowding. During the period before and after the clemency, the Italian rate of incarceration—approximately 103 in 100,000 (which was roughly the U.S. rate before 1980) before the pardon⁴³—was much lower than that in the United States, which was roughly 750 in 100,000.

The effect of the clemency on the Italian crime rate was large. There was a sharp increase in the years just after the clemency. "The magnitude of the increase in crime coinciding with the mass prisoner release suggests that on average each released inmate generates fourteen reported felony crimes per year."⁴⁴

This finding is in line with the hypothesis of diminishing marginal

38. STEVEN RAPHAEL & MICHAEL A. STOLL, *THE HAMILTON PROJECT: BROOKINGS INST., A NEW APPROACH TO REDUCING INCARCERATION WHILE MAINTAINING LOW RATES OF CRIME*, (2014) [hereinafter RAPHAEL & STOLL, *REDUCING INCARCERATION*].

39. *Id.* at 13.

40. *Id.* at 9.

41. *Id.*

42. *Id.*

43. *Id.* at 12.

44. *Id.* at 10 (quoting Paolo Buonanno & Steven Raphael, *Incarceration and Incapacitation: Evidence from the 2006 Italian Collective Pardon*, 103 AM. ECON. REV. 2437, 2450 (2013)).

returns to incarceration as a crime-detering strategy. As Raphael and Stoll put it, “[w]hen prisons are used sparingly, incarceration is reserved for the highest-risk and most-serious offenders.”⁴⁵ And prisons were used sparingly in Italy (despite the overcrowding), as the above figure for the incarceration rate showed. That implies that when the mass release occurred, some very serious and high-risk offenders were back in society. There should be no surprise, therefore, that crime rates increased significantly after the implementation of the Collective Clemency Act.

California’s experience with a similar situation is instructive. In the early 2000s, the problem of prison overcrowding was so severe in California that the 156,000 prisoners in the system were twice what the system had been built to handle.⁴⁶ In 2009 a federal appellate panel held that the overcrowding was a violation of the prisoners’ constitutional rights and ordered the State of California to relieve the situation within two years.⁴⁷

California enacted legislation in April 2011 to comply with the court decisions and began implementing reforms in October 2011. Among other correctives, the “legislation halted the practice of revoking parolees back to prison for technical violations and diverted many nonserious, nonviolent, nonsexual offenders to jail sentences and sentences to be served via some form of community corrections.”⁴⁸

The reduction in the prison population in California occurred much more slowly than it had in Italy, but the reduction was just as significant. By May 2013, California had reduced its prison population by 28,000, or 17% since October 2011.⁴⁹ This resulted in a significant

45. *Id.* at 9.

46. *See* *Brown v. Plata*, 131 S. Ct. 1910 (2011) (class action lawsuit on behalf of California prisoners).

47. *See id.* at 1923 (upholding the appellate court decision by a vote of five to four); *see also* Ariane De Vogue, *Supreme Court: California Must Slash Prison Population by At Least 30,000*, ABC NEWS (May 23, 2011), <http://abcnews.go.com/Politics/supreme-court-california-reduce-prison-population-30000/story?id=13666195&singlePage=true> (reporting on the Supreme Court’s decision to alleviate overcrowding in California prisons). The ABC News story also includes a comment by Steve Levitt from the *Freakonomics* blog on that decision’s consequences if that many prisoners were to be released. Steven D. Levitt, *The Supreme Court Provides a Dissertation Topic for a Budding Economist*, FREAKONOMICS (June 1, 2011, 11:27 AM), <http://freakonomics.com/2011/06/01/the-supreme-court-provides-a-dissertation-topic-for-a-budding-economist/> (“California’s violent crime rates should rise about 4 percent relative to the rest of the U.S. over the next few years. That adds up to about 80 extra homicides a year.”) (citing Steven D. Levitt, *The Effect of Prison Population Size on Crime Rates: Evidence from Prison Overcrowding Litigation*, 111 Q.J. ECON. 319, 336–39 (1996)).

