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Hyperbolic Criminals and Repeated Time-Inconsistent Misconduct

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ARTICLE

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I.   INTRODUCTION

Judges and legal scholars have little tolerance for offenders who plea an excuse or ask for reductions in sentences using self-control arguments.[1] There are exceptions: the delusional, who acts out of an "irresistible impulse," may be found not guilty by reason of insanity; the jealous spouse, "reasonably" provoked to murder while "in the heat of passion," may have the charge reduced to involuntary manslaughter.[2] This general skepticism of "weakness of will" arguments is not shared by criminologists, who have produced a large empirical literature showing that low self-control[3] is a principal predictor of criminal misconduct.[4]

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    1.   *See, e.g.*, Stephen J. Morse, *Culpability and Control*, 142 U. PA. L. REV. 1587, 1599–1602 (1994) (arguing against giving too much weight to claims of impulsivity and loss of control in context of criminal excuses); Richard A. Posner, *Rational Choice, Behavioral Economics, and the Law*, 50 STAN. L. REV. 1551, 1568 (1998) (arguing that the criminal justice system should not be designed on the "assumption that the population of potential criminals is dominated by hyperbolic discounters" with self-control problems); *see also* ARISTOTLE, NICOMACHEAN ETHICS bk.VII (350 B.C.E.), *reprinted in* 2 THE COMPLETE WORKS OF ARISTOTLE: THE REVISED OXFORD TRANSLATION 1729, 1818 (Jonathan Barnes ed., 2nd prtg. 1985) (1984) (drawing a distinction between the more morally reprehensible weak-willed incontinent, who "after deliberating fail, owing to their passion, to stand by the conclusions of their deliberation," and the more morally forgivable impetuous incontinent—"keen and excitable people" who "because of the violence of their passions do not wait on reason").

    2.   *See* Parsons v. State, 2 So. 854, 866–67 (Ala. 1887) (stating that an irresistible impulse requires that an offender has "lost the power to choose between the right and wrong, and to avoid doing the act in question, as that his free agency was at the time destroyed" (emphasis omitted)); *see also* MODEL PENAL CODE § 210.3(1)(b) (2001) (explaining that criminal homicide will be downgraded to manslaughter when it "is committed under the influence of extreme mental or emotional disturbance for which there is reasonable explanation or excuse"). *See generally* Dan M. Kahan & Martha C. Nussbaum, *Two Conceptions of Emotion in Criminal Law*, 96 COLUM. L. REV. 269, 272–75 (1996) (discussing ways that emotions are treated in the criminal law); George Loewenstein, *Out of Control: Visceral Influences on Behavior*, 65 ORG. BEHAV. & HUM. DECISION PROCESSES 272, 272–73 (1996) (describing how hot psychological states can highjack a person's ability to effectively deliberate and make rational choices).

    3.   As a general matter, "[s]elf-control problems arise from impulsive behavior" and occur when we "find ourselves making tempting choices against our own better judgment and self-interest." Klaus Wertenbroch, *Consumption Self-Control by Rationing Purchase Quantities of Virtue and Vice*, 17 MARKETING SCI. 317, 318 (1998).

    4.   *See* MICHAEL R. GOTTFREDSON & TRAVIS HIRSCHI, A GENERAL THEORY OF CRIME 232 (1990) (arguing that self-control problems are, "for all intents and purposes, *the* individual-level cause of crime"); Travis C. Pratt & Francis T. Cullen, *The Empirical*

Criminologists posit that offenders with low self-control will often commit crimes while in the pursuit of "short-term, immediate pleasure,"[5] ignoring the consequences of their actions on their future well-being.[6]

A growing empirical literature in economics suggests that people become increasingly impatient the closer that they get to an immediate payoff. Time-inconsistent preferences, or "hyperbolic discounting,"[7] can lead people to experience "internal" intertemporal conflicts: they make repeated short-term decisions to yield to the transient lure of immediate gratification, notwithstanding their long-term preference to be patient.[8] These hyperbolic actors exhibit self-control problems, as they "would 'like' to behave in one manner, but instead 'choose' to behave in another."[9] How often they end up overriding the wishes of their long-run selves will depend on their awareness of their future willpower. Those who are sufficiently aware will take prophylactic action by adopting commitment devices to properly guide their own future behavior; those who are overly optimistic of the resoluteness of their future selves will incur welfare losses each time that they override their long-term preferences.

This Article examines the effect of time-inconsistent preferences on the decisionmaking process of criminal offenders.[10] The idealized rational offenders of the standard law and economics (or neoclassical) approach have time-consistent preferences: the preference of their long-run *and* short-run selves

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Status of Gottfredson and Hirschi's General Theory of Crime: A Meta-Analysis, 38 CRIMINOLOGY 931, 951–53 (2000) (undertaking a meta-analysis and review of empirical literature on self-control theory and finding that the principal predictor of difference between offenders and nonoffenders is their level of awareness of future consequences of their misconduct); James Q. Wilson & Allan Abrahamse, *Does Crime Pay?*, 9 JUST. Q. 359, 372–74 (1992) (discussing the role of self-control problems of criminal activity).

   5.   *See* GOTTFREDSON & HIRSCHI, *supra* note 4, at 93; *see also* JAMES Q. WILSON & RICHARD J. HERRNSTEIN, CRIME AND HUMAN NATURE 194–96 (1985) (discussing the role of offender impulsivity in the decision to violate the law).

   6.   *See* GOTTFREDSON & HIRSCHI, *supra* note 4, at 89 (declaring that low self-control offenders have a "'here and now' orientation," unlike high self-control individuals who are more forward-looking and willing to defer gratification).

   7.   *See* Christopher Harris & David Laibson, *Hyperbolic Discounting and Consumption*, *in* 1 ADVANCES IN ECONOMICS AND ECONOMETRICS: THEORY AND APPLICATIONS, EIGHTH WORLD CONGRESS 258 (Mathias Dewatripont et al. eds., 2003) (describing hyperbolic discount functions and time-inconsistent preferences).

   8.   *See infra* Part III.C (describing evidence on time-inconsistent preferences and effects on overconsumption and procrastination).

   9.   Ted O'Donoghue & Matthew Rabin, *The Economics of Immediate Gratification*, 13 J. BEHAV. DECISION MAKING 233, 233 (2000).

   10.   The term "present-biased preferences" was coined in an earlier article examining self-control problems. *See* Ted O'Donoghue & Matthew Rabin, *Doing It Now or Later*, 89 AM. ECON. REV. 103, 106 n.7 (1999).

will always coincide.[11] A neoclassical offender and a hyperbolic offender will both have a long-term preference to violate the law if and only if the benefits are greater than the expected sanctions, which I will refer to as "worthwhile" crimes. When a neoclassical offender has the opportunity to commit a crime she will not give any added weight to the immediate benefits that the crime would bring. As a result, a neoclassical offender will never override her long-term preference merely because she has become more impatient. However, this Article shows that even a relatively *small* preference for immediate gratification and overoptimism about their future self-control can lead hyperbolic criminals to repeatedly commit "nonworthwhile" crimes—those crimes that from a long-term perspective have negative expected returns. This phenomenon of *time-inconsistent misconduct* is foreclosed by the standard assumptions of neoclassical theory, but is one with important implications for questions of optimal deterrence and the problem of repeated criminal misconduct.

We can generally say that a person "overconsumes" a product or good whenever the transient, short-term pull of immediate gratification leads that person to override their more detached, nondistorted, long-term preference not to purchase, use, or otherwise consume the good. Therefore, the Article's principal argument is that the prospect of grabbing the immediate rewards from misconduct can lead a hyperbolic offender to consciously "overconsume" (commit) nonworthwhile crimes, in the same manner that she may be tempted to overconsume in other areas of her life, for example, food, cigarettes, leisure, income, and illicit affairs.[12]

In fact, in recent years, economists have found that relaxing the time-consistent assumption of neoclassical economics allows for more intuitive, less strained explanations of such matters as why people undersave for retirement, rack up large credit card balances, become addicted to drugs and cigarettes, and procrastinate leaving the unemployment and welfare rolls. Given the criminology findings on the self-control problems of criminals, there is no reason to believe that a person's decision to violate the

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11. *See* RICHARD A. POSNER, ECONOMIC ANALYSIS OF LAW 219–20 (6th ed. 2003) (asserting that individuals commit crimes when the expected benefits exceed expected costs).

12. In fact, the criminology literature on self-control makes important use of the fact that criminals who exhibit low self-control in their criminal activity also have similar problems in other areas of their lives in which they can grab immediate benefits. *See* GOTTFREDSON & HIRSCHI, *supra* note 4, at 89–91 (observing that people lacking self-control often "have unstable marriages, friendships, and job profiles" as well as displaying a high rate of smoking, alcohol use, and involvement in accidents).

law is exempt from the same underlying dynamics. In short, the time-inconsistent misconduct theory I develop can help explain why many criminal offenders engage in what, to criminologists and lay observers alike, appears as irrational, self-destructive behavior.[13]

This Article has two principal objectives. The first is to develop a theory that isolates four factors that will affect whether offenders engage in repeated time-inconsistent misconduct: (1) an offender's level of present-bias; (2) her awareness of the true magnitude of her future resoluteness or willpower to keep to her long-term preferences; (3) the availability of cost-effective "commitment devices" to help offenders overcome the pull of immediate gratification; and (4) the extent to which criminal sanctions and enforcement efforts directly target the short-term, time-inconsistent preferences of offenders. In the end, any theory has to be open to empirical testing; identifying these four factors will help in this endeavor.

This Article's second objective is to identify various mechanisms available to policymakers to efficiently deter repeated time-inconsistent misconduct. The key insight is that a hyperbolic offender will be underdeterred—will make short-term decisions to commit nonworthwhile crimes—whenever the immediate benefits from misconduct (with the added weight due to the offender's present-bias) are less than the delayed criminal sanctions. It thus follows that one way to deter time-inconsistent misconduct is through enforcement policies that directly reduce the immediate benefits (or increase the immediate costs) of criminal activity. Alternatively, criminal sanctions have to be set high enough to overcome the added weight that a hyperbolic offender gives to immediate benefits. One of the contributions of this Article is showing that, all other things being equal, the optimal sanctions of the neoclassical approach will underdeter hyperbolic offenders. The Article also suggests a series of less obvious policy approaches to time-inconsistent misconduct, such as providing offenders with "off-the-rack" commitment devices. Finally, the theory also helps explain various puzzles of neoclassical deterrence theory—for example, why policymakers punish repeat offenders more harshly and increase enforcement expenditures before resorting to increasing sanctions to the maximum extent feasible, as well as why, in some areas, people violate the law much less frequently than predicted by neoclassical models.

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13. *See id.* at 89–90 (describing long-term and short-term self-harm by offenders with low self-control).

Part II of this Article describes the relevant features of neoclassical deterrence theory and several empirical puzzles that follow. Part III develops the concept of time-inconsistent misconduct. Among other things, it shows that even small levels of present-bias can lead to repeated nonworthwhile misconduct. Part IV revisits the neoclassical puzzles. In doing so, it shows that the optimal sanctions prescribed by neoclassical theory will necessarily underdeter hyperbolic offenders and that, in choosing the optimal sanctions for such offenders, lawmakers must target these offenders' short-term preference for immediate gratification. Part V describes various criminal law implications of the time-inconsistent misconduct theory, including describing how the theory helps explain criminal law rules dealing with conspiracies, entrapment, and domestic violence. Part VI provides conclusions.

II. THE NEOCLASSICAL THEORY OF CRIMINAL MISCONDUCT

The dominant theory of criminal behavior and deterrence, at least among policymakers and a large number of legal commentators, is based on the principles of punishment proposed by British philosopher Jeremy Bentham in the late eighteenth century.[14] Bentham's basic insights were formalized by economist Gary Becker in his seminal article, *Crime and Punishment: An Economic Approach*,[15] and further elaborated by law and economics scholars.[16] This section describes the general assumptions and conclusions of the law and economics approach.

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14.   *See* JEREMY BENTHAM, AN INTRODUCTION TO THE PRINCIPLES OF MORALS AND LEGISLATION 158–59 (J.H. Burns & H.L.A. Hart eds., Athlone Press 1970) (1789). Bentham, in turn, was influenced by the earlier work of Cesare Beccaria. *See id.* at 166 (citing to Beccaria when discussing gravity of punishments).

15.   *See* Gary S. Becker, *Crime and Punishment: An Economic Approach*, 76 J. POL. ECON. 169, 191–95 (1968) (incorporating Bentham's ideas into a discussion regarding the optimal amount of criminal sanctions).

16.   *See, e.g.*, POSNER, *supra* note 11, at 4 (recognizing Becker's work as a fundamental aspect of applying economic reasoning to a broad range of legal questions); Nuno Garoupa, *The Theory of Optimal Law Enforcement*, 11 J. ECON. SURV. 267, 267–69 (1997) (acknowledging Becker in discussion of the optimal law enforcement model); Richard A. Posner, *An Economic Theory of Criminal Law*, 85 COLUM. L. REV. 1193, 1194 (1985) (arguing that Becker's theory can be extended to various areas of substantive criminal law).

A. The Rational Choice Assumption

The neoclassical model assumes that offenders are rational,[17] value-maximizing actors who choose to violate the law if and only if the benefits from the crime are greater than the expected costs.[18] Because offenders know that they may escape detection, they make their cost-benefit analyses using *expected* sanctions, which they calculate by multiplying the gross sanctions by the probability that they will be caught and punished. For example, if the monetary fine for speeding is $200, and a person believes that the probability[19] that she will be caught is 10%, the expected fine is $20.

Violating the law can provide an offender with both monetary and intangible benefits,[20] and will expose her to formal and informal sanctions—not only fines and imprisonment but also shaming, ostracism, and loss of reputation.[21] In addition to these delayed sanctions, there are a series of more immediate costs of criminal activity, such as the effort and time to prepare for, execute, and cover up a crime.[22] The neoclassical approach focuses almost exclusively on fines and imprisonment.[23] However, as we will see, the immediate costs of engaging in misconduct can

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17.   *See* POSNER, *supra* note 11, at 219–20 (stating that the economic approach to deterrence assumes that offenders are rational actors). For a discussion of some of the general limitations of the rational choice approach in the context of venture capitalists, see Manuel A. Utset, *Reciprocal Fairness, Strategic Behavior & Venture Survival: A Theory of Venture Capital-Financed Firms*, 2002 WISC. L. REV. 45, 128–30 (2002).

18.   *See* A. Mitchell Polinsky & Steven Shavell, *The Economic Theory of Public Enforcement of Law*, 38 J. ECON. LIT. 45, 47 (2000) (suggesting that a person will violate the law if and only if the expected utility from doing so, taking into account the expected benefits and sanctions, exceeds the utility that she would get from obeying the law).

19.   *See* STEVEN SHAVELL, FOUNDATIONS OF ECONOMIC ANALYSIS OF LAW 503–04 (2004) (noting that, for deterrence purposes, an offender's belief of the probability of detection is more important than the actual probability).

20.   *See* POSNER, *supra* note 11, at 219 (stating that the benefits from criminal misconduct include "various tangible (in the case of crimes of pecuniary gain) or intangible (in the case of so-called crimes of passion) satisfactions from the criminal act"). Because there is always a chance that the benefits will not materialize, offenders will discount the gross benefits from violating the law to account for this risk. *See* Wilson & Abrahamse, *supra* note 4, at 367–68, 375 (finding that criminals consistently miscalculate the net expected benefits of committing crimes). Throughout the Article I refer to "benefits" instead of expected benefits because my primary concern is with immediate benefits.

21.   *See, e.g.*, Dan M. Kahan, *What Do Alternative Sanctions Mean?*, 63 U. CHI. L. REV. 591, 637–47 (1996) (discussing the role of shaming in deterring criminal behavior and effecting other potential goals of punishment).

22.   *See* Chris William Sanchirico, *Detection Avoidance*, 81 N.Y.U. L. REV. 1331, 1352–60 (2006) (discussing empirical evidence on avoidance costs incurred by offenders).

23.   *See, e.g.*, *id.* at 1348–50 (arguing that the neoclassical approach has paid little attention to avoidance costs).

play an important role in a hyperbolic offender's decision-making process.

B. *Choosing Socially Optimal Criminal Sanctions*

All punishment theories provide some account of why society should punish offenders and prescriptions for choosing the type and magnitude of criminal sanctions. The neoclassical approach posits that the sole aim of punishment is to maximize social welfare. In order to accomplish this, policymakers would, at least in theory, follow the following four steps.[24]

First, they would identify harmful activities to be outlawed and the level of harm produced. The general aim is to deter offenders from engaging in behavior that produces greater social harm than benefits, not necessarily to foreclose all criminal activity. Some crimes, like murder, rape, and armed robbery, require total deterrence because they produce harm that is so serious in nature that it trumps any plausible legitimate benefits to criminals.[25] However, there are a series of less harmful offenses, including regulatory crimes that, while serious, do not necessarily call for total deterrence—at least not from an economic standpoint.[26]

Second, policymakers would choose the actual magnitude of the sanctions. When crimes call for total deterrence, penalties can be set at a level that greatly exceeds the benefits that offenders would hope to receive, given that there is no danger of overdeterring offenders. In all other cases, policymakers would set the expected sanctions equal to the expected harm of the illegal behavior. This would assure the correct economic result because, by assumption, rational offenders violate the law only when the benefits from misconduct exceed expected sanctions, and thus setting sanctions equal to the expected harm guarantees that offenders will fully internalize the costs of their actions. This means that, in theory, offenders will commit crimes

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24.   *See* Becker, *supra* note 15, at 181–85 (describing the goal of minimizing the social costs of crimes).

25.   In order to affect complete deterrence, these crimes require the maximal sanction. *See* POSNER, *supra* note 16, at 1196-97, 1215-16 (discussing criminal activity, much falling under the rubric of common law crimes, that society has determined calls for total deterrence).

26.   In fact, the law and economics approach to criminal sanctions is based on the same general principles used to determine the optimal damages for torts, where the goal is to provide actors with the right incentives when choosing their activities and level of care, rather than completely dissuading them from engaging in those activities. *See* SHAVELL, *supra* note 19, at 474–79 (discussing analogous strict liability and fault-based rules in tort and criminal law contexts).

only when their actions produce a net gain for society; that is, only when their net expected benefits (after taking the expected sanctions into account) are at least as great as the social harm.[27] For example, if discharging pollutants into a stream produces a harm equal to $1,000, and there is a 50% probability that an offender will be detected and punished, then the optimal fine is $2,000.[28] This will assure that the expected sanctions and harm both equal $1,000, and that a utility-maximizing offender will pollute if and only if the benefits she receives exceed the harm produced.[29]

Third, policymakers would need to determine *how* to punish offenders. As mentioned above, the neoclassical approach focuses on fines and imprisonment.[30] However, the general insights of the approach can be extended to other types of nonmonetary sanctions.[31] As a general matter, fines, which are essentially a transfer of wealth from offenders to society, have lower administrative costs and deadweight losses. Crimes punished by imprisonment require greater procedural protections, and thus expenditures, during trial and impose ongoing administrative costs of running prisons. Imprisonment creates other deadweight losses by keeping inmates from being economically productive and, if the prison term is sufficiently long, diminishing valuable human capital that inmates could use for employment after parole.[32] As a result, all other things being equal, the neoclassical approach prescribes that policymakers should resort to prison sentences[33] only if the targeted offenders would be unable to pay the optimal fines.

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27. *See* Becker, *supra* note 15, at 181–85 (calculating aggregate welfare by taking into account the benefits offenders receive from their criminal activity).

28. As a general matter, suppose that an offense produces a harm, h, and the probability of detection is p. When the sanction, s, is discounted by p—$p * s$—and if we set $p * s = h$, then the optimal sanction is reached by multiplying the harm by the probability multiplier $1/p$. Therefore, the optimal sanction is h/p.

29. If polluting would yield a benefit of $1,500, the company will pollute and face the expected fine of $1,000. If the company is detected, it will have to pay the $2,000 fine, but as there is only a 50% chance of this, the expected net benefit is $500.

30. *See* A. Mitchell Polinsky & Steven Shavell, *The Optimal Use of Fines and Imprisonment*, 24 J. Pub. Econ. 89, 89–90 (1984) (discussing various ways of trading off monetary fines and prison terms).

31. *See* Polinsky & Shavell, *supra* note 18, at 47 n.6 (stating that their economic analysis of jail terms carries over to other sanctions such as probation, electronic monitoring, and community service).

32. *See* Posner, *supra* note 11, at 223 (arguing that imprisonment causes a depreciation of skills and a loss of contacts that impairs a convict's productivity post-parole and thus causes depreciation in the convict's human capital).

33. *See* Polinsky & Shavell, *supra* note 18, at 51 (stating that sanctions via fines should be exhausted first before using prison sanctions because fines are wealth transfers and are generally cheaper to collect than the social costs of imprisonment); *see also*

Fourth, because expected sanctions are a function of both the gross penalty and the probability of detection, policymakers would choose how much to spend to detect criminal activity and apprehend offenders.[34] Because the normative goal of neoclassical theory is to minimize the social costs of criminal deterrence, policymakers would expend resources to increase the probability of detection only if the same level of deterrence cannot be achieved more cheaply by increasing the magnitude of the gross sanctions. It follows that they would invest in enforcement only if wealth-constrained offenders are unable to pay the optimal fine, or if preventing crimes from occurring is more cost-effective than using prison sentences after the fact.[35]

In conclusion, the neoclassical approach prescribes that policymakers should identify the type and magnitude of harm that they want to deter. Next, they would set the expected sanctions equal to the expected harm and, in doing so, will choose the type of sanction. Finally, policymakers would determine how much of the desired deterrence will be affected through the gross penalty and how much through enforcement measures aimed at increasing the probability that offenders will be caught and punished.

C. *Some Puzzles and Problems of the Neoclassical Approach*

Proponents of the neoclassical approach assert that they are providing a positive account of the way criminals and policymakers actually behave, not just a normative framework

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SHAVELL, *supra* note 19, at 482 (discussing underdeterrence when offenders do not have sufficient levels of wealth to pay fines necessary to properly deter them).

34. Not all increases in enforcement costs will provide a sufficiently high return in reducing the harm from misconduct; thus, to economize these costs, society will sometimes opt for underdeterrence. If there is underdeterrence, then it does not follow that when a criminal is observed in misconduct, social welfare is increased. *See* SHAVELL, *supra* note 19, at 488–89 (arguing if there is underdeterrence, the fact that someone engaged in misconduct does not signal that her expected benefit exceeds the expected harm).

35. If the expected harm of an offense is $1,000 and offenders can afford up to a $100,000 fine, the probability of detection should be 1% and the actual fine $100,000. Assuming that the administrative costs of fines do not increase with the level of the fine (which will not always be the case because offenders facing higher fines may attempt to hide assets), any investment in enforcement that increases the probability of detection above 1% would be wasteful. This was one of the important insights in Gary Becker's work on optimal criminal deterrence. *See* Becker, *supra* note 15, at 190–93 (describing the trade-off between the magnitude of sanctions and enforcement expenditures to increase probability of detection); *see also* Lucian Arye Bebchuk & Louis Kaplow, *Optimal Sanctions When Individuals Are Imperfectly Informed About the Probability of Apprehension*, 21 J. LEGAL STUD. 365, (1992) (describing the optimal trade-off between higher sanctions and enforcement costs when offenders are imperfectly informed of probability of detection).

and policy prescriptions. This section describes a number of well-known puzzles (or problems, depending on the normative lens employed) with the positive claims of neoclassical theory, and sets forth some additional empirical wrinkles and explanatory "gaps." As we will see, beginning in Part III, these puzzles (or problems) are the result of the time-consistency assumption and disappear if one allows for hyperbolic offenders.

1. The Puzzle of the Overdeterrence of Serial Offenders. This Article is primarily concerned with "serial offenders": those who commit more than one crime over time, including—although not exclusively—those who have been previously convicted of a crime.[36] Serial misconduct is a common phenomenon. For example, a large number of prison inmates are either repeat offenders or have been reincarcerated for parole violations.[37] In 2002, 46% of prison inmates were repeat nonviolent offenders and 41% repeat violent ones.[38] Additionally, many types of crimes afford offenders with repeated opportunities to violate the law. For example, employees who embezzle funds often do so repeatedly and over extended periods. Co-conspirators in criminal enterprises and members of gangs engage in a variety of repeated criminal activity over long periods of time. Managers who falsify financial results usually do so in more than one reporting period and may over time resort to other fraudulent transactions to cover up the false disclosure. More generally, serial misconduct is common in securities, antitrust, and environmental law, as well as in a number of other regulatory contexts.[39]

As a result, one would expect that any comprehensive theory of criminal misconduct would account for serial misconduct. Under the neoclassical approach, the optimal expected sanctions are solely determined by the harm produced when an offender violates the law, which (all other things being equal) will be the

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36. Ehud Guttel & Alon Harel, *Matching Probabilities: The Behavioral Law and Economics of Repeated Behavior*, 72 U. CHI. L. REV. 1197, 1198 (2005) (stating that the standard law and economics approach to repeated misconduct has "long assumed that whether choices are made repeatedly or on a one-time basis is expected to have little or no effect on individuals' decisions").

37. *See, e.g.*, James A. Wilson, *Bad Behavior or Bad Policy? An Examination of Tennessee Release Cohorts, 1993–2001*, 4 CRIMINOLOGY & PUB. POL'Y 485, 496–98 (2005) (discussing a Tennessee Department of Correction report that overall return rates for offenders released to parole increased from 40.5% in 1993 to 48% in 1997).

38. DORIS J. JAMES, BUREAU OF JUDICIAL STATISTICS, NCJ 201932, PROFILE OF JAIL INMATES, 2002, at 1 (2004), *available at* http://www.ojp.usdoj.gov/bjs/pub/pdf/pji02.pdf.

39. *See infra* notes 40-43 (discussing penalty schemes for repeated violations in regulatory context).

same across offenders and regardless of the number of times the crime is committed. In other words, a utility-maximizing offender will commit a crime ten times (or equivalently, ten offenders will each commit it once) only if, in each instance, the benefits are greater than the expected sanctions (and thus greater than the harm produced). Since for the purpose of setting optimal sanctions all instances of the same crime are identical, the neoclassical approach does not draw a distinction between the one-time and serial offender.

Lawmakers, however, do. The law routinely punishes previously convicted offenders and those who commit more than one crime before being caught (whether or not previously convicted) with "super-punitive" expected sanctions.[40] In other words, serial offenders face sanctions that are greater than the aggregate expected harm created by repeatedly engaging in prohibited activity[41] or delaying compliance with legally-imposed duties.[42] Proponents of the neoclassical approach acknowledge that super-punitive sanctions will overdeter rational offenders—some socially beneficial misconduct will not occur[43]—and have

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40. The Federal Sentencing Guidelines Manual provides for heightened sanctions for repeat and career offenders. *See* U.S. SENTENCING GUIDELINES MANUAL § 4A1.1 (2006) (allowing for the addition of points to criminal history dependent upon the type and length of prior sentence); *id.* at § 4B1.1 (2006) (adjusting the offense level for career offenders). Under the Immigration Reform and Control Act, the range of penalties for a first-time offender are $250 to $2,000; for a second-time offender they are $2,000 to $5,000; and for a third-time offender they increase to $3,000 to $10,000. Immigration Reform and Control Act of 1986 § 101, 8 U.S.C. § 1324a(e)(4)(A) (2000). In addition, a person who engages in a pattern of violation of the Act can also be subject to a six-month jail sentence. *See* 8 U.S.C. § 1324a(f)(1). Environmental statutes, such as the Clean Water Act and the Clean Air Act, also have provisions for escalating criminal penalties for repeat offenders. Under the Clean Water Act, the available penalties are doubled after a first conviction. Water Quality Act of 1987 § 312, 33 U.S.C. § 1319(c)(1), (2) (2000) (stating that negligent violators face a maximum of $25,000 per day and a one year jail sentence, knowing violators face maximum of $50,000 per day and three year jail sentence for first conviction and providing that the sanctions for second offenses in each can be doubled); *see also* Clean Air Act § 701, 42 U.S.C. § 7413(c)(1) (2000) (allowing maximum sanctions for second offense to be double those for first offenses).

41. *See, e.g.*, United States v. Technic Servs., Inc., 314 F.3d 1031, 1047–48 (9th Cir. 2002) (affirming sentence enhancement for defendant's violation of Clean Water Act for repeatedly washing asbestos down drain that discharged into bay); United States v. Liebman, 40 F.3d 544, 549–51 (2d Cir. 1994) (agreeing that a sentence can be enhanced for "ongoing and repetitive discharge" of a hazardous substance).

42. *See, e.g.*, Water Quality Act of 1987 § 312, 33 U.S.C. § 1319(c)(2) (2004) (stating that each one-day delay in complying with the agency's order is an act of misconduct, triggering daily fines between $5,000 and $50,000, regardless of the connection between the ongoing delay and the harm caused by the violation being remedied).

43. *See* A. Mitchell Polinsky & Steven Shavell, *On Offense History and the Theory of Deterrence*, 18 INT'L REV. L. & ECON. 305, 307 (1998) (admitting that escalating sanctions may overdeter some criminal behavior). A similar argument holds for the use of punitive damages in tort. *See Punitive Damages, in* 3 THE NEW PALGRAVE DICTIONARY OF

offered various possible explanations for the continued use of escalating sanctions.[44] However, they have not reached any real consensus as to why lawmakers systematically violate such a core neoclassical principle, and at least one commentator has argued that under neoclassical assumptions, aggregate sanctions for repeat offenders should in fact be *lower* than the aggregate harm.[45]

    2.   *The Puzzle of Systematic Underdeterrence*. One plausible explanation for why serial offenders are punished with super-punitive damages is that lawmakers believe that existing criminal sanctions are not having the desired deterrence effect. Some offenders, the argument would go, are simply not reacting to sanctions in the manner predicted by neoclassical theory.[46] One can fairly assume that a lawmaker who concludes that offenders are being systematically underdeterred will ratchet the sanctions up until the deterrence gap is closed.[47]

ECONOMICS AND THE LAW 192, 193 (Peter Newman ed., Macmillan Ref. Ltd. 1998) ("[I]f damages are less than harm, levels of activity will tend to be socially excessive, and if damages exceed harm, levels of activity will tend to be low.").

    44.   *See* POSNER, *supra* note 11, at 228–29 (noting several reasons why higher sanctions make sense, including to offset the reduced stigma effect from a second conviction and to counteract the learning-by-doing of repeat offenders); C.Y. Cyrus Chu, Sheng-Cheng Hu & Ting-Yuan Huang, *Punishing Repeat Offenders More Severely*, 20 INT'L REV. L. & ECON. 127, 130–31 (2000) (arguing that because the risk of an erroneous conviction is greater for a first conviction, the penalty for a first conviction is set lower than the expected harm); Polinsky & Shavell, *supra* note 43, at 308–09 (arguing that punishing repeat offenders more severely increases the level of deterrence because a first-time offender will take into account the expected sanctions for both the first and second offense).

    45.   *See* David A. Dana, *Rethinking the Puzzle of Escalating Penalties for Repeat Offenders*, 110 YALE L.J. 733, 742 (2001) (arguing that the probability of detection increases with prior convictions because convicted offenders leave a paper trail in system; therefore, optimal sanctions should be lower for previously convicted offenders).

    46.   A number of criminal law scholars have persuasively argued that in practice, this approach has led to repeated increases of criminal sanctions without achieving the deterrence lawmakers desired. *See, e.g.*, John M. Darley, *On the Unlikely Prospect of Reducing Crime Rates by Increasing the Severity of Prison Sentences*, 13 J.L. & POL'Y 189, 193–95 (2005) (describing the problem of underdeterrence notwithstanding ever-increasing prison sentences).

    47.   There are two reasons why policymakers may intentionally adopt sanctions that underdeter offenders. The first reason is that risk averse offenders will be overdeterred by the optimal sanctions for risk neutral offenders. Risk averse offenders would prefer lower actual sanctions and a higher probability of being caught, given that if they are caught, the extra disutility to them from the higher sanctions is a deadweight loss. For example, if the actual fine is $100,000, a risk averse person who is caught will perceive a loss greater than $100,000, but society will only get the $100,000 fine. As a result, policymakers who believe that the population is comprised of more risk averse than risk neutral individuals will adopt lower sanctions. Second, policymakers may want to adopt expected sanctions that are slightly lower than the expected harm, up to the point that the savings in enforcement costs are greater than the marginal harm that is not deterred. *See* SHAVELL,

One neoclassical explanation for this perceived underdeterrence is that, as mentioned above, offenders who are financially unable to pay the optimal fine will be underdeterred; such offenders are, in essence, "judgment-proof." However, the question remains why those offenders would also be underdeterred by prison sentences.[48] The perception by lawmakers that some offenders are not just judgment-proof but also "prison-proof" is what has led states to adopt three-strikes laws. The Supreme Court recognized as much when it refused to strike down California's three-strikes law in *Ewing v. California*, explaining that California's legislature made a "deliberate policy choice that individuals who have repeatedly engaged in serious or violent criminal behavior, and whose conduct has not been deterred by more conventional approaches to punishment, must be isolated from society in order to protect the public safety."[49]

The emergence of three-strikes laws is not the only indication that many lawmakers believe that there is a deterrence gap. Since the early 1970s, the average prison sentence in the United States nearly tripled in length,[50] and the number of inmates in prison increased from 216,000 to over 2,000,000.[51] Even taking into account population growth, we are currently incarcerating about four times as many offenders as in 1970.[52] Given present rates of incarceration, of all the individuals born in 1991 and 2001, approximately 5.2% and 6.6%, respectively will serve time in prison.[53]

Moreover, in the last twenty years, lawmakers have repeatedly ratcheted up both fines and prison sentences for white collar criminals, in a number of instances triggered by corporate "scandals"[54]—a word that, by definition, implies that lawmakers

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supra note 19, at 484–85 (illustrating the relationship between a low probability and high magnitude sanction policy).