48. RAPHAEL & STOLL, REDUCING INCARCERATION, *supra* note 38, at 10.

49. *Id.*

lowering of the incarceration rate. At the time of the passage of the reform legislation, the incarceration rate in California was 426 per 100,000.⁵⁰ By the end of 2012 the incarceration rate (including the approximately 8000 who had been transferred from prison to county jails) was 354 per 100,000, roughly the rate that prevailed in the early 1990s.⁵¹

What was the effect of the prisoner releases on the crime rate in California? Raphael and Stoll found almost no evidence of an increase in violent crime but a modest increase in non-violent property crimes.⁵²

The California crime consequences of prisoner release are less dramatic than might have been predicted and less significant than those that followed the implementation of pardons in Italy. Why the difference? One important difference is that California implemented a more selective and more gradual release program than did Italy (which did exclude from pardon some serious offenders). But almost certainly the most significant difference has to do with the pre-reform incarceration rates and the diminishing marginal crime-reduction gains from imprisonment. Recall that California's pre-release rate was more than four times greater than Italy's pre-release rate, suggesting that California had used incarceration for a broader range of crimes, particularly less serious felonies, than had Italy. This fact, when combined with the more selective California release practices, meant that those most likely to be released from the overcrowded California prisons were less serious offenders and, therefore, less likely to commit crime—particularly violent crime—upon their release. As Raphael and Stoll put it: “[w]hen the incarceration rate is high, the marginal crime-reduction gains from further increases tend to be lower, because the offender on the margin between incarceration and an alternative sanction tends to be less serious.”⁵³

There are important criminal justice system policy implications of these findings. Raphael and Stoll press two strategies: “introduc[ing] a greater degree of discretion into U.S. sentencing and parole practices, and incentiviz[ing] local authorities to reserve prison for those who pose the greatest risk.”⁵⁴ The result, they believe, will be a dramatic lowering of the incarceration rate in the United States without much of

50. *Id.*

51. *Id.* at 10–12.

52. The increase was from roughly 80,000 incidents per month before the reform to approximately 90,000 incidents per month after the reform. *Id.* at 11–12.

53. *Id.* at 9.

54. RAPHAEL & STOLL, REDUCING INCARCERATION, *supra* note 38, at 14.

an increase in the crime rate (and what increase there might be will be in non-violent crime).

III. BEHAVIORAL INSIGHTS AND CRIMINAL SENTENCING

The new empirical evidence on the deterrent effects of the death penalty and the relationship between incarceration rates and crime rates presents strong evidence for being skeptical about deterrence. But there is more evidence—this time from some recent work in behavioral law and economics.

Behavioral law and economics is, I believe, one of the two most important developments occurring in legal scholarship.⁵⁵ It begins with the proposition that real human beings do not often behave as the rational choice theory predicts that they will. Literally hundreds—possibly thousands—of empirical studies support this proposition by showing behavior that is inconsistent with the standard microeconomic assumption that people are rational decision-makers.

There are some well-known standard examples. One that is relevant to decision making regarding crime is overoptimism bias or overconfidence bias. This is the belief that good things are more likely than average to happen to us while bad things are less likely than average to happen to us.⁵⁶ For example, in a famous article, Neil Weinstein reported on an experiment he performed on a sample of students at Rutgers University.⁵⁷ First, he gave each student a list of positive events that might take place in his life and asked each student to estimate the likelihood that each event would happen to him and also to compare that estimate to an estimate of the likelihood that that event would happen to his classmates.⁵⁸ Of the eighteen positive events, such as owning their own home or marrying someone wealthy, the mean respondent estimated his chances to be greater than the average for his

55. For a modern introduction, see generally Thomas S. Ulen, *The Importance of Behavioral Law*, in THE OXFORD HANDBOOK OF BEHAVIORAL LAW AND ECONOMICS 93 (Eyal Zamir & Foron Teichman eds., 2014) (discussing behavioral law and economics).

56. See Russell B. Korobkin & Thomas S. Ulen, *Law and Behavioral Science: Removing the Rationality Assumption from Law and Economics*, 88 CAL. L. REV. 1051, 1091 (2000) (defining “overconfidence bias”).