    48.   *Id.* at 495 (noting that an actor whose benefit exceeds the maximum imprisonment time will not be deterred).

    49.   Ewing v. California, 538 U.S. 11, 24 (2003).

    50.   Darley, *supra* note 46, at 190.

    51.   THOMAS P. BONCZAR, U.S. DEP'T OF JUSTICE, PREVALENCE OF IMPRISONMENT IN THE U.S. POPULATION, 1974–2001, at 1 (2003), *available at* http://www.ojp.usdoj.gov/ bjs/pub/pdf/piusp01.pdf (listing the number of individuals incarcerated in 1974 as 216,000); PAIGE M. HARRISON & ALLEN J. BECK, U.S. DEPARTMENT OF JUSTICE, PRISONERS IN 2005 (2006), *available at* http://www.ojp.usdoj.gov/bjs/pub/pdf/p05.pdf (listing the number of individuals incarcerated in 2005 as 2,320,359).

    52.   Darley, *supra* note 46, at 190.

    53.   BONCZAR, *supra* note 51, at 1.

    54.   Enacted in the wake of Enron and Worldcom, the Sarbanes-Oxley Act provides for enhanced criminal penalties for white-collar offenders. *See* Sarbanes-Oxley Act of 2002, Pub. L. No. 107-204, § 807, 116 Stat. 745, 800 (2002) (codified at 18 U.S.C. § 1348) (detailing corporate and criminal fraud accountability); Sarbanes-Oxley Act of 2002, Pub.

and the public were "surprised" by the ineffectiveness of existing sanctions.[55] This sense of surprise is captured by Alan Greenspan's post-Enron "infectious greed" testimony before Congress:

> Why did corporate governance checks and balances that served us reasonably well in the past break down? . . . An infectious greed seemed to grip much of our business community. Our historical guardians of financial information were overwhelmed. . . . It is not that humans have become any more greedy than in generations past. It is [that] the avenues to express greed had grown so enormously.[56]

Under neoclassical theory, an offender may also be underdeterred if she was somehow mistaken about the true magnitude of the gross sanctions or the probability of detection. This explanation has three shortcomings. First, most of the perceived underdeterrence involves repeat offenders, the very type of offender who is least likely to make systematic mistakes of this type, given that each conviction provides her with information about the expected sanctions. Second, it does not explain why these mistaken beliefs will necessarily lead to systematic underdeterrence. In other words, it is just as likely that offenders will be mistaken in the opposite direction and be overdeterred. Third, even if one assumed that offenders were underdeterred, it does not explain why policymakers would

L. No. 107-205, §§ 902–905, 116 Stat. 745, 804 (codified at 18 U.S.C. §§ 1341, 1343, 1349, and 29 U.S.C. § 1131) (providing penalty enhancements for white collar crime); Sarbanes-Oxley Act of 2002, Pub. L. No. 107-205, § 1106, 116 Stat. 745, 807 (codified at 15 U.S.C. § 78ff) (providing penalties for any person who willfully and knowingly provides false and misleading statement to the Securities Exchange Commission). This exposes an additional puzzle of the neoclassical approach: the fact that lawmakers routinely adopt imprisonment sanctions for offenders, such as white-collar criminals, who have sufficient disposable wealth to pay optimal fines. *See* Garoupa, *supra* note 16, at 271 (explaining that in the United States, and much less in Europe, policymakers resort to prison sentences before exhausting fines).

    55.   *See, e.g.*, 107 CONG. REC. H5470 (daily ed. July 25, 2002) (statements of Rep. Crowley) (recognizing that the bill "punishes criminal acts by greedy CEOs," and "will ensure the independent auditors of America's publicly traded corporations are actually independent"); *id.* (statements of Rep. Wilson) (observing that "we have had some greedy people who cooked the books" and concluding that the legislation is necessary "to restore confidence in the American system of free enterprise"); 107 CONG. REC. H5468 (daily ed. July 25, 2002) (statements of Rep. Sanders) (propounding that if Congress is "serious about tackling corporate greed," they need to go further than Sarbanes-Oxley); 107 CONG. REC. H5466 (daily ed. July 25, 2002) (statements of Rep. Kelly) (noting that the bill will help "mend the bonds which have been abused by the people who have been motivated by greed").

    56.   *Federal Reserve's Second Monetary Policy Report for 2002: Hearing Before the Comm. on Banking, Housing, & Urban Affairs*, 107th Cong. 11 (2002) (statement of Alan Greenspan, Chairman, Board of Governors of the Federal Reserve System).

resort to increasing sanctions instead of providing offenders with more accurate information.

Some nonneoclassical scholars have tried to explain the underdeterrence problem by referring to social science evidence finding that offenders often make decisions without giving any real (or meaningful) consideration to the magnitude of the punishment that they may face.[57] A variant of this explanation posits that offenders significantly undervalue long prison sentences because of their extreme myopic outlook[58]—for example, offenders discount the first year of a prison sentence by a much larger amount than they discount a year that is added to the end of a long sentence.[59] While this explanation of underdeterrence is no doubt accurate for some offenders, it relies on rather extreme discounting between an offender's short-term and long-term well-being.[60] Moreover, it is a type of impatience that can be captured using standard long-term discounting if one allows for very high discount rates.[61] Finally, this explanation fails to account for the fact that some offenders, as we will now see, are in fact overdeterred.

3. The Overenforcement and Overdeterrence Puzzles. There are two more related problems with the neoclassical approach. The first is that policymakers spend much more on enforcement than the theory predicts.[62] A neoclassical policymaker who wants

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57. *See* Darley, *supra* note 46, at 195–201 (setting forth reasons why offenders fail to give full weight to the prospect of future punishment, including disordered personalities, influence of drugs or alcohol, peer pressure, and lack of knowledge about the probability of detection or the magnitude of the punishment).

58. *See* Stephanos Bibas, *Plea Bargaining Outside the Shadow of Trial*, 117 HARV. L. REV. 2463, 2505–06 (2004) (discussing how higher discount rates can lead more myopic offenders to bargain harder at the time of plea bargaining); Christine Jolls, Cass R. Sunstein, & Richard Thaler, *A Behavioral Approach to Law and Economics*, 50 STAN. L. REV. 1471, 1538–40 (1998) (describing myopia of offenders and consequences for deterrence policy); Posner, *supra* note 1, at 1567–68 (acknowledging that it is likely that many offenders are myopic discounters and describing the effect of long-term prison sentences).

59. This type of myopic discounting is different from the time-consistent discounting used in standard rational choice theories—an additional year in prison should carry the same weight, regardless of whether it is the first year or comes after the tenth. *See* Posner, *supra* note 16, at 1213–14 (discussing standard economic exponential discounting in the context of long prison sentences).

60. *See* Ted O'Donoghue & Matthew Rabin, Incentives and Self-Control 9 (Dec. 2005) (unpublished manuscript, on file with The Houston Law Review) (arguing that hyperbolic discounting is "*not* a theory of long-term impatience" but one whose important feature is that it permits "the study of immediate gratification without assuming insane myopia").

61. *See* Posner, *supra* note 1, at 1555 (arguing that decisions of hyperbolic offenders of this type can be analyzed under a standard rational choice model).

62. *See* Garoupa, *supra* note 16, at 271 (stating that policymakers resort to prison

to increase the expected sanction of a crime by one (deterrence) unit can do so by increasing the magnitude of a fine or prison term, or, alternatively, by spending more on enforcement in order to increase the probability of detecting offenders. The goal is to produce the additional deterrence unit at the lowest cost possible. This means that, as a general matter, the policymaker should first increase fines, then prison terms, and only as a last resort spend more on enforcement. Since imprisonment creates a series of deadweight costs, it will not always be the case that increasing prison sentences will be more economical than increasing the probability of detection. Nonetheless, spending money on enforcement is an ongoing expenditure, while the costs of imprisonment will only be triggered when an offender is caught and punished. This means that in many instances increasing prison sentences will create a smaller social cost than the enforcement option. All this notwithstanding, in reality policymakers routinely resort to greater enforcement expenditures before they have exhausted these other options.

Under the neoclassical approach, an offender will violate the law whenever the benefits exceed the expected sanctions. However, in some areas, such as tax compliance, people obey the law much more often than predicted by the theory—in short, they are overdeterred.[63] When this phenomenon is combined with the underdeterrence problem described above, it seems that the more general problem is that people sometimes underreact and other times overreact to criminal penalties.

As we will see in the remainder of the Article, the time-inconsistent misconduct theory provides a more intuitive explanation for this miscalibration between penalties and the behavior of offenders and thus for the various puzzles of the neoclassical approach described in this section.

III. A MODEL OF REPEATED TIME-INCONSISTENT MISCONDUCT

This Part begins by describing the intertemporal characteristics of all decisions to violate the law, as well as those that attach to serial misconduct in particular. The first section ends by developing the concept of intertemporally worthwhile misconduct. The second section defends the assumption that hyperbolic offenders have a long-term preference to act in a time-

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sentences before exhausting fines); Polinsky & Shavell, *supra* note 18, at 51 (arguing that fines should be exhausted before resorting to prison sentences because fines are socially costless).

    63.   *See* Polinsky & Shavell, *supra* note 18, at 72 (noting that given the penalties for tax avoidance, one would expect a greater level of underpayment).

consistent manner and not yield to immediate gratification, and the third describes the empirical evidence on time-inconsistent preferences. The rest of Part III develops the time-inconsistent misconduct model. First it provides a formal account of exponential and hyperbolic discounting. Next it develops the concept of time-inconsistent misconduct and contrasts the model's predictions with those of neoclassical theory. After that, it discusses the welfare losses from time-inconsistent misconduct, and then extends the model to serial misconduct. The Part concludes by setting forth various conclusions and addressing some possible objections.

A. *Serial Misconduct and the Intertemporal Nature of Crime*

Before continuing, it is necessary to specify in greater detail the concept of serial misconduct and the decisionmaking process of serial offenders. I will say that a person engages in serial misconduct whenever she commits more than one crime over a chosen time period, which may be as short as a day for a spree offender or years for the career criminal. Additionally, a serial offender may commit the same crime repeatedly, or different ones which, of course, may be connected in various ways. For example, a bank employee who repeatedly embezzles funds may also make false disclosures to the bank and regulators, violate money-laundering laws, and commit perjury when interviewed by federal investigators. Finally, the serial offender may be a recidivist or a person whose repeated misconduct is never detected.

1. Serial Misconduct and Future Well-Being. The first thing to note about serial misconduct is that each crime a person commits will cast a shadow over her future well-being.[64] As a result, one would expect that, when deciding whether to embark on a path of serial misconduct, an offender will try to predict her future preferences, including giving thought to how she expects to behave in the future, whether she may come to regret the decision, and how others will react to her behavior. For example, when an offender is caught, her past decisions to obey or disobey the law can affect how others frame and judge her current act of

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64. *See* Deborah Tannen, *What's in a Frame? Surface Evidence for Underlying Expectations*, *in* FRAMING IN DISCOURSE 14, 20–21 (Deborah Tannen ed., 1993) (explaining that people approach the world "as experienced and sophisticated veterans of perception who have stored their prior experiences as 'an organized mass,' and see events and objects in the world in relation to each other and in relation to their prior experience").

misconduct[65]—her state of mind, intent, and knowledge[66]—and parcel reactive sentiments of resentment or indignation.[67] Additionally, an offender embarking on a "life of crime" will compare the value of the knowledge she will acquire in the process with the increased cost of acquiring or diversifying her human capital in the future through education or employment. She will also account for how her decision will affect the social and personal networks that she develops and whether she will eventually form friendships and stable family relationships with noncriminals.

There are other factors that potential serial offenders will consider, but as can be seen from this brief list, a decision to embark on a path of serial misconduct can be very complex.[68] This means that serial offenders may not make fully informed decisions, even if they had all the information at hand, given well-known cognitive constraints faced by rational actors when making decisions in complex environments.[69] Our concern, however, is not with systematic departures from rationality

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65. *See* ERVING GOFFMAN, FRAME ANALYSIS: AN ESSAY ON THE ORGANIZATION OF EXPERIENCE 496–99 (1974) (discussing the role of expectations—"frames"—in dealing with ambiguities and avoiding misunderstandings); Robert N. Ross, *Ellipsis and the Structure of Expectations*, *in* 1 SAN JOSE STATE OCCASIONAL PAPERS IN LINGUISTICS 183 (1975) (describing "structure of expectations" used by people to organize knowledge about the world and process new information, events, and experiences).

66. *See* Roger C. Crampton, *Enron and the Corporate Lawyer: A Primer on Legal and Ethical Issues*, 58 BUS. LAW. 143, 147 (2002) (arguing that lawyers should anticipate hindsight bias when advising clients acting at the margin of legality); Jeffrey J. Rachlinski, *A Positive Psychological Theory of Judging in Hindsight*, 65 U. CHI. L. REV. 571, 590–94 (1998) (discussing the role of the hindsight bias in *ex post* reconstructions of past behavior).

67. *See* R. JAY WALLACE, *Reason and Responsibility*, *in* NORMATIVITY AND THE WILL: SELECTED PAPERS ON MORAL PSYCHOLOGY AND PRACTICAL REASON, 123, 123–24 (2006) (describing expectations of behavior in moral communities as reactive sentiments and judgments). This explains why some commentators who reject the neoclassical approach argue that repeat offenders should be punished more harshly. *See* Morse, *supra* note 1, at 1601 ("[A]n habitually impulsive person may have less ground for an excuse than an agent suddenly and unpredictably faced with an impulse" given that the latter "knows that she is especially likely to act thoughtlessly and may therefore be held accountable for failure to take those steps that might remedy habitual impulsiveness or avoid those situations that facilitate it.").

68. As a general matter, complexity is a function of the number of sub-parts of the system in question and the level of interdependence between them. *See generally* HERBERT A. SIMON, THE SCIENCES OF THE ARTIFICIAL 195 (2d ed. 1981) (defining a complex system as "one made up of a large number of parts that interact in a nonsimple way" and where "given the properties of the parts and the laws of their interaction, it is not a trivial matter to infer the properties of the whole").

69. *See* Amos Tversky & Daniel Kahneman, *Judgment Under Uncertainty: Heuristics and Biases*, 185 SCI. 1124, 1124 (1974) (stating that people routinely resort to heuristics when making complex decisions, something that can lead to systematic errors and departures from complete rationality).

brought about by the use of decision heuristics by boundedly rational offenders but those due to their short-term impatience. Nonetheless, the two are connected in an important way. Complex decisions will often involve a number of immediate costs—for example, an offender will have to exert greater effort when making the decision. As we will see in Part IV, these immediate costs of misconduct can lead otherwise resolute hyperbolic offenders to repeatedly procrastinate committing worthwhile crimes.

2. The Temporal Gap Between the Benefits and Costs of Crime. When we say that serial misconduct casts a shadow over an offender's future well-being, what we mean is that the costs and benefits from that misconduct are received at different points in time—or alternatively, that it involves a series of intertemporal choices.[70] More generally, any time that an offender decides to violate the law, she is making an intertemporal decision. This is because there is always a temporal gap between the time the offender commits a crime and the first possible moment in which she will experience the disutility from criminal sanctions. This follows from the very nature of criminal punishment: an offender must first be caught and convicted before she can be punished.[71] Additionally, if the punishment is in the form of a prison sentence, then even the punishment itself will have intertemporal features.

On the other hand, in almost all instances, the benefits from misconduct are received (or the offender expects to receive them) before the time when she can be punished. Even more importantly for our purposes, these benefits are usually received immediately at the time the crime is committed. This holds for both tangible benefits, such as money and personal property, as

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70.   An intertemporal decision is one in which the costs and rewards that flow from the decision are not all incurred or received in the same time period. *See* George Loewenstein & Richard H. Thaler, *Anomalies: Intertemporal Choice*, 3 J. ECON. PERSP. 181, 181 (1989) (defining intertemporal choices as "decisions in which the timing of costs and benefits are spread out over time"); George F. Loewenstein & Dražen Prelec, *Preferences for Sequences of Outcomes*, *in* CHOICES, VALUES, AND FRAMES 565, 565–67 (Daniel Kahneman & Amos Tversky eds., 2000) (discussing intertemporal choices and defining temporal sequence).

71.   A person may, of course, bear an immediate disutility in shame or anxiety when her misconduct is detected. However, that disutility will be relatively small when compared to criminal penalties, so it is unlikely to be sufficiently large to affect any of the conclusions below. This claim gains some support from the fact that this type of immediate disutility from getting caught is rarely, if ever, discussed by commentators concerned with deterring misconduct. Nonetheless, even if one were to allow this immediate disutility to be large, it does not affect our conclusions as long as the immediate rewards from misconduct are sufficiently high.

well as various types of intangible utility.[72] For example, criminologists have argued that criminals get immediate (intangible) pleasure from violating the law and that some get utility from being labeled "bad" by fellow criminals or society at large.[73] Offenders may also get immediate utility from using criminal activity as a form of retaliation against perceived injustice.[74]

This temporal gap between the benefits and costs of misconduct matters because people are generally impatient, and thus, will give full weight to rewards and costs that are immediate in nature but discount those that are delayed.[75] As we will see, an intertemporal decisionmaker will discount delayed payoffs using a discount function that, at the very least, captures the fact that people give less weight to costs (and benefits) the later that they are to be incurred (or received). The discount function used in the neoclassical model assumes that this discount rate stays constant over time. The discount function used in this Article reflects the evidence (discussed in Section C) finding that decisionmakers actually become increasingly impatient the closer that they get to an immediate payoff. This is why the fact that the benefits from misconduct are usually received immediately will play an important role in our model.

There are two principal reasons why it is important for commentators and lawmakers to understand the general intertemporal dynamics of criminal misconduct. First, there is overwhelming empirical evidence indicating that decisionmakers experience intertemporal conflicts due to shifting preferences.

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72. *See* GOTTFREDSON & HIRSCHI, *supra* note 4, at 89 (cataloguing immediate rewards of crime).

73. *See e.g.*, JACK KATZ, SEDUCTIONS OF CRIME, MORAL AND SENSUAL ATTRACTIONS IN DOING EVIL 312 (1988) (arguing that criminals take "delight in deviance" and "take pride in a defiant reputation as 'bad'").

74. *See* Vai-Lam Mui, *The Economics of Envy*, 26 J. ECON. BEHAV. & ORG. 311, 312 (1995) (exploring "the role of envy in provoking sabotage or retaliation against others" and stating that "envy plays an important role in social and economic life"); William Terris & John Jones, *Psychological Factors Related to Employees' Theft in the Convenience Store Industry*, 51 PSYCHOL. REP. 1219, (1982) (finding that revenge is one of the major motivators of employee theft).

75. *See* Shane Frederick, George Loewenstein, & Ted O'Donoghue, *Time Discounting and Time Preference: A Critical Review*, *in* ADVANCES IN BEHAVIORAL ECONOMICS 162, 162–68 (Colin F. Camerer et al. eds., 2004) (describing the history of various approaches to modeling the impatience of intertemporal decisionmakers). A number of explanations have been offered for this general impatience. *See, e.g.*, Derek Parfit, *Personal Identity*, 80 PHIL. REV. 3, 26–27 (1971) (arguing that individuals discount future payoffs because of changes in identity over time—a diminution of the connection between our present and future selves).

However, under the neoclassical model, an offender who has a long-term preference to abstain from misconduct will never override it merely because she has become more impatient.[76] Second, under the neoclassical approach, the goal of lawmakers is to choose the level of sanctions and enforcement in order to maximize social welfare. However, to accomplish this a lawmaker must have a correct notion of what motivates people to commit crimes. In particular, Part V.B shows that, in order to efficiently deter hyperbolic offenders, a lawmaker needs to adopt sanctions and enforcement policies that directly target the offender's short-term preferences.

   3.   Intertemporally Worthwhile Misconduct. We can generalize the discussion in the previous two sections by saying that a rational offender will commit a crime in the current period only if she believes that it is "intertemporally worthwhile"—if, given her beliefs of how she plans to act in the future, the action maximizes her current *and* future well-being.[77] As a result, when deciding whether to commit a crime (or a series of them) an offender: (1) will try to predict how her preferences and those of others (e.g., co-conspirators or lawmakers) may change over time; and (2) will choose to obey the law if the benefits from misconduct are less than the *time-discounted* expected sanctions (that is, the gross sanctions, discounted to account for both the probability that she will escape detection and her level of impatience).[78] These two components of an offender's decision are related in a number of ways, but we will be concerned with just one. At the time an offender makes a decision, her then "current self" will have a preference regarding how she wants her various future selves to behave and, thus, will try to

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   76.   *See* GARY S. BECKER, ACCOUNTING FOR TASTES 11 (1996) (explaining how time-consistent preferences require that "the choices an individual *would like* to make in the future, if he knew now what would happen in the interim, are exactly the same as the choices he *will actually* make then"); Roland Bénabou & Jean Tirole, *Self-Knowledge and Self-Regulation: An Economic Approach*, *in* 1 THE PSYCHOLOGY OF ECONOMIC DECISIONS 137, 138 (Isabelle Brocas & Juan D. Carrillo eds., 2003) (arguing that actors "who usually populate economic models have little doubt about 'who they are': they know their own abilities and basic preferences").

   77.   *See* Ted O'Donoghue & Matthew Rabin, *Choice and Procrastination*, 116 Q.J. ECON. 121, 128 (2001) (setting up a general model where people act with reasonable beliefs about future actions and choose current actions to maximize preferences in light of those beliefs).

   78.   Of course, offenders may also discount the benefits side of the ledger—if there is some risk that the benefits of crime will not materialize and if the benefits are not received immediately. The general point is that sanctions will always be delayed and benefits, more likely than not, will be received immediately. Except for the discussion of time-inconsistent obedience below, I will assume that the benefits are both certain and immediate, both of which are plausible assumptions, for many types of criminal activity.

predict how those future selves will react to the immediate rewards of misconduct.

B.   *The Assumption that Long-Term Preferences Govern*

Because we will be concerned with the intertemporal conflict between an offender's long-run and short-run preferences, it is necessary to specify which of the two preferences an offender wants to govern her behavior. This Article will assume that an offender's "preferred" preference is to act in a time-consistent manner and not yield to immediate gratification. The argument is not that an offender would never want to indulge in the immediate benefits of misconduct; rather, it is that a rational offender is no different than other individuals who, more often than not, have long-term preferences not to live their lives by the dictates of immediate indulgence.[79] Of course, there are isolated exceptions. A prude who is afraid that he may let his prudishness keep him from activities that he believes he might enjoy may indeed want the prospect of immediate pleasure to move him into action.[80]

More generally, people usually give some detached consideration to how they want to behave in the future. Individuals who go through life thoughtlessly acting according to whatever desire they happen to be feeling at the time are what the philosopher Harry Frankfurt calls "wantons."[81] While it may be that such wantons exist among criminal offenders, I will exclude them from consideration, as our concern is with instrumentally rational offenders who, by definition, deliberate about the best ways of achieving their goals. Therefore, I will assume that offenders give some thought to the fact that they may be moved to commit crimes

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79.   Evidence of this is found in the commitment devices adopted by people to assure that they save enough for retirement, exercise, and quit consuming harmful products. *See* O'Donoghue & Rabin, *supra* note 60, at 10 (stating that the goal of the time-inconsistent preference literature is to explore whether, in some instances, people engage in activities "against their *own* long-run preferences due to an *over*pursuit of immediate gratification").

80.   An offender who has determined that misconduct is worthwhile, but is afraid that they may "chicken out," may want the pull of immediate gratification to take them the extra step. However, an offender who can predict her true propensity to chicken out from future misconduct opportunities would be better off adopting a commitment device ahead of time to assure that she follows through as planned. For a discussion of why such a chickening out may be considered a self-control problem, see ALFRED R. MELE, IRRATIONALITY: AN ESSAY ON AKRASIA, SELF-DECEPTION, AND SELF-CONTROL 17–18 (1987).

81.   *See* HARRY G. FRANKFURT, THE IMPORTANCE OF WHAT WE CARE ABOUT, PHILOSOPHICAL ESSAYS 47–57 (1988) (arguing that the ability of people to form second-order preferences regarding what first-order desires they want to ultimately motivate them is an important part of what it means to be a person); *see also* Richard C. Jeffrey, *Preferences Among Preferences*, 71 J. PHIL. 377, 381 (1974) (discussing how people choose their preferred preferences).

by purely transient desires, such as the pull of immediate gratification, and that, as a result, they have second-order preferences about the types of desires that they want to be operative when they are faced with the opportunity to commit a crime.

Moreover, we are assuming that a rational offender will violate the law in the current period only if it is intertemporally worthwhile, a deliberative process that by definition is forward-looking; in other words, the offender will have to form a belief about how she expects to behave in the future and make various tradeoffs between her current and future well-being. A rational serial offender may willingly engage in time-inconsistent misconduct once or twice if she believes that they are isolated cases. What we rule out are serial offenders who want to repeatedly yield to immediate gratification. After all, such a resolutely present-biased strategy would make it difficult for an offender to coordinate with co-conspirators, avoid detection by the authorities, comply with the terms of parole, or avoid a "third-strike" conviction.

In conclusion, a serial offender is more likely to survive and succeed if she adopts a second-order preference not to allow her short-term preference for immediate gratification to influence her decision to violate the law. Such an approach would allow her to make detached and objective cost-benefit analyses and, thus, to commit crimes only when they are worthwhile from a long-term perspective. For example, a hyperbolic criminal who knows that robbing a bank on Friday would yield the greatest return would not want to let her transient preference for immediate gratification move her to rob it earlier in the week.

C. *The Empirical Evidence Regarding Time-Inconsistent Preferences*

The principal challenge to the time-consistency assumption of neoclassical theory originated in a series of experiments finding that people value immediate gratification and therefore exhibit declining, instead of constant, discount rates. In short, people discount immediate payoffs more steeply than they discount those same payoffs from a long-term perspective.[82] A common type of experiment to test whether people have time-inconsistent

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82. *See* GEORGE AINSLIE, PICOECONOMICS 63–80 (1992) (describing evidence of declining discount rates and using hyperbolas to model them); Harris & Laibson, *supra* note 7, at 258 (stating that generalized hyperbolic discount functions decline at a faster rate in the short-run than in the long-run, matching a key feature of experimental data); George Loewenstein & Drazen Prelec, *Anomalies in Intertemporal Choice: Evidence and an Interpretation*, 107 Q.J. ECON. 573, 579–81 (1992) (setting forth hyperbolic discount function).

preferences asks subjects to choose between a smaller, earlier reward and a higher, delayed one, where in some instances the smaller reward can be received immediately and in others both the smaller and larger rewards are delayed until future periods.

In an early study, the economist Richard Thaler told subjects to imagine that they had won a lottery and could choose to either receive the money immediately or leave it in the bank earning interest.[83] He then asked them how much interest they would require to make them indifferent between receiving $15 immediately or in three, twelve, and thirty-six months.[84] The required median returns were $30, $60, and $100, respectively, which translates into continuously compounded discount rates of 277%, 139%, and 63%, for the three, twelve, and thirty-six month delays.[85] As can be seen, the implicit discount rate declined as the delay in receiving the money increased.[86]

A similar type of experiment provides subjects with a menu like the one below and asks them to choose their preferred outcome from each group (note that A and B are identical except that the smaller reward in A.1 will be received immediately):

A.1: $1 today; or

A.2: $2 tomorrow.

B.1: $1 in one year; or

B.2: $2 in one year and one day.

A time-consistent rational person who wants to maximize her returns would choose A.2 and B.2; however, in experiments, people routinely choose the immediate reward provided by A.1 and higher delayed reward of B.2. For example, Kirby and Herrnstein asked subjects to choose between two expensive prizes, with the better of the two to be received later in time.[87] When the subjects had the ability to choose the smaller prize immediately they did so; however, when both prizes were delayed, the subjects chose the better prize.[88] Moreover, this present-bias is not limited to humans.

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83. *See* RICHARD H. THALER, *Some Empirical Evidence on Dynamic Inconsistency*, *in* QUASI RATIONAL ECONOMICS 127, 128–29 (1991).

84. *Id.* at 130.

85. *Id.*

86. *Id.* at 129.

87. *See* Kris N. Kirby & Richard J. Herrnstein, *Preference Reversals Due to Myopic Discounting of Delayed Reward*, 6 PSYCHOL. SCI. 83, 84–85 (1995).

88. *Id.* at 85–86. Researchers have conducted numerous similar experiments and have consistently found that subjects exhibited declining discount rates. *See, e.g.*, AINSLIE, *supra* note 82, at 63–80 (describing evidence of declining discount rates and use of hyperbolas to model them); Uri Benzion, Amnon Rapoport & Joseph Yagil, *Discount Rates Inferred from*

A number of studies have found that animals, such as pigeons[89] and rats,[90] also exhibit declining discount rates.

A recent brain imaging study provides one possible explanation for why humans (as well as animals) have a preference for immediate gratification.[91] McClure, along with other researchers, measured the brain activity of participants who were offered a series of binary choices, each with a smaller earlier reward and a larger delayed one.[92] Some choices involved a smaller immediate reward, while in others both payoffs were delayed.[93] The brain imaging found that when the participants were faced with the prospect of an immediate reward, the limbic structures—the part of the brain associated with impulsive behavior—exhibited disproportionate activity.[94]

Decisions: An Experimental Study, 35 MGMT. SCI. 270, 282–83 (1989) (finding declining discount rates); Gretchen B. Chapman, *Temporal Discounting and Utility for Health and Money*, 22 J. EXPERIMENTAL PSYCHOL 771, 779 (1996) (finding steeper discounting over short delays than longer delays for money rewards and hypothetical health outcomes); Harris & Laibson, *supra* note 7, at 258 (stating that generalized hyperbolic discount functions decline at a faster rate in short-run than in long-run, matching key feature of experimental data); Kris N. Kirby & Nino N. Marakovic, *Modeling Myopic Decisions: Evidence for Hyperbolic Delay-Discounting Within Subjects and Amounts*, 64 ORG. BEHAV. & HUM. DECISION PROCESSES 22, 25 (1995) (finding that hyperbolic function is better fit to results of an experiment with twenty-two college student subjects); Kris N. Kirby, Nancy M. Petry & Warren K. Bickel, *Heroin Addicts Have Higher Discount Rates for Delayed Rewards Than Non-Drug-Using Controls*, 128 J. EXPERIMENTAL PSYCHOL. 78, 84 (1999) (finding greater amount of short-term impatience among heroin addicts); Joel Myerson & Leonard Green, *Discounting of Delayed Rewards: Models of Individual Choice*, 64 J. EXPERIMENTAL ANALYSIS BEHAV. 263, 272 (1995) (finding hyperbolic function a better fit to results of an experiment with twelve undergraduate subjects).

    89.   *See* George Ainslie & R.J. Herrnstein, *Preference Reversal and Delayed Reinforcement*, 9 ANIMAL LEARNING & BEHAV. 476, 479 (1981) (finding that pigeons exhibit declining discount rates in a manner resembling hyperbolic discounting); *see also* Shin-Ho Chung & R.J. Herrnstein, *Choice and Delay of Reinforcement*, 10 J. EXPERIMENTAL ANALYSIS BEHAV. 67, 68–73 (1967) (same); Drazen Prelec & R.J. Herrnstein, *Feedback Functions for Reinforcement: A Paradigmatic Experiment*, 6 ANIMAL LEARNING & BEHAV. 181, 181–86 (1978) (same). *See generally* A. W. Logue, *The Living Legacy of the Harvard Pigeon Lab: Quantitative Analysis in the Wide World*, 77 J. EXPERIMENTAL ANALYSIS BEHAV. 357, 363 (2002) (reviewing these animal studies and their influence on various disciplines).

    90.   *See* Jerry B. Richards et al., *Determination of Discount Functions in Rats with an Adjusting-Amount Procedure*, 67 J. EXPERIMENTAL ANALYSIS BEHAV. 353, 358–59 (1997) (finding implicit discount rates that decline over time in a manner resembling hyperbolic discounting).

    91.   *See* Samuel M. McClure et al., *Separate Neural Systems Value Immediate and Delayed Monetary Rewards*, 306 SCI. 503, 504 (2004) (finding that certain points of the limbic system are activated by decisions involving immediate gratification).

    92.   *Id.* at 505.

    93.   *Id.*

    94.   *Id.* The researchers also found that the some areas of the prefrontal cortex, an area of the brain associated with more deliberate decisionmaking, were active whenever the participants made a choice, whether or not those rewards were immediate in nature. *Id.* This makes sense because the prefrontal cortex plays an important role in collecting and mediating inputs between different areas of the brain to assist the subject in

Some of the strongest evidence that people have time-inconsistent preferences comes from the observation that, in the real world, people routinely adopt commitment devices.[95] Commitment devices are mechanisms adopted by individuals to restrict their future ability to yield to the pull of immediate gratification.[96] Such devices are costly to implement, and even if they were available at zero cost, people are reluctant to restrict their future ability to act freely[97] unless they believe that pre-commitment was otherwise worthwhile.[98] As a result, in a world

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planning and decisionmaking. Jacqueline N. Wood & Jordan Grafman, *Human Prefrontal Cortex: Processing and Representational Perspectives*, 4 NATURE REVS.: NEUROSCIENCE, 139, 140 (2003). However, the researchers found that participants who were given a choice between a smaller immediate and a larger delayed reward and chose the larger delayed one exhibited significantly greater activity in the pre-frontal cortex than those participants who chose the earlier smaller reward. McClure et al., *supra* note 91, at 505. In fact, damage to the pre-frontal cortex has been shown to lead both humans and animals to become more impulsive and more likely to yield to the prospect of immediate gratification. *See* Stephen B. Manuck et al., *A Neurobiology of Intertemporal Choice*, *in* TIME AND DECISION: ECONOMIC AND PSYCHOLOGICAL PERSPECTIVES ON INTERTEMPORAL CHOICE 139, 146–47 (George Loewenstein et al. eds., 2003) (discussing studies of humans and animals with prefrontal cortex damage which find that such individuals have a greater propensity to grab immediate rewards).