57. Neil D. Weinstein, *Unrealistic Optimism About Future Life Events*, 39 J. PERSONALITY SOC. PSYCHOL. 806, 809 (1980).

58. *Id.*; see Neil D. Weinstein, *Unrealistic Optimism About Susceptibility to Health Problems*, 5 J. BEHAV. MED. 442, 446 (1982) (explaining a different study that measures overconfidence bias). But see Adam J. L. Harris & Ulrike Hahn, *Unrealistic Optimism About Future Life Events: A Cautionary Note*, 118 PSYCHOL. REV. 135, 136 (2011) (reevaluating the method used to conduct optimism research).

peers in fifteen of the events.⁵⁹ Second, Weinstein asked each student to estimate the likelihood of a range of negative events, such as having a drinking problem or developing cancer, happening to him and to compare that likelihood with an estimate of each negative event's happening to his classmates. The mean response was that these adverse events were less likely to happen to him than to his classmates in twenty-two of twenty-four events.⁶⁰

In another famous study, Lynn Baker and Robert Emery found that although most respondents knew that close to half of all marriages end in divorce, when asked to predict the likelihood that their marriage would end in divorce, the modal response was zero.⁶¹ That may not be surprising, but it is not necessarily what rational choice theory would predict.

The obvious connection to the decision to commit a crime is that criminals, like the rest of us, are overoptimistic about their own likelihood of success and greatly underestimate their own likelihood of failure. As a result, they may, in the language of the Becker model, overestimate the expected benefits of crime or underestimate the probabilities of detection, arrest, and conviction. And these miscalculations may lead them to commit more crimes than would be the case if they had a more accurate estimate of the costs and benefits of their actions.

Paul Robinson of the University of Pennsylvania Law School and John Darley of the Department of Psychology at Princeton University have argued that criminal law does not deter.⁶² More precisely, they believe that the criminal justice system probably does deter crime, but they are very doubtful that specific criminal laws deter crime.⁶³ That is, they want to draw a distinction between such actions as the legislative manipulation of sentence length, which they believe does not have a deterrent effect, and such actions as increasing police patrols or the

59. Weinstein, *supra* note 57, at 810–11.

60. *Id.*

61. Lynn A. Baker & Robert E. Emery, *When Every Relationship Is Above Average: Perceptions and Expectations of Divorce at the Time of Marriage*, 17 LAW HUM. BEHAV. 439, 443 (1993). But who would want to marry someone who had a clear-eyed view of the probability of divorce?

62. Paul H. Robinson & John M. Darley, *Does Criminal Law Deter? A Behavioral Science Investigation*, 24 OXFORD J. LEGAL STUD. 173, 173 (2004); see Paul H. Robinson & John M. Darley, *The Role of Deterrence in the Formulation of Criminal Law Rules: At Its Worst When Doing Its Best*, 91 GEO. L.J. 949, 950–51 (2004) (explaining why the “penalty-setting system” designed by lawmakers is not effective).

63. Robinson & Darley, *supra* note 62, at 174–75.

harshness of prison conditions, which they believe might deter crime.⁶⁴

The authors base their contention on findings in the behavioral sciences.⁶⁵ They write that for criminal law to have a deterrent effect on a potential criminal's conduct choices,

[T]he following three questions must all be answered in the affirmative:

- A. Does the potential offender know, directly or indirectly, and understand the implications for him, of the law that is meant to influence him? . . .
- B. If he does know, will he bring such understanding to bear on his conduct choices at the moment of making his choices?
- C. If he does know the rule and is able to be influenced in his choices, is his perception of his choices such that he is likely to choose compliance with the law rather than commission of the criminal offense? That is, do the perceived costs of non-compliance outweigh the perceived benefits of the criminal action so as to bring about a choice to forgo the criminal action?⁶⁶

Robinson and Darley argue that there is evidence that none of these premises is true.⁶⁷ They report on surveys that they and others have conducted in different states about a limited number of legal rules to ascertain how well a random sample of citizens knows prevailing criminal laws.⁶⁸ One survey of a "target population" (not the general population) of potential offenders found that 18% of them had no idea what the sanctions for several crimes would be, 35% said that they did not pay attention to what the sanction would be, and only 22% thought they knew exactly what the punishment would be.⁶⁹ So, the authors conclude, "people rarely know the criminal law rules."⁷⁰

One might propose that the better dissemination of information about what constitutes criminal activity and about sentencing and other sanctions would be a means of getting people to make better decisions about criminal and legitimate uses of their time. But one of the most

64. Some of the following accounts of Robinson and Darley draw on COOTER & ULEN, *supra* note 2, at 495–96.

65. Robinson & Darley, *supra* note 62, at 174.

66. *Id.* at 175.