95. *See* O'Donoghue & Rabin, *supra* note 10, at 105 (noting that economists use commitment devices as evidence—"smoking guns"—of time-inconsistent preferences).

96. More generally, a commitment device is a type of externally imposed self-regulation mechanism adopted to overcome self-control problems when relying on internal sources of self-regulation is not sufficient. *See* ROY F. BAUMEISTER ET AL., LOSING CONTROL: HOW AND WHY PEOPLE FAIL AT SELF-REGULATION 6–7 (1994) (describing the ability among human beings "to exert control over one's own inner states, processes, and responses" and defining self-regulation as "any effort by a human being to alter its own responses" so as to override the push to act in ways that diverge from what they really want).

97. One cost of commitment is that people generally value their autonomy and find disutility in having their wills constrained unnecessarily. *See* CHARLES FRIED, CONTRACT AS PROMISE: A THEORY OF CONTRACTUAL OBLIGATION 13–14 (1981) (discussing the cost of commitment and autonomy in the realm of interpersonal contracts).

98. Once we introduce the potential of uncertainty regarding future payoffs, an intertemporal decisionmaker may find it valuable to have an option to reverse her original decision. On the creation of option values by waiting to make irreversible investments until a decisionmaker has acquired greater information, see AVINASH K. DIXIT & ROBERT S. PINDYCK, INVESTMENT UNDER CERTAINTY 6–9 (1994). *See also* ANDREU MAS-COLELL ET AL., MICROECONOMIC THEORY 689–90 (1995) (discussing how the passage of time aids in revealing true states of the world and resolving uncertainty). In addition to the general economic consideration, an individual may want the ability to change her mind out of fear that she may grow to regret her original decision. For example, psychologists have found that individuals often prefer changeable decisions because they predict, sometimes incorrectly, that they will not be satisfied with the choices they made. *See, e.g.*, Daniel T. Gilbert & Jane E.J. Ebert, *Decisions and Revisions: The Affective Forecasting of Changeable Outcomes*, 82 J. PERSONALITY & SOC. PSYCHOL. 503, 510–11 (2002) (finding that, although the individuals who were given the choice to change their minds about which photography prints to keep liked their choices less than those individuals who had no ability to change, individuals still preferred having the option to change).

of time-consistent actors, commitment devices would not exist.[99] Nonetheless, people with long-term preferences to eat healthily, exercise, and lose weight join health clubs and go to special weight-loss spas, both of which require costly up-front commitments. Students and professors use deadlines (preferably externally imposed)[100] to combat the temptation to procrastinate completing papers. Additionally, the economist David Laibson has argued that people with long-term preferences to set enough money aside for retirement make highly illiquid investments in their youth—purchasing homes—to prevent themselves from overconsuming early in life; retirement accounts with penalties for withdrawals serve similar purposes.[101]

More recently, researchers have begun to supplement the evidence from laboratory experiments with other types of empirical studies. For example, in a field experiment in the Philippines, 1,767 bank customers answered questionnaires that elicited their present-biased premium; half were then given the choice of opening an account with a built-in commitment device in the form of withdrawal restrictions.[102] The study found that customers with higher levels of present-bias were more likely to accept the offer to open the account and that those who did increased their savings by 86.3%. The study also reported that a number of participants had previously participated in informal savings clubs with similar commitment features.

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99.   *See* Dan Ariely & Klaus Wertenbrook, *Procrastination, Deadlines, and Performance: Self-Control by Precommitment*, 13 PSYCHOL. SCI. 219, 223 ("A rational decision maker with time-consistent preferences would not impose constraints on his or her choices.").

100.   *See, e.g.*, T.C. Schelling, *Egonomics, or the Art of Self-Management*, 68 AM. ECON. REV. 290, 290 (1978) (discussing externally imposed self-control devices such as creating an inaccessible savings account and overstating dependents for tax purposes in order to reduce tax liability in April); *see also* Ariely & Wertenbroch, *supra* note 99, at 220–23 (analyzing the role of self-imposed deadlines in addressing temptation to procrastinate); Wertenbroch, *supra* note 3, at 318 (describing the strategic self-imposition of constraints in the context of purchasing cigarettes). Drug and alcohol rehabilitation programs require minimum stays and full payment (up-front) for the required treatment period, a part of which is kept if the patient checks out early. For example, the Cirque Lodge, a well-known facility of this type, has a thirty-day minimum stay and requires patients to pay for that thirty-day period at the time that they check in. *See* The Cirque Lodge, Admission Guidelines, http://www.cirquelodge.com/ Admission/AdmissionGuidelines.php (last visited Aug. 7, 2007) (requiring that "[a] deposit for 30 days is due upon admission").

101.   *See* David Laibson, *Life-Cycle Consumption and Hyperbolic Discount Functions*, 42 EUR. ECON. REV. 861, 868 (1998) (discussing commitment devices to deal with procrastination in saving for retirement, including channeling funds to illiquid assets such as defined benefit pensions, 401(k)'s, social security contributions, and home equity).

102.   *See* Nava Ashraf et al., Tying Odysseus to the Mast: Evidence from a Commitment Savings Product in the Philippines 2 (Apr. 11, 2004) (unpublished manuscript, on file with The Houston Law Review).

D. Modeling Short-Run Impatience and Time-Inconsistency

So far this Part has made three principal arguments. First, whenever an offender chooses to violate the law she is making an intertemporal decision, given that, by definition, if she were to be sanctioned, it would not be until some later point in time. A rational offender would discount those delayed sanctions to account for her level of impatience; however, whether this discounting has a material effect on the offender's ultimate decision will depend on her level of impatience and the type of discount function that she uses. A time-consistent offender has a constant discount rate and is unlikely to be affected by the delayed nature of punishment, unless she is very impatient. From a long-term perspective, a hyperbolic offender discounts the immediate rewards from crime in the same manner as her time-consistent counterpart. However, when faced with the opportunity to commit the crime, the hyperbolic offender gives added weight to the immediate rewards of misconduct, and thus, may override her original preferences and commit nonworthwhile crimes.

Second, I argued that the intertemporal nature of crime is magnified whenever offenders engage in serial misconduct. A rational serial offender would want to violate the law only when doing so is intertemporally worthwhile—if it maximizes her intertemporal return, given her beliefs about how she expects to behave in the future. For example, a hyperbolic offender may decide to yield to immediate gratification in the current period if she believes that it will not happen again, but may feel very differently if she believed that she would make a habit of it.

Third, I provided a set of arguments for why a rational serial offender would want to adopt a long-term preference to act in a time-consistent fashion. This claim received greater support from the evidence discussed in the previous section regarding the prevalent use of commitment devices by real-world actors.

This section will provide a more formal account of time-consistent and time-inconsistent discounting, and the following one will extend the general hyperbolic model to the context of time-inconsistent misconduct. Economists model intertemporal decisions using an *intertemporal utility function* that sums up the instantaneous utility (the payoffs) in each relevant time period as discounted to account for an actor's time preference. It follows that a rational actor will choose her behavior to maximize her discounted intertemporal utility.[103] Early work formalizing

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103. *See* O'Donoghue & Rabin, *supra* note 10, at 106.

intertemporal choice used an exponential discount function, which, as it happens, is the only type that guarantees the constant discounting[104] that yields time-consistent preferences.[105] Importantly, economists embraced exponential discounting because it made their models more tractable mathematically, not because they believed that real-world actors use exponential functions.[106]

In order to model the time-inconsistent behavior reflected in the empirical evidence described above, many economists use a highly tractable quasi-hyperbolic discount function that draws a sharp distinction between immediate and delayed gratification.[107] From a long-term perspective, when all costs and benefits are delayed, the quasi-hyperbolic and exponential models are identical. That is, in period 0, both the exponential and hyperbolic actor would discount their delayed instantaneous utility in periods 1 through T using an exponential function: δu_1, $\delta^2 u_2$, $\delta^3 u_3, \ldots, \delta^T u_T$, where the discount factor, δ, which is set to less than 1, captures a decisionmaker's long-run impatience.[108]

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104. *See* Frederick, Loewenstein, & O'Donoghue, *supra* note 75, at 166–67 (stating that the exponential function is the only one that ensures that actors will exhibit constant levels of impatience).

105. *Id.* at 170 ("Constant discounting implies that a person's intertemporal preferences are *time-consistent*, which means that later preferences 'confirm' earlier preferences.").

106. *See* BECKER, *supra* note 76, at 11 ("The assumption of consistent preferences is clearly not a literal description of much actual behavior . . . but it is an extremely useful simplification of behavior."); Frederick, Loewenstein, & O'Donoghue, *supra* note 75, at 167 (noting that Samuelson and Koopman, the two economists most responsible for formalizing the intertemporal utility model, never endorsed the exponential discount function as an accurate representation of the myriad psychological factors that motivate individuals to discount future payoffs). Unlike the large body of evidence supporting the time-inconsistency assumption, there is no systematic evidence finding that people have constant discount rates. *See* Warren K. Bickel & Matthew W. Johnson, *Delay Discounting: A Fundamental Behavioral Process of Drug Dependence*, *in* TIME AND DECISION: ECONOMIC AND PSYCHOLOGICAL PERSPECTIVES ON INTERTEMPORAL CHOICE, *supra* note 94, at 419, 422 (stating that "[e]xponential discounting . . . has *not* been empirically supported by behavioral research" conducted in humans and animals); *see also infra* Part III.C (describing evidence that real-world actors have declining discount rates).

107. Economists have used other hyperbolic functions to model decisionmakers with declining discount rates; however, the quasi-hyperbolic function has achieved wide acceptance because it captures a basic empirical fact—that people give greater value to the same exact payoff when they can receive it immediately than when it is delayed by *any* amount of time—without adding too much complexity to models. *See* David Laibson, *Golden Eggs and Hyperbolic Discounting*, 112 Q.J. ECON. 443, 449–51 (1997) (setting forth quasi-hyperbolic function). For an early treatment of time-inconsistent preferences, see R.H. Strotz, *Myopia and Inconsistency in Dynamic Utility Maximization*, 23 REV. ECON. STUD. 165, 165 (1955–1956) (analyzing intertemporal planning problem in which individuals choose consumption plans to maximize future utility, but tend to adopt future behavior which is inconsistent with their chosen plans).

108. More formally, if u_i is the immediate (or instantaneous) utility that the

Both types of actors will have a long-term preference to act in a manner that maximizes the sum of these δ-discounted instantaneous utilities.

The difference between the two approaches only arises when a decisionmaker has the prospect of grabbing an immediate benefit (or incurring an immediate cost). From the perspective of period 1, the exponential discounter will give full weight to the instantaneous utility in that period while discounting those in periods 2 through T using the same exponential function as before: u_1, δu, $\delta^2 u_3$, $\delta^3 u_4$, ... $\delta^{T-1} u_T$. As seen, from both a long-term and short-term perspective, the exponential actor compares her instantaneous utility in periods 1 and 2, by discounting the latter by δ. More generally, under the exponential function, a person will always discount payoffs between *any* two adjacent periods by her discount factor δ.[109] This ensures that she will have time-consistent preferences, given that she will always reach the same conclusion vis-à-vis the relative value of payoffs, regardless of the time-period in which she makes that assessment.[110]

However, the quasi-hyperbolic function introduces a short-term discount factor, β, which is set to less than 1, that acts as a multiplier that is inert when all payoffs are in the future but magnifies immediate costs and benefits. This short-term multiplier captures a hyperbolic actor's preference for immediate gratification. In period 0, exponential and hyperbolic actors discount their delayed period-1 instantaneous utility using their long-term discount factor—they value it as δu_1. However, from the short-term perspective of period 1, an exponential actor

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hyperbolic discounter would receive in period 1, in period 0, she gives full weight to an immediate payoff and discounts those in periods 1 through T in the following manner: u_0, $\beta\delta u_1$, $\beta\delta^2 u_2$, $\beta\delta^3 u_3$, ..., $\beta\delta^T u_T$. On the other hand, an exponential discounter would discount: u_0, δu_1, $\delta^2 u_2$, $\delta^3 u_3$, ..., $\delta^T u_T$. Since β is the same in all periods, in period 0, they compare periods 1 through T in the same manner by: δu_1, $\delta^2 u_2$, $\delta^3 u_3$, ..., $\delta^T u_T$. For example, suppose that in period 0, both types of discounters are interested in payoffs in periods 1 and 3. The exponential actor would compare $\delta^3 u_3 - \delta u_1 = (\delta^3/\delta)u_3 - u_1 = \delta^2 u_3 - u_1$. The hyperbolic actor would also compare between $\delta^2 u_3 - u_1$, since $\beta\delta^3 u_3 - \beta\delta u_1 = (\beta\delta^3/\beta\delta)u_3 - u_1 = \delta^2 u_3 - u_1$.

   109.   More formally, let u_i be the nondiscounted instantaneous utility in period 1. In period 0, a person using the exponential discount function will give full weight to an immediate payoff u_0, while discounting delayed payoffs using her long-term discount factor, as follows: in δu_1, $\delta^2 u_2$, $\delta^3 u_3$, ..., $\delta^{10} u_{10}$, $\delta^{11} u_{11}$. This means that in period 0 and in period 10, the person discounts between periods 10 and 11 by her discount factor δ. In period 0, the person compares $\delta^{10} u_{10}$ with $\delta^{11} u_{11}$, or equivalently u_{10} with $(\delta^{11}/\delta^{10})u_{11} = \delta u_{11}$. Moreover, when period u_{10} arrives, she compares the immediate utility of u_{10} with δu_{11}, and thus reaches the same result.

   110.   *See* O'Donoghue & Rabin, *supra* note 10, at 106 (stating that under constant discounting, "[a] person's relative preference for well-being at an earlier date over a later date is the same no matter when she is asked").

values the immediate payoff at its face value (as u_1), but a hyperbolic actor's preference for immediate gratification leads her to give it greater weight, which is captured by the multiplier—she now values the immediate payoff as u_1/β. For example, a person with a β of 0.5 gives 50% greater weight to a reward when it is immediate in nature than she did from a long-term perspective, while someone with a β of 0.7 gives 30% added weight.

More specifically, when all payoffs are delayed, the hyperbolic actor (in keeping with her exponential counterpart) compares the instantaneous utility in periods 1 and 2 by giving full weight to the earlier utility and discounting the latter by δ; moreover, she will have a long-term preference to behave in a manner that maximizes the sum of the two:

$$\delta u_1 + \delta^2 u_2 = u_1 + \delta u_2.$$

When period 1 arrives, the hyperbolic actor still discounts the period 2 utility by δ, but now gives added weight to the immediate payoff and makes a short-run decision to maximize the sum of:

$$u_1/\beta + \delta u_2.$$

Since a hyperbolic actor by definition has a β that is less than 1, it will always be the case that u_1/β will be greater than u_1. We can refer to the difference between the two as a hyperbolic actor's "immediacy premium." It follows that if this immediacy premium is high enough, a hyperbolic actor will reverse her long-term preferences.[111]

Finally, because by definition exponential actors give no added weight to the prospect of immediate gratification, they can be easily incorporated into the quasi-hyperbolic model by giving them a β equal to 1.

A numerical example can help illustrate the difference between exponential and hyperbolic discounting. Suppose that in period 0, hyperbolic John and exponential Mary are asked to choose between receiving $15, $20, or $25 in periods 1, 2, and 3, respectively. They both have a long-term discount factor of 0.9, but John has a short-term factor of 0.5. They will both discount

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111.   More generally, in period 0, the exponential discounter compares between a period 1 payoff and those in periods 2 through T, in the following manner: u_1, δu_2, $\delta^2 u_3$, $\delta^3 u_4$, . . . , $\delta^{T-1} u_T$. When period 1 arrives, she will discount as before and reach the same conclusion. On the other hand, in period 0, the hyperbolic actor compares between βu_1, $\beta \delta u_2$, $\beta \delta^2 u_3$, $\beta \delta^3 u_4$, . . . , $\beta \delta^{T-1} u_T$. And in period 1, she gives full weight to u_1, while still discounting the later payoffs by $\beta \delta u_2$, $\beta \delta^2 u_3$, $\beta \delta^3 u_4$, . . . , $\beta \delta^{T-1} u_T$. Since $\beta < 1$, u_1 will always be greater than βu_1, which is what can lead her to exhibit time-inconsistent preferences.

these delayed payoffs by δ, δ^2, and δ^3, respectively, and thus will have a long-term preference to wait until period 3 and receive the \$25, since they would compare:

$(0.9 * \$15) = \$13.50$

$(0.81 * \$20) = \$16.20$

$(0.73 * \$25) = \$18.25.$

If in period 1 they were both to reconsider their decisions, exponential Mary would reach the same conclusion, since she now compares:

$(1 * \$15) = \$15$

$(0.9 * \$20) = \$18$

$(0.81 * \$25) = \$20.25.$

Moreover, in period 2 she would again decide to wait until period 3, given that the immediate \$20 is less than $0.9 * \$25$, or \$22.50. As can be seen, exponential Mary's preferences are consistent over time.

On the other hand, when in period 1, hyperbolic John reconsiders the original decision, his immediacy premium will lead him to grab the \$15 instead of waiting until period 3. This is because he will compare:

$(\$15/0.5) = \$30$

$(0.9 * \$20) = \$18$

$(0.81 * \$25) = \$20.25$

Therefore, unlike exponential Mary, hyperbolic John exhibits time-inconsistent preferences. Importantly, by overriding his long-term preference to act in a time-consistent manner, hyperbolic John chose to receive \$15 instead of the period-3 discounted \$20.25, and thus incurred a welfare loss of \$5.25.

E. *Time-Inconsistent Misconduct*

While economists have come to realize the shortcomings of exponential discount functions, law and economics scholars have been slow to follow suit, which explains why, as a matter of course, offenders in economics-inspired models of criminal misconduct behave in a time-consistent fashion.[112] This section

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112. Academic disciplines (like other institutions) are often affected by historical contingencies of this sort and are sometimes slow to shed simplifying—path-dependent—

shows that hyperbolic offenders can engage in time-inconsistent misconduct, a phenomenon that is obscured by the time-consistency assumption of the neoclassical model. Because the only difference between exponential and hyperbolic actors is in how they discount when one of the payoffs is immediate, in what follows I will assume, without loss of generality, that there is no long-term discounting, or, equivalently that offenders have a long-term discount factor, δ, that is equal to 1.[113] This allows us to isolate the role played by an offender's present-bias. It should be noted that the neoclassical model adopts the same assumption, given that as a general matter it is unlikely that an offender will have a sufficiently large long-term discount factor to materially alter her decision.[114]

Misconduct is "long-run worthwhile" when from a long-term perspective the discounted, delayed benefits exceed the discounted, delayed expected sanctions. As we are assuming that there is no long-term impatience, a crime is long-run worthwhile whenever the following inequality holds true:

(benefits) – (expected sanctions) > 0

Given the discussion in Section B about the "preferred" preferences of hyperbolic offenders, I will assume that both exponential *and* hyperbolic offenders have a long-term preference to commit crimes if and only if they are long-run worthwhile. This means that a hyperbolic offender who, from a long-term perspective, has concluded that a crime is *not* worthwhile will not want to override that decision.

However, what really matters is an offender's behavior when she is presented with the opportunity to commit a crime. Misconduct is "short-run worthwhile" whenever the immediate benefits, as magnified by the short-term multiplier, are greater than the delayed expected sanctions. Because the neoclassical exponential offender has a short-term factor of β = 1, all other

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assumptions whose benefits hindsight has shown do not add up to the costs. *See* Manuel A. Utset, *Back to School with Coase: The Production of Information and Modes of Knowledge Within and Across Academic Disciplines*, 75 B.U. L. REV. 1063, 1073–74, 1085 (1995) (describing the role of path-dependence within academic disciplines and its effect on the sharing of information and knowledge across disciplines).

   113.   *See* O'Donoghue & Rabin, *supra* note 10, at 107 n.11 (showing that results of quasi-hyperbolic model are not affected by assuming that δ = 1).

   114.   Long-term discounting is sometimes reintroduced when discussing imprisonment. *See* A. Mitchell Polinsky & Steven Shavell, *On the Disutility and Discounting of Imprisonment and the Theory of Deterrence*, 28 J. LEGAL STUD. 1, 4–6 (1999) (discussing the role of exponential discounting in calculating the overall disutility of prison sentences when there are variations among populations regarding their level of long-term discounting—e.g., some offenders are risk neutral while others are risk averse).

things being equal, she will conclude that a crime is short-run worthwhile if and only if it was long-run worthwhile.

On the other hand, misconduct is short-run worthwhile for a hyperbolic offender whenever the immediate benefits, with the added present-bias premium, are greater than the delayed expected sanctions. More specifically, a hyperbolic offender will consider a crime to be short-run worthwhile whenever the following inequality holds:

$$(\text{benefits})/\beta - (\text{expected sanctions}) > 0$$

Whenever a hyperbolic offender commits a crime that is not long-run worthwhile, she engages in time-inconsistent misconduct, which occurs whenever the following holds:

$$(\text{benefits})/\beta - (\text{expected sanctions}) > 0 \geq (\text{benefits}) - (\text{expected sanctions})$$

Finally, notice that the immediate benefits from misconduct can be of two types. First, an offender may take a prohibited action that provides her with an immediate reward, such as embezzling funds, discharging pollutants into a stream, or making a false disclosure in a securities filing. A hyperbolic offender may overconsume crimes of this sort in the same manner that a person with a long-term preference not to smoke or overeat may repeatedly succumb to temptation.[115] We can thus refer to this type of serial misconduct as "nibbling opportunism."[116]

Secondly, many laws and regulations require that an individual take an action by a specific date—for example, filing tax returns, making corporate disclosures, and complying with environmental regulations. However, a person will have to exert effort and, in most cases, incur other immediate costs in order to comply. A hyperbolic offender who has a long-term preference to comply on time will nonetheless procrastinate taking the

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115. In a recent example, employees in a ski resort engaged in a scheme to skim money off cash registers by canceling out parts of completed transactions. They were successful for a relatively long period of time, but were finally detected when one of the employees could not forego the ongoing temptation and started taking money every five minutes. *See Register Scheme Exposed at D.V., Workers Took $800 Each*, PARK CITY REC., Mar. 14, 2006, *available at* http://www.parkrecord.com/archivesearch.

116. As a general matter, an actor acts opportunistically when she tries to renegotiate a contract *ex post* due to the acquisition of new information or a windfall of bargaining power. *See* OLIVER E. WILLIAMSON, THE ECONOMIC INSTITUTIONS OF CAPITALISM: FIRMS, MARKETS, RELATIONAL CONTRACTING, 30–31 (1985) (discussing the role of contracts in reducing opportunistic behavior of transacting parties). A hyperbolic offender has a long-term preference that her future self does not act opportunistically by renegotiating the previous understanding—not to give any weight to the present-bias premium.

required action in each period in which these immediate costs, as magnified by the short-term multiplier, are greater than the incremental delayed sanction of waiting one more period.[117] Each time that she does so, she engages in time-inconsistent misconduct. For example, assume that an environmental regulation requires compliance by a specified deadline and triggers expected sanctions of $100 for each one-day delay. If the immediate cost of taking the required action is $60, a hyperbolic actor with a short-term factor of 0.5 will choose to procrastinate.

F. *Welfare Losses from Time-Inconsistent Misconduct*

There are two principal types of social costs associated with time-inconsistent misconduct.[118] First, aggregate social welfare will be reduced any time that an offender commits a crime that creates a greater amount of harm than the benefits that she receives. Even if each hyperbolic offender in society engages in time-inconsistent misconduct just once, the aggregate losses created can be large (although the actual magnitude would depend on the distribution of offenders with different levels of present-bias).[119] The second type of social cost is counterintuitive but no less real than the first. An offender will harm herself each time she overrides her long-term preference by making short-term decisions to commit nonworthwhile crimes. In other words, time-inconsistent misconduct is a type of rationality "mistake."[120]

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117.   *See* George A. Akerlof, *Procrastination and Obedience*, 81 AM. ECON. REV. 1, 1 (1991) (declaring that individuals procrastinate "when present costs are unduly salient in comparison with future costs, leading individuals to postpone tasks until tomorrow without foreseeing that when tomorrow comes, the required action will be delayed yet again"); O'Donoghue & Rabin, *supra* note 10, at 104 (distinguishing between overconsumption—taking action when one should wait, given that costs are delayed and benefits immediate—and procrastination, which is defined as delaying action one should take, because of immediate costs and delayed rewards).

118.   *See* O'Donoghue & Rabin, *supra* note 10, at 112–14 (describing methods for calculating welfare losses due to time-inconsistency).

119.   The harm to society is analogous to the one created by offenders who commit crimes when: (1) the benefits they receive are lower than the harm to society; but (2) those benefits are higher than the maximum fines that they will be able to pay due to wealth constraints. *See* A. Mitchell Polinsky & Steven Shavell, *The Optimal Tradeoff Between the Probability and Magnitude of Fines*, 69 AM. ECON. REV. 880, 884–85 (1979); Polinsky & Shavell, *supra* note 18, at 51 (stating that sanctions via fines should be exhausted before using prison sanctions because sanctions are wealth transfers and are generally cheaper to collect than the social costs of imprisonment).

120.   *See* O'Donoghue & Rabin, *supra* note 10, at 112–13 (proposing long-term perspective welfare criterion and referring to time-inconsistent actions as a type of "bad decision"). *But see* Harris & Laibson, *supra* note 7, at 285–86 (examining different methods of calculating welfare loss and explaining that, although there is no clear consensus among economists as to which welfare measure is more appropriate, the various proposed approaches "usually give similar answers to policy questions").

This is because nonworthwhile crimes are those that, from a long-term perspective, would give an offender benefits that are less than the expected sanctions.

Notice that a hyperbolic offender's maximum welfare loss from *one* act of time-inconsistent misconduct cannot exceed her immediacy premium, which is equivalent to the benefits, as perceived from a short-term perspective, minus the nondistorted benefits from a long-term perspective—(benefits)/β – (benefits). This means that an offender's welfare losses will increase as her preference for immediate gratification, as captured by the short-term multiplier, increases.

For example, assume that hyperbolic John, who has a β of 0.7, is considering committing a crime that is not long-run worthwhile, because the crime would provide him with an immediate benefit of $100 but trigger expected sanctions of $130. Although John has a long-term preference to obey the law, his present-bias premium will lead him to engage in time-inconsistent misconduct—($100/0.7) = $142.86, which is greater than the $130 expected sanctions. This means that John will incur a welfare loss of $30, which is the difference between the expected sanctions and the actual benefits—that is, the nondistorted benefits that a time-consistent neoclassical offender would perceive as the actual benefits. The maximum welfare loss that John can experience, however, cannot exceed $42.85. This is because if the expected sanctions were raised to $142.86, John would conclude that the crime is not short-run worthwhile and obey the law.

A hyperbolic offender's welfare losses are a valid concern under the neoclassical approach because the aggregate benefits to offenders from their criminal activity are part of the social welfare calculus;[121] it follows that the same should be the case for welfare losses that are due to an offender's time-inconsistent misconduct. Additionally, as we will see in Part IV, lawmakers can reduce the cost of deterring crime if they take into account the time-inconsistent preferences of offenders. Time-consistent offenders who are already optimally deterred by neoclassical sanctions would not be harmed by sanctions that directly target the short-term preferences of hyperbolic offenders. At the same time, a hyperbolic offender who has a long-term preference to abstain from nonworthwhile misconduct would want society to properly deter her. She may, of course, feel differently *ex post*—

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121.   *See* Becker, *supra* note 15, at 173, 181–85 (arguing that the benefit received by offenders should be included in the social calculus).

from a short-term perspective—but what really governs is her *ex ante* preference.

In other words, an offender who is sufficiently aware of her time-inconsistency would want her future self deterred so that it cannot commit nonworthwhile crimes. She can either adopt her own commitment device or have the state impose it on her. Even if one allows that state-imposed commitment creates some intangible "paternalism cost", the hyperbolic offender would still prefer the state action as long as that cost is less than the welfare loss from time-inconsistent misconduct.[122]

G. Serial Time-Inconsistent Misconduct

This Article is concerned with the *aggregate* welfare losses produced by *serial* time-inconsistent misconduct which, unlike the loss from one-shot misconduct, has no upper bound and thus can be very large. Whether or not a hyperbolic offender engages in repeated nonworthwhile misconduct will depend on two principal factors (in addition to her preference for immediate gratification). The first factor is an offender's awareness of her future willpower to abstain from committing nonworthwhile crimes. This requires not only that an offender know that she has a present bias but also that she can predict with sufficient accuracy the true magnitude of the immediacy premium that she will apply when she is presented with the prospect of receiving the immediate rewards of committing a crime.[123] The second factor is the availability of cost-effective commitment devices that she can use to deter her future self.

1. The Role of Incorrect Beliefs of Future Present-Bias. We want to distinguish between two types of actions available to an offender in any one period. First, an offender may have an opportunity to commit a crime and must decide whether to obey the law. The second type of action is prophylactic in nature. Each period, an offender must decide whether to adopt a commitment device to foreclose future time-inconsistent misconduct.[124]

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122. This problem is similar to the one described in the economic literature on renegotiation of contracts: parties to a contract may want to precommit to their *ex ante* preference to abstain from renegotiating the contract *ex post*. *See* Oliver Hart & John Moore, *Incomplete Contracts and Renegotiation*, 56 ECONOMETRICA 755, 756 (1988).

123. *See* O'Donoghue & Rabin, *supra* note 10, at 103 (implying that time-inconsistent preferences are due to a "tendency to grab immediate rewards and to avoid immediate costs in a way that our 'long-run selves' do not appreciate").

124. This sort of *intra*personal commitment is analogous to *inter*personal commitment by contracting parties. On the use of contracts to deter interpersonal opportunism, see POSNER, *supra* note 11, at 94–95 (stating that a role of contract law "is

Offenders who are sufficiently mistaken about the true magnitude of their future self-control problems will see no value in adopting them.

Of course, offenders may face both types of decisions in any one period. However, even if offenders are committing nonworthwhile crimes in the current period, it does not necessarily follow that they will see the need to adopt commitment devices. One of the insidious aspects of repeated self-control problems is that, even when individuals are yielding in the current period, they are often overly optimistic about their future willpower. It is these incorrect beliefs about how they expect to behave in the future that can lead offenders to repeatedly forego commitment and engage in serial time-inconsistent misconduct.[125]

More generally, whether an offender in any one period chooses to commit a crime, to adopt commitment devices, or both, will depend on her beliefs of how she will behave in future periods; in short, whether she believes that taking such an action is intertemporally worthwhile. At one end of the spectrum are naïve hyperbolic offenders—those who incorrectly believe that in the future they will not give added weight to immediate gratification and thus will behave in a time-consistent fashion.[126] Because of this false optimism, naïve offenders will see no value in adopting commitment devices and little harm in indulging in the current period—it is the same phenomenon as taking an extra slice of cake believing that the diet will definitely start tomorrow. For these two reasons, naïve offenders are the most likely to engage in repeated time-inconsistent misconduct and

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to deter people from behaving opportunistically toward their contracting parties, in order to encourage the optimal timing of economic activity and (the same point) obviate costly self-protective measures"). Nonetheless, there is an important difference between the two. In the interpersonal context, repeat players may forgo acting opportunistically in order to protect the prospect of future transactions. However, a critical aspect of a person's intrapersonal relationship with her future selves is that it cannot be severed voluntarily (except by suicide); therefore, it follows that intrapersonal reputation will not be a very effective mechanism for dealing with self-control problems.

125.   These incorrect beliefs are what motivate repeated time-inconsistent behavior in general models of procrastination and overconsumption. *See* O'Donoghue & Rabin, *supra* note 10, at 108 (describing the difference between time-consistent and hyperbolic individuals as the fact that the latter have incorrect beliefs of how they expect to behave in future periods); *see also* David Laibson, *Decision-Making, Intertemporal*, *in* 1 ENCYCLOPEDIA OF COGNITIVE SCIENCE 915, 918 (Lynn Nadel ed., 2003) (stating that time-inconsistency is due to the fact that projects may appear worthwhile from a distance, "but as the moment for sacrifice approaches the project becomes increasingly unappealing").

126.   *See* O'Donoghue & Rabin, *supra* note 10, at 108 (stating that naïve procrastinators act as if in future periods they will have time-consistent preferences and will face no self-control problems).

incur large aggregate welfare losses. The offenders described in the criminology literature on self-control problems are, by and large, naïve ones.[127]

At the other end of the awareness spectrum are sophisticated hyperbolic offenders—those who know that they will have future self-control problems and correctly predict the magnitude of their present-bias premium.[128] A sophisticated offender who has available cost-effective commitment devices will not engage in repeated time-inconsistent misconduct. However, the empirical evidence shows that, even when people know that they have self-control problems, they still often fail to correctly predict the magnitude of their future temptations.[129] A partially naïve offender is one that, although aware of her present-bias, is overoptimistic about her future ability not to yield to it. As a result, a partially naïve offender may adopt commitment devices, but those devices may not be sufficiently high-powered to foreclose all nonworthwhile misconduct. Importantly, even relatively small prediction errors can lead a partially naïve offender to act in the same manner as a naïve one and, therefore, to incur large aggregate welfare losses.[130]

2. Entry Into and Exit from a Path of Serial Misconduct. Entry into crime is no different than entry decisions in other contexts; it requires initial effort and search and may require a leap of faith or unfounded optimism to overcome anxiety induced

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127. *See* GOTTFREDSON & HIRSCHI, *supra* note 4, at 177 (arguing that the level of self-control established early in life remains stable, but also stating that "[f]ortunately, again, crimes require more than individual tendencies for their performance"). *But see* Charles R. Tittle, David A. Ward, & Harold G. Grasmick, *Capacity for Self-Control and Individuals' Interest in Exercising Self-Contro*l, 20 J. QUANTITATIVE CRIMINOLOGY 143, 151 (2004) (drawing a distinction between people's capacity for self-control and their interest in engaging in self-regulation, which is closely related to an offender's environment).