67. *Id.* at 175–96.

68. *Id.* at 175–77.

69. *Id.* at 176.

70. *Id.* at 176. They recognize that this may be an overgeneralization. Many people know about important inflection points in the criminal sanctions. For example, the penalties for a given crime jump considerably when a juvenile becomes an adult. So, it should not be surprising to learn that when juveniles pass the age to become an adult, they commit fewer crimes. *Id.* at 176–77.

important articles (and now, a book) in recent legal scholarship—by Omri Ben-Shahar of the University of Chicago Law School and Carl Schneider of the University of Michigan School of Law—persuasively argues that information disclosure has almost no discernible effect on behavior.⁷¹ It has not worked at all in affecting fuel economy decisions by automobile buyers;⁷² it has no discernible impact on people’s health decisions about what to eat, what not to eat, how much to exercise, and the like;⁷³ it has had no good effect and possibly a deleterious effect on decisions regarding retirement savings;⁷⁴ and it has had almost no effect on improving financial literacy.⁷⁵ Given all these failures, it would seem to be a safe prediction that dissemination of information about crimes and sentences would not alter an individual’s behavior.

Robinson and Darley also point out that the overall rate of conviction for crimes is extremely low—approximately 1.3% of all crimes result in a conviction—and the chances of a convicted criminal receiving a prison sentence is about one hundred to one for most offenses.⁷⁶ Many in the general population may not know these facts. Rather, they may believe that the chances of being detected, arrested, and convicted are much higher and are, therefore, deterred from committing crime. But career criminals, their friends, and their relatives are likely to know how low the conviction and punishment rates really are. In short, we know very little about how people inform themselves about the risk of detection, arrest, and conviction of a crime. What little we do know

71. See generally OMRI BEN-SHAHAR & CARL E. SCHNEIDER, *MORE THAN YOU WANTED TO KNOW: THE FAILURE OF MANDATED DISCLOSURE* (Princeton Univ. Press 2014); Omri Ben-Shahar & Carl E. Schneider, *The Failure of Mandated Disclosure*, 159 U. PA. L. REV. 647 (2011).

72. See Ryan Bubb & Richard H. Pildes, *How Behavioral Economics Trims Its Sails and Why*, 127 HARV. L. REV. 1593, 1665–73 (2014) (discussing the effect of behavioral economics and automobile purchasing decisions).

73. See DAN ARIELY, *PREDICTABLY IRRATIONAL: THE HIDDEN FORCES THAT SHAPE OUR DECISIONS* 111 (Harper Collins 2008) (discussing the problem of procrastination and the possible root causes); DOUGLAS E. HOUGH, *IRRATIONALITY IN HEALTH CARE: WHAT BEHAVIORAL ECONOMICS REVEALS ABOUT WHAT WE DO AND WHY* 21–24 (Stanford Econ. & Fin. ed., 2013) (same).

74. See, e.g., Bubb & Pildes, *supra* note 72, at 1630–32 (analyzing the difficulties that tax subsidies and information concerning them causes individuals contemplating and planning retirement).

75. See, e.g., Lauren E. Willis, *The Financial Education Fallacy*, 101 AM. ECON. REV. 429, 430 (2011) (discussing the influence of product information on the financial decisions and knowledge of consumers); Lauren E. Willis, *When Nudges Fail: Slippery Defaults*, 80 U. CHI. L. REV. 1155, 1224 (2013) (claiming that, even if information on consumer products is released, consumers fail to use it to their advantage).

76. Robinson & Darley, *supra* note 62, at 184. “Even the most serious offences [sic], other than homicide, have conviction rates of single digits.” *Id.*

suggests that they do not engage in the processes imagined by rational choice theory and that they are, therefore, likely to be ill-informed about the true risks associated with committing a crime.