128. *See* O'Donoghue & Rabin, *supra* note 10, at 108–09 (describing sophisticated individuals as those who can correctly predict the magnitude of time-inconsistent preferences).

129. *See* Ariely & Wertenbroch, *supra* note 99, at 222–23 (detailing a study finding that a group of students with external deadlines performed better than a second group who underappreciated the full extent of their propensity to procrastinate and, thus, adopted sub-optimal deadlines); Stefano DellaVigna & Ulrike Malmendier, *Paying Not to Go to the Gym*, 96 AM. ECON. REV. 694, 716–17 (2006) (finding that people are overoptimistic about how much they will use a gym membership and then procrastinate in canceling the membership).

130. This will occur whenever a partially naïve offender's mispredictions lead her to incorrectly believe that her short-run self will conclude that engaging in criminal misconduct has negative expected returns. *See* O'Donoghue & Rabin, *supra* note 77, at 126–27, 141 (concluding that even small amounts of overoptimism can lead partially naïve person to act in same manner as naïve one).

by uncertainty.[131] One important entry barrier is the fact that committing a crime may undermine a person's deeply held beliefs about her moral integrity. However, once she becomes an offender, many of these entry costs will disappear and cognitive dissonance may lead her to rationalize her behavior *ex post*.[132] This means that a person who plans to commit just one crime may nonetheless find it easier to commit others—for example, a manager considering misstating financial results will want to consider whether she is making a "[t]ransition into [c]rime"[133] that will be costly to reverse.

These entry and exit decisions will thus be affected by an offender's predictions of her future preferences, including her present-biased preferences. For example, suppose that a person is considering joining a gang and knows that joining will shorten his life expectancy, and that it will be difficult for him to leave the gang; difficult in that other gang members will generally oppose his leaving and because he may become dependent on (or otherwise accustomed to) a gang lifestyle.[134] If in addition to having this knowledge, he can correctly predict his future preferences and willpower to leave the gang, he can make a decision that takes into account how joining the gang will affect his current and future well-being. The same is true for a person deliberating about whether to try an illegal drug. If she is correctly informed about the drug's addictive quality, the negative effects of repeated use (including out-of-pocket expenses and intangible costs) and her future willpower to quit, she will choose to start using the drug only if she believes that it is intertemporally worthwhile.[135]

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131. For example, overoptimism about the potential for success plays an important role in the decisions of entrepreneurs to market their products and form new businesses. *See* Utset, *supra* note 17, at 100–04.

132. *See* Donald C. Langevoort, *The Epistemology of Corporate-Securities Lawyering: Beliefs, Biases and Organizational Behavior*, 63 BROOK. L. REV. 629, 647–48 (1997) (explaining cognitive dissonance); Lisa G. Lerman, *The Slippery Slope from Ambition to Greed to Dishonesty: Lawyers, Money, and Professional Integrity*, 30 HOFSTRA L. REV. 879, 909 (2002) (citing lawyer greed as the principal catalyst for beginning to slide down the "slippery slope" to misconduct); David Luban, *Integrity: Its Causes and Cures*, 72 FORDHAM L. REV. 279, 281–82 (2003) (discussing role of deception and cognitive dissonance in self-perception).

133. *See* Darley, *supra* note 46, at 199 (describing white collar offenders who make an "[u]nnoticed [t]ransition into [c]rime").

134. *See* Neal Kumar Katyal, *Conspiracy Theory*, 112 YALE L.J. 1307, 1319–21 (2003) (describing social science work on group dynamics showing that, once individuals are part of a group, they often act against their own self-interest, including subverting it in favor of the group's interest); *see also* CAL. PENAL CODE § 186.22(a) (West 1999) (prohibiting participation in a criminal street gang).

135. *See* Gary S. Becker, Michael Grossman, & Kevin M. Murphy, *Rational*

On the other hand, offenders with incorrect beliefs about their future preferences may join gangs or try illegal drugs only to find out later that their willpower to leave the gang or to overcome a drug addiction was weaker than they had predicted.[136] Even when offenders have a long-term preference to cease their criminal activity—to "fly straight"[137]—they may repeatedly procrastinate following through due to the immediate costs of exit.[138] These include the costs of foregoing the immediate benefits from crime, the time and effort necessary to get a job (particularly if they have a criminal record or no real training, or must overcome a drug or alcohol addiction), and those imposed by their associates to prevent their exit.

A number of recent studies have found that time-inconsistent preferences can lead individuals to procrastinate making analogous exit decisions even when the immediate costs are much lower than in the above examples. One study measured the effort expended by unemployed workers searching for new jobs.[139] Because search costs are immediate in nature, and the benefits—finding and starting a new job—are delayed until future periods, one would expect that individuals who give greater weight to immediate gratification will exhibit lower levels of search intensity and remain unemployed longer.[140] Using various proxies of short-term impatience,[141] the authors found

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Addiction and the Effect of Price on Consumption, 81 AM. ECON. REV. 237, 237 (1991) (describing the model of rational addiction).

136.   *Cf.* Teela Sanders, *Becoming an Ex-Sex Worker: Making Transitions Out of a Deviant Career*, 2 FEMINIST CRIMINOLOGY 74, 75–76 (2007) (describing studies finding that women delay leaving the sex trade because of the immediate economic costs of exiting, such as drug use and lack of an available alternative work).

137.   *See* Morse, *supra* note 1, at 1607–08 (noting that rationality helps people "fly straight" and obey the law).

138.   *See, e.g.*, Ted O'Donoghue & Matthew Rabin, Addiction and Present-Biased Preferences 1–3 (May 21, 2001) (unpublished manuscript, on file with The Houston Law Review) (setting forth a model of addiction where miscalculations of future self-control problems can lead to addiction and cause someone to delay becoming unaddicted because of the immediate costs of doing so); *see also* George Loewenstein, *A Visceral Account of Addiction*, *in* GETTING HOOKED: RATIONALITY AND ADDICTION 235, 236 (Jon Elster & Ole-Jørgen Skog eds., 1999) (noting that visceral factors such as extreme hunger, thirst, pain, anger, and sleepiness affect the preferences and actions of addicts).

139.   *See* Stefano DellaVigna & M. Daniele Paserman, *Job Search and Impatience*, 23 J. LABOR ECON. 527, 569 (2005).

140.   Search intensity was measured by looking at the number of search methods used by unemployed workers. *Id.* at 563.

141.   The proxies used to measure impatience are similar to those used in other studies. Individuals are deemed to have higher levels of impatience if they smoke, consume a lot of alcohol, fail to use contraceptives, or do not have life insurance or bank accounts. *See id.* at 547–51 (discussing variables and other studies using similar proxies to measure impatience).

that those with a higher level of impatience did, in fact, search less.[142]

A second study looked at employees deciding whether to stay in their current jobs and seek promotions, a process that requires more time and patience (but potentially much higher rewards), or to switch jobs in order to receive a more immediate increase in salary.[143] Again, using standard proxies for short-term impatience, the study found that those with higher levels of impatience were more likely to switch jobs.[144]

Finally, researchers studied single women with children and their decisions on whether to work or participate in welfare programs.[145] The authors fitted the evidence to a model that allowed for time-inconsistent preferences and concluded that the data regarding the women's decisions to delay exiting welfare programs were best explained as reflecting time-inconsistent behavior; in particular, that the women procrastinated finding jobs because of immediate costs.

3. Serial Time-Inconsistent Misconduct: A Numerical Example. Suppose that releasing pollutants into a stream is a crime and that a hyperbolic offender with a short-term discount factor of 0.7 has the opportunity to pollute everyday over a one-year period. Each time that he pollutes he derives an immediate benefit of $1,000, but triggers expected sanctions of $1,250. Because the crime is not long-run worthwhile, the offender will have a long-term preference to obey the law all 365 days. At the same time, polluting is always short-run worthwhile, given that $1,000/0.7 = $1429 > $1250.

A naïve offender will pollute all 365 days—each day believing incorrectly that it will be the last time—and will incur an aggregate welfare loss of $91,250.[146] On the other hand, a sophisticated offender will correctly predict his future present-bias premium and conclude that he will have a short-term preference to pollute all 365 days. As a result, he will want to

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142. *See id.* at 565 (finding that higher levels of impatience led to lower search intensity). The study also found that the level of impatience was negatively correlated with the exit rate from unemployment. *Id.* at 556.

143. *See* Francesco Drago, *Career Consequences of Hyperbolic Time Preferences* 1–3 (IZA Discussion Paper No. 2113, 2005), *available at* http://ssrn.com/abstract=706281.

144. *See id.* at 25.

145. *See* Hanming Fang & Dan Silverman, Time-Inconsistency and Welfare Program Participation: Evidence from the NLSY 1, Feb. 2006 (unpublished manuscript, on file with The Houston Law Review).

146. The owner's decision to pollute all 365 days exposed her to expected sanctions of $456,250, and because her aggregate benefits from polluting equaled only $365,000, she incurred net sanctions of $91,250.

adopt a commitment device that will either increase the delayed expected costs by at least \$179 (to \$1,429), or decrease the immediate benefit from polluting from \$1,000 to at least \$875 (given that \$875/0.7 = \$1,250).

One possibility is for him to contract with a waste removal company to dispose of the waste and, as part of the contract, have a daily surcharge of \$125, which would be paid immediately, but refunded each day that the removal company's services are used. Note two things about this contract. First, as long as the offender uses the waste removal company, he will not incur a loss from the surcharge because it will be refunded.[147] Second, in deciding whether a waste disposal contract (or similar alternative) is worthwhile, he will compare the cost of the contract with the losses that he would incur due to his present-bias. As we will see in Part IV, to effectively deter time-inconsistent offenders, lawmakers must adopt penalty schemes that mirror the commitment strategy of a sophisticated offender.

Finally, even a relatively small error in prediction can lead a partially naïve offender down the path of repeated, nonworthwhile misconduct. For example, a partially naïve offender who mistakenly believes that his short-term discount factor is 0.8 (or higher) instead of 0.7 will end up polluting all 365 days and incur a welfare loss equal to that of the naïve offender. This is because each day he will predict incorrectly that on the following day he will conclude that polluting is not short-run worthwhile and choose to obey the law—given that \$1000/0.8 = \$1,250, which equals the expected sanction. Because of this, he will not adopt a commitment device.

H. Some Conclusions and Possible Objections

This Part has argued that if we extend the empirical findings regarding time-inconsistency to the context of legal misconduct, criminals may engage in repeated, nonworthwhile misconduct notwithstanding a long-term preference to obey the law. The phenomenon of time-inconsistent misconduct is a counterintuitive result given the standard characterization of criminal misconduct—that people who engage in repeated

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147. This payment structure is not that different from deposit refunds used in pollution contexts—e.g., surcharges and refunds on bottled drinks. Thus, some of those payments can be seen as a sort of commitment device to get around self-control problems. For a discussion of deposit-refund schemes, see Peter S. Menell, *Beyond the Throwaway Society: An Incentive Approach to Regulating Municipal Solid Waste*, 17 ECOLOGY L.Q. 655, 735–36 (1990) (discussing the use of a deposit refund system—a surcharge—to provide incentive to return polluting products).

criminal activity must be doing so because they believe that the expected benefits exceed the expected costs. Importantly, the time-inconsistent misconduct model adopts the neoclassical assumption that offenders will *want* to commit crimes only if the benefits are greater than the expected sanctions. But ultimately, wanting is not the same as *doing*.[148] Moreover, as a general matter, a hyperbolic offender will act in the same manner predicted by the neoclassical model whenever committing a crime is worthwhile from both a long-run and a short-run perspective. Finally, whether or not offenders will actually engage in time-inconsistent misconduct will depend on the magnitude of their preference for immediate gratification, their awareness of it, and the availability of cost-effective commitment devices.

Let me set forth a caveat that should help foreclose possible misunderstandings. This Article compares time-consistent and hyperbolic offenders in order to contrast the conclusions of the time-inconsistent misconduct model with those of the standard law and economics model. I do not mean to imply that real offenders *always* act in a time-inconsistent manner, or that all criminal acts are due to time-inconsistent preferences. Undoubtedly, a large portion of the illegal activity observed in the real world is both long-run and short-run worthwhile; however, given the evidence on time-inconsistency, it is safe to assume that a subset of observed misconduct is due to the present-bias of offenders. In short, to the extent that we want our models to reflect the available evidence and make predictions that track real-world behavior, the neoclassical model of criminal misconduct is incomplete because it only captures time-consistent criminal behavior.

Before leaving this Part of the Article, let me address a couple of possible objections. One objection is that while it is possible that people procrastinate and overconsume in many facets of their lives, they are unlikely to do so in an area—criminal misconduct—where the consequences are potentially severe. However, as a general matter, the more important a decision or the greater its potential consequences (gains as well as losses), the more likely it is that a decisionmaker will procrastinate because, all other things being equal, she will have

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148. *See* MICHAEL E. BRATMAN, INTENTION, PLANS, AND PRACTICAL REASON 29–30 (1987) (defining "plans" as "mental states involving an appropriate . . . commitment to action" and discussing the contingent, reversible nature of plans); JOHN R. SEARLE, RATIONALITY IN ACTION 13–15 (2001) (discussing the assumption in the rational choice model that there is no gap between the time a person makes a decision and the time she follows through with the decision).

to exert greater immediate effort in both physical and mental exertion.[149]

For example, a person that spends years writing the (never-ending) great American novel may have completed a series of good short stories instead. An employee that has only one investment option available to her—a money-market account—may quickly enroll in a 401(k). If instead she has the ability to choose from a menu of mutual funds, she may repeatedly delay exerting the extra effort and procrastinate opening the 401(k). This is the case even though the employee has the ability to initially choose the money-market fund and later switch to other mutual funds.[150]

In the same manner, a serial offender who has determined that continuing to commit crimes is not worthwhile must make a series of important and complex decisions in order to exit. The immediate costs of making these decisions—about alternative sources of income, for example—can lead her to repeatedly procrastinate following through with a worthwhile exit.

A second potential objection is that the model is not open to easy empirical testing. This is actually the case with any model of criminal misconduct given that offenders are unlikely to share data regarding their behavior. However, the time-inconsistent misconduct model builds on the overwhelming empirical evidence that people routinely engage in time-inconsistent behavior, while the standard model is based on an assumption—time-consistency—that economists acknowledge does not reflect real-world discounting behavior. Moreover, the model isolates a number of factors that will aid in empirical testing, including the following three. First, time-inconsistent misconduct is more likely in contexts in which offenders have the prospect of gaining immediate benefits or avoiding immediate costs. Second, hyperbolic offenders will react more pronouncedly than their time-consistent counterparts to changes in these immediate benefits and costs. Third, time-inconsistent misconduct is more likely in contexts in which offenders have repeated opportunity to

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149. *See* O'Donoghue & Rabin, *supra* note 77, at 141–42 (arguing that "people may procrastinate more in pursuit of important goals than unimportant ones, or equivalently that increasing importance can exacerbate procrastination").

150. A number of studies have found that employees are likely to procrastinate enrolling in retirement accounts due to the effort of choosing among investment options. Some employers have tried to address this issue by providing default enrollment and investment choice—e.g., a money-market account—in order to combat this type of procrastination. *See id.* at 124 (arguing that employees are more likely to delay enrolling in retirement accounts if provided with a menu of investment options).

commit a crime and the *incremental* expected sanctions are relatively small and bearable.

IV. LEGAL IMPLICATIONS OF TIME-INCONSISTENT MISCONDUCT: THE PUZZLES OF NEOCLASSICAL THEORY REVISITED

Part II identified four puzzles of neoclassical theory—four areas in which the theory's predictions diverge from the observed behavior of lawmakers and offenders. This Part uses the time-inconsistent misconduct theory to explain these puzzles. In doing so, I show that the optimal sanctions of neoclassical theory will underdeter hyperbolic offenders, set forth the types of policies available to lawmakers to effectively deter hyperbolic offenders, and develop a counterintuitive result that follows from the model—the phenomenon of time-inconsistent obedience, which can lead some offenders to repeatedly procrastinate committing *worthwhile* crimes.