One of the most intriguing points that Robinson and Darley make is that the duration of prison sentences may not have a deterrent effect. They note that people adapt fairly quickly to changed circumstances; for instance, there is evidence that within six months of incarceration, prisoners have returned to their pre-incarceration level of subjective well-being.⁷⁷ And there is compelling evidence that in remembering experiences, we all suffer from “duration neglect”—that is, we do not accurately remember the duration of good or bad experiences.⁷⁸

As a result of these psychological findings, it is possible that thoughts of imprisonment may deter those of us who have not been “inside,” but that for those who have been imprisoned, they recall the experience as not as bad as they had anticipated. To the extent that that remembrance informs their own future behavior, incarceration—both because of hedonic adaptation and duration neglect—may not deter them from future criminal activity. And if they communicate their incarceration experience to others in their community who have not been imprisoned that the experience is “not so bad,” then they may undermine the deterrent effect on others that we have heretofore expected criminal sanctions to have.

There is, of course, significantly more research that must be done on these matters, but even at this first blush, these findings from behavioral law and economics strongly suggest that while there may be some or even many people who behave as the rational choice theory proposes,

77. *Id.* at 188–90 (citing Shane Frederick & George Loewenstein, *Hedonic Adaptation*, in WELL-BEING: THE FOUNDATIONS OF HEDONIC PSYCHOLOGY (Daniel Kahneman et al. eds., 1999)). “Hedonic adaptation” refers to the well-established fact that human beings tend to return to their previous level of subjective well-being whenever some event or circumstance pushes them above or below that “set point” of subjective well-being. Researchers are not certain where our “set point” of happiness comes from—for example, from our genes or environment—but they are fairly certain that it is extremely difficult for subsequent events and circumstances to move us away from the set point permanently. For the classic study of this phenomenon, see, e.g., Philip Brickman et al., *Lottery Winners and Accident Victims: Is Happiness Relative?*, 36 J. PERS. SOC. PSYCH. 917, 923 (1978) (discussing the effects certain events have on one’s overall happiness rating).

78. A distinctive aspect of “duration neglect” is that in remembering events, we tend to focus on what happened at the peak or trough of the experience and what happened at the end, not at all focusing on how long the experience lasted. See DANIEL KAHNEMAN, *THINKING, FAST AND SLOW* 380–81 (2011) (explaining the studies that have attempted to measure duration neglect); Donald A. Redelmeier & Daniel Kahneman, *Patients’ Memories of Painful Medical Treatments: Real-Time and Retrospective Evaluations of Two Minimally Invasive Procedures*, 116 PAIN 3, 7 (1996) (same).

those who are most likely to commit crime—because they have committed crime—behave in ways not predicted by rational choice theory. As a result, policies meant to deter rational actors may not adequately deter those most in need of deterrence.

IV. THE DYNAMIC GENOME AND CRIME

To this point, I may have been perceived as walking among you here on the ground. But now I want to take wing to write to you from a great height about some truly remarkable scholarship from a completely different source. I think that there is a good probability that once it develops, this literature may shed some very bright light on human behavior generally and in particular on why some people commit crimes, and how we might influence people not to commit crimes.

I recently organized a panel presentation at the University of Illinois College of Law by four scholars from the University's Institute for Genomic Biology.⁷⁹ The audience—primarily the faculty at the College of Law—was extremely receptive but had to be spoken to non-technically, which the presenters did very articulately. The nub of what they had to say was this: until about ten years ago, most people believed that “DNA is destiny.” As in, we inherit genes from our parents, that those genes influence a great deal of our traits and behavior (somewhere between 40–60%; more with regard to some traits like height), and that the only device at our disposal to change behavior is the environment or context in which people find themselves. At best that environment can only affect about 50% of our behavior. But that effect only lasts, at best, during the life of an individual (unless the effect manages to change the environment permanently or to get embedded in culture).

That account, it turns out, is only half true. One of the most remarkable findings of genomic biology over the last ten or so years is that during an individual's life, the environment or context can have an effect on an individual's genes, and those changes can be passed on to his offspring.⁸⁰

Most of the examples of this “dynamic genome” that the panelists

79. The panel appeared on April 2, 2014, and consisted of Gene Robinson, Director of IGB; Allison Bell, Professor of Animal Biology; Brent Roberts, Professor of Psychology; and Ripan Malhi, Professor of Anthropology.

80. See Gene E. Robinson, *Beyond Nature and Nurture*, 304 *SCIENCE* 397, 399 (2004) (discussing the study of genes and behavior); Gene E. Robinson, *The Behavior of Genes*, N.Y. TIMES, Dec. 13, 2004, http://www.nytimes.com/2004/12/13/opinion/13robinson.html?module=Search&mabReward=relbias%3Aw%2C%7B%221%22%3A%22R1%3A11%22%7D&_r=0 (discussing the ability of gene influence by the environment).

gave us had to do with animals other than humans. But because all genomes are conserved (that is, do the same thing in all organisms), the panelists strongly believe that these examples also explain some human behavior. They referred to some new findings that suggest that some events—such as famine and mistreatment of children—can cause changes in the genes of those who are famished and mistreated that not only affect their behavior throughout their lives, but may also be passed on to their children. That is, simply removing mistreated children from abuse and neglect may not be enough for them to overcome the mistreatment. The results may stay with them throughout their lives and their children's lives and beyond.⁸¹

I think that the implications of these findings for the study of human behavior might be profound.⁸² Many of our current policies in a wide range of matters are premised on the view that changing the external incentives facing decision-makers, or altering the environment or institutional details within which decision-makers act are the key to achieving both socially and individually optimal results. While I do not mean to denigrate these views entirely, it does seem to me to be the case that the discovery of the dynamic genome complicates this tremendously. For example, simply removing individuals from a bad situation or presenting them with a strong external incentive to behave in a different fashion may not be enough if a powerful event has altered their genes and if the altered gene is an important determinant of their behavior. Moreover, to the extent that the altered gene is heritable, the behavior may continue for an additional generation or more.

To connect these thoughts to the central topic of this Essay, I do not suggest that criminal behavior is genetically determined. I do not have the learning to speak on that matter. However, we do know that some behavior is genetically influenced and, crucially, that behavior can influence genes so that there may be influences running from crime and

81. See, e.g., Nathan Nunn & Leonard Wantchekon, *The Slave Trades and the Origins of Mistrust in Africa*, 101 AM. ECON. REV. 3221, 3249 (2011) (stating that the slave trades in Africa have led to significant amounts of distrust, even generations since their occurrence). Arguing that traumas suffered in parts of Africa during the last wave of the slave trade—when, in the late nineteenth century, neighbors and family turned over their acquaintances and family members to the slave traders—gave rise to a culture of mistrust that was transmitted through generations down to the present. That is, long-forgotten events, never directly experienced, can have important repercussions in societies decades later through the transmission of cultural norms and beliefs. *Id.*

82. For a survey of cases in which courts have sought to evaluate how genes may have influenced culpable behavior, see generally Deborah W. Denno, *Courts' Increasing Consideration of Behavioral Genetics Evidence in Criminal Cases: Results of a Longitudinal Study*, 2011 MICH. ST. L. REV. 967 (2011).

punishment to genes and from genes to crime and punishment. In a very real sense, all this suggests how narrow our understanding of human behavior is. There are processes going on within each of us of which we are only dimly aware and may be relatively powerless to alter.

CONCLUSION

I have argued that the simplistic rational choice model of crime and punishment of the 1970s may have outlived its ability to inform our criminal justice policies. The empirical work of the past thirty-five years has presented evidence that some of the deterrence we thought that we were likely to get was not, in fact, forthcoming. Although there are other reasons than deterrence to argue for the death penalty, the evidence is that the threat of capital punishment is not likely to deter many death-eligible homicides. And we appear to have long since passed the point at which incarcerating more criminal offenders achieves significant deterrence. Finally, behavioral studies have presented us with further empirical evidence that those whom we most seek to deter from criminal acts are not likely to be deterred by any of the policies currently in force. In brief, it is time to re-think our accounts of criminal behavior so that we can design policies better suited to deterrence.

I conclude with a cautionary note. We know much less than we need to know about human behavior. Our current tools for influencing that behavior may be no better than were the flint tools that our ancestors used 100,000 years ago to fashion implements when compared to today's highly technical machine tools. At a very minimum, we should be very skeptical of simplistic theories like rational choice theory that have so deeply influenced our criminal sentencing policies over the last forty years. I have a deep fear that 200 years from now humans will look back on what we have been doing over the last forty years in criminal justice with the same mixture of horror and wistfulness with which we look back on criminal policies of the late Middle Ages.