A. *The Systematic Underdeterrence Puzzle and Hyperbolic Offenders*

The time-inconsistent misconduct model provides one explanation for why lawmakers believe that some serial offenders are systematically underdeterred by standard sanctions: all other things being equal, the optimal sanctions of the neoclassical model will underdeter hyperbolic offenders. Neoclassical and hyperbolic offenders both have long-term preferences to commit a crime if and only if it is long-run worthwhile—if from a long-term perspective, the nondistorted benefits exceed the expected sanction. However, a hyperbolic offender will sometimes commit crimes that are short-run, but not long-run, worthwhile—something an exponential offender would never do. In other words, as a general matter, if a neoclassical offender commits a crime, so will the hyperbolic offender;[151] but in some instances, the neoclassical offender will obey the law but the hyperbolic offender will not.

More specifically, recall that under the neoclassical model the optimal expected sanctions are equal to the expected harm from misconduct. Then, continuing with the assumption that $\delta = 1$, a hyperbolic offender engages in time-*consistent* misconduct whenever the following holds:

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151. There is one exception: if the immediate costs of committing a crime are sufficiently high, hyperbolic offenders may procrastinate engaging in misconduct that is worthwhile. *See infra* Part IV.F (developing the concept of time-inconsistent obedience).

$$(\text{benefits})/\beta - (\text{expected sanctions} = \text{harm}) > (\text{benefits}) - (\text{expected sanctions} = \text{harm}) > 0$$

Notice that this means that, whenever misconduct is both long-run and short-run worthwhile, a hyperbolic offender will see even greater benefits in committing the crime than an exponential offender, but in any case they will both engage in misconduct.

On the other hand, an exponential offender will obey the law, but a hyperbolic offender will engage in time-inconsistent misconduct whenever the following inequality holds:

$$(\text{benefits})/\beta - (\text{expected sanctions} = \text{harm}) > 0 \geq (\text{benefits}) - (\text{expected sanctions} = \text{harm})$$

As can be seen, the neoclassical sanctions will underdeter hyperbolic offenders in cases in which exponential offenders are optimally deterred. A hyperbolic offender is underdeterred by an amount equal to $(\text{benefits})/\beta - (\text{benefits})$, which means that her present-bias premium will be the maximum amount by which she can be underdeterred.

This is an important result because this deterrence gap produces welfare losses not only for those harmed by the time-inconsistent misconduct, but also for the hyperbolic offender who has a long-term preference to obey the law and whose behavior exposes her to expected sanctions that are higher than the benefits that she receives. Moreover, a lawmaker who perceives a deterrence gap but incorrectly assumes that offenders behave in a time-consistent fashion will resort to increasing the expected sanctions to close that gap. This will have two negative effects. First, it will have the spillover effect of overdeterring offenders with lower levels of present-bias. Second, as we will now see, all other things being equal, it is generally more efficient to deter hyperbolic offenders by reducing the immediate benefits of misconduct, rather than by increasing delayed sanctions.

B. *Well-Tailored Deterrence: Targeting Present-Bias of Offenders*

In choosing between deterrence schemes, a lawmaker would want to compare the direct and indirect social costs of alternative mechanisms and choose the one that produces the most deterrence at the lowest cost.[152] To remedy the underdeterrence of hyperbolic offenders, a lawmaker would first target their short-term preferences.

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152. *See* Sanchirico, *supra* note 22, at 1365 (stating that a cost-effective deterrence mechanism incurs "low social costs per 'unit' of generated deterrence").

1. The Incentives Asymmetry: Increasing Delayed Sanctions versus Reducing the Immediate Benefits from Misconduct. If a lawmaker wanted to increase the deterrence of an exponential offender, she can either increase the expected sanction or decrease the immediate benefits from misconduct. In other words, if we continue to assume that offenders do not have long-term impatience, then an exponential offender would perceive a $1 increase in expected sanctions in the same manner as a $1 decrease in immediate benefits and would be equally deterred by either method. However, because hyperbolic offenders give added weight to immediate benefits of misconduct, all other things being equal, reducing immediate benefits by $1 will increase deterrence by a greater amount than increasing sanctions by the same amount. Since $\beta < 1$, it will always be the case that:

$$(\text{benefits}) - \$1/\beta > (\text{expected sanctions}) + \$1.$$

Suppose that hyperbolic John has a short-term discount factor, β, of 0.7 and is contemplating committing a crime that would give him an immediate benefit of $100 and trigger expected sanctions of $100; and further assume that a crime is not worthwhile if the benefits equal the expected sanctions. Although the crime is not long-run worthwhile, it is short-run worthwhile given that $100/0.7 = $142.86. To properly deter John, a lawmaker can either increase the expected sanctions by $42.86 (from $100 to $142.86), or reduce the immediate benefits by a smaller amount, $30 (from $100 to $70, since $70/0.7 = $100).

Of course, it does not necessarily follow that decreasing immediate benefits always will be cheaper than increasing expected sanctions. Moreover, a lawmaker will not have to increase expected sanctions if she can make existing sanctions more salient to hyperbolic offenders when they are considering committing a crime. For example, the Sarbanes-Oxley Act's certification requirements[153] make more salient—at the point in time when a manager makes a securities filing—the costs she would incur if she were to fail to comply with federal securities laws.

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153.   *See* Sarbanes-Oxley Act of 2002, Pub. L. No. 107-204, § 302, 116 Stat. 745, 777 (codified as amended at 15 U.S.C. § 7241) (addressing general certification requirements); Sarbanes-Oxley Act of 2002, Pub. L. No. 107-204, § 906, 116 Stat. 745, 806 (codified at 18 U.S.C. § 1350) (addressing certification for filings that include financial reports and criminal sanctions for violating those certification requirements); Sarbanes-Oxley Act of 2002, Pub. L. No. 107-204, § 404, 116 Stat. 745, 789 (codified at 15 U.S.C. § 7262) (addressing management assessment of internal controls).

    2. Reducing Immediate Benefits from Misconduct. Lawmakers can reduce the immediate benefits from misconduct by adopting mechanisms that effectively (1) reduce an offender's access to a portion (or all) of the benefits, or (2) delay their receipt by a sufficient amount of time so that they are no longer received immediately. For example, financial institutions, casinos, and other industries in which employees handle large amounts of cash adopt internal controls to limit access to those funds except by a small group of well-monitored employees; these controls are sometimes required by regulators or are part of internal auditing controls under accounting rules.[154] One of the rationales for segregation controls is to remove the "temptation to steal" that comes from easy access. Such temptation would only affect hyperbolic offenders. Easy access to funds would lead time-consistent offenders to steal only if it results in a sufficiently large reduction in the expected costs from stealing—if easy access increased the probability that they would "get away with it"—and not because it led to an increase in their temptation because, by definition, time-consistent offenders would not yield to temptation.[155]

    A second example is Section 402 of Sarbanes-Oxley, which, among other things, prohibits a corporation from making personal loans to managers and board members.[156] This complete bar on personal loans was adopted to deal with conflicts of interest and the nontransparency of loans like the ones made to officers of Enron, WorldCom, and Tyco.[157] However, Section 402 also has a self-control component. Corporate loans increase the liquidity of managers, making it easier for them to overconsume (overextend themselves financially) outside of the corporation, which in turn can affect their management decisions.[158] In other words, managers with easy access to corporate credit can

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    154.   Note that incapacitation is one extreme way of reducing the immediate benefits available to offenders, at least for any crime that they would be able to commit outside of prison.

    155.   Under neoclassical deterrence, total segregation is optimal only if the benefits exceed the costs—higher administrative costs—and if offenders would be equally deterred by setting an expected fine that exceeds the expected benefits.

    156.   *See* Sarbanes-Oxley Act of 2002, Pub. L. No. 107-204, § 402, 116 Stat. 745, 787 (codified at 15 U.S.C. § 78m(k)) (addressing prohibition of personal loans to executives).

    157.   *See* Letter from Senators Susan M. Collins & Carl Levin to Harvey L. Pitt, Chairman, Sec. Exch. Comm'n, Sept. 25, 2002, http://levin.senate.gov/newsroom/release.cfm?id=209886 (describing loans made to executives in companies such as Enron, WorldCom, and Tyco).

    158.   For example, Bernie Ebbers of WorldCom owed the company $400 million, which he had primarily borrowed to purchase WorldCom stock. *Id.*

overconsume in the same manner as individuals who have easy access to credit-card financing.[159]

   3. Increasing Immediate Costs of Misconduct. Hyperbolic offenders care both about delayed sanctions and the immediate costs of committing crimes. Even if a hyperbolic offender gets an immediate benefit from misconduct, she will not engage in time-inconsistent misconduct if she must incur immediate costs that are sufficiently high to offset the added weight she gives to the benefits.

   For example, the gang loitering ordinances adopted in Chicago allow the police to approach gang members (or other groups of individuals who are "loitering") and ask them to disperse.[160] As Tracey Meares has pointed out, one of the purposes of the ordinance is to increase drug dealers' costs of doing business.[161] Drug dealers use "advertisers" to signal to potential buyers from outside the neighborhood the locations where they can purchase drugs; dispersal increases costs by, among other things, requiring dealers to hire more "advertisers."[162] However, the ordinance also increases immediate search costs to recreational *buyers*. A hyperbolic buyer who has a long-term preference to abstain from purchasing drugs but who is motivated by the prospect for immediate gratification may be sufficiently deterred by the added costs.

   Another approach is to adopt gatekeeper schemes in which gatekeepers not only engage in their usual gatekeeping activities, but also police each other. The highly criticized Section 404 of the Sarbanes-Oxley Act adopts this type of cross-monitoring procedure. It requires managers to make representations regarding the company's internal control procedures and requires auditors to "attest to, and report on, the assessment made by the management of the issuer."[163] Managers and accounting firms, in

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   159.   *See* George-Marios Angeletos et al., *The Hyperbolic Consumption Model: Calibration, Simulation, and Empirical Evaluation*, 15 J. ECON. PERSP. 47, 48–49 (2001) (comparing a simulated model of hyperbolic discounting households with empirical evidence that households tend to hold low levels of liquid assets and engage in aggressive credit card borrowing).

   160.   *See* Tracey L. Meares, *Norms, Legitimacy and Law Enforcement*, 79 OR. L. REV. 391, 410–12 (2000) (describing antiloitering ordinance and its role in dispersing gang members and drug dealers by keeping them from the same location for at least three hours after dispersal).

   161.   *See id.* at 412 (explaining the use of "advertisers" and the role of the ordinance in increasing the cost of doing business).

   162.   *Id.*

   163.   Sarbanes-Oxley Act of 2002, Pub. L. No. 107-204, § 404, 116 Stat. 745, 789 (codified at 15 U.S.C. § 7262) (addressing management assessment of internal controls).

turn, hire lawyers to help prepare these attestations. It may well be that critics are correct that Section 404 imposes high compliance costs. However, the rule also increases the immediate costs to managers and auditors of engaging in certain types of illegal misconduct and, thus, helps deter managers and auditors who may be motivated to act by their time-inconsistent preference.

   4.   The Potential Costs of the Time-Inconsistent Approach. A possible objection to the deterrence strategy set forth in this section is that a lawmaker will need to have some knowledge of the short-term discount factor of hyperbolic offenders and about the magnitude of the immediate benefits and costs of criminal misconduct. This is true. One advantage of the standard approach—at least in theory—is that, in order to set the optimal sanction, a lawmaker only needs to know the magnitude of the expected harm. The lawmaker does not need to know the identity of potential offenders, the benefits that they would receive, or any other preferences that they may have. This "offender-neutral" approach is attractive, but it is not one that the more nuanced versions of neoclassical theory adhere to or lawmakers follow. For one thing, the neoclassical approach draws distinctions between offenders with different levels of wealth, risk aversion, and beliefs about the magnitude of sanctions and probability of detection. And as we have seen, lawmakers routinely take into account offender-specific factors, such as their offense histories.

   Even if neoclassical theory strictly adhered to the offender-neutral approach, there are at least two reasons why the objection fails. First, in a quest for generality, the neoclassical approach tells lawmakers to assume that their goal is to deter exponential offenders. However, the evidence on time-inconsistency, described in Part III, exposes a number of important shortcomings to this approach. Second, the additional knowledge that lawmakers need to have to adopt optimal sanctions under the time-inconsistent model is not as great as may be first supposed. For example, for many types of crimes it is quite easy to identify the extent to which offenders will receive immediate benefits or incur immediate costs that would lead them to engage in nibbling opportunism or procrastinate complying with legal requirements. Additionally, the time-inconsistent misconduct model would be an improvement over the standard model even if it were to prescribe that lawmakers should use a single short-term discount factor for all offenders. In other words, setting β = 0.9, or 0.8, for all offenders will be a

better approximation of the present-bias of actual offenders than assuming by fiat that none of them will give added weight to the prospect of immediate gratification. Such an intermediate approach would, at the very least, eliminate the current underdeterrence of a subset of hyperbolic offenders. Of course, settling on the right short-term discount factor will require empirical investigation.

C.   *The Market for Commitment Devices and the Value of Default Devices*

When misconduct is observed by third parties, it can trigger immediate informal sanctions that may, in certain cases, be sufficient to offset a hyperbolic offender's present-bias premium. Of course, an offender who believes that the benefits from a crime are much larger than the costs will not be dissuaded by small, informal sanctions. One limitation of lawmakers' reliance on informal commitment is that they will tend to be very sensitive to a hyperbolic offender's level of wealth, social connections, and educational and job prospects. Moreover, an offender's environment and relationships can sometimes have the opposite effect. For example, some of the signs used by gangs and drug dealers to advertise their wealth and profits from crime can make more salient the immediate rewards of misconduct.

To the extent that commitment devices are valuable, one would expect that a market would develop to provide cost-effective commitment opportunities for sufficiently aware offenders. A number of contractual provisions in insurance and financial contracts can be characterized as commitment devices of this sort—affirmative and negative covenants in indentures, and provisions in officers and directors insurance excluding coverage for certain types of misconduct, for example. The aim of many of these provisions is to deter standard time-consistent misconduct. Some of them, however, have a spillover effect, helping deter hyperbolic offenders by increasing the immediate costs of misconduct, reducing immediate benefits, or making future sanctions more salient.

Nonetheless, there is an important obstacle to the development of active markets for commitment contracts: an offender's offer to enter into such a contract will signal to the other party (or the government) that they are contemplating potential misconduct.[164] To the extent that this signal creates a

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164.   *See* DREW FUDENBERG & JEAN TIROLE, GAME THEORY 300–01 (1991) (discussing the problem of revealing information about one's type in games with the government,

cost greater than the benefits from foreclosing time-inconsistent misconduct, offenders will forgo otherwise valuable commitment opportunities.

Given some of the obstacles of developing markets for commitment devices, lawmakers can increase social welfare by providing off-the-rack default devices that can be used by sufficiently sophisticated offenders.[165] In other words, society can provide Ulysses the rope and information about the Sirens without necessarily taking a fully paternalistic approach and tying him to the mast. As with default rules generally, these state-provided devices can create value whenever a large number of offenders face the same misconduct scenario and would each have to develop their own commitment strategies.[166] All other things being equal, a sophisticated offender will be indifferent between using her own device or one provided by society, because she will opt out of it if she can commit at a lower cost.

However, if offenders are sufficiently naïve, they may decide to opt out of default mechanisms. To the extent that lawmakers have sufficient information about the short-term preferences of these naïve offenders they may make some commitment devices mandatory.[167] Nonetheless, there is a simpler, less paternalistic approach: using a default device, but making the immediate costs of opting out sufficiently high to cause naïve offenders to repeatedly procrastinate following through. Finally, another way of reducing paternalistic concerns is for lawmakers to provide commitment devices that have both default and mandatory features. For example, the government provides tax incentives to encourage sophisticated individuals to make contributions to retirement accounts, as well as penalties to deter naïve ones from making early withdrawals; both help hyperbolic individuals overcome the temptation to overconsume early in life.[168]

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given the fact that the government cannot commit to abstain from renegotiating).

165.   *See* Michael Klausner, *Corporations, Corporate Law, and Networks of Contracts*, 81 VA. L. REV. 757, 829–34 (1995) (discussing contractarian arguments regarding the way courts should choose and design default rules).

166.   *See* POSNER, *supra* note 11, at 96 (arguing that courts should fill gaps by imagining what parties would have done if they had thought of the issue at the time of contracting); Charles J. Goetz & Robert E. Scott, *The Limits of Expanded Choice: An Analysis of the Interactions Between Express and Implied Contract Terms*, 73 CAL. L. REV. 261, 261 (1985) (distinguishing between party-supplied terms and state-supplied gap-filling, implied terms).

167.   Tax withholding is one such device, most colorfully summarized by E.B. White. In complaining about its advent, he claims that the rule betrays a government with little confidence in the citizenry: "[I]f left to your own devices, you will fritter away your worldly goods and tax day will catch you without cash." E.B. WHITE, THE SECOND TREE FROM THE CORNER 123 (1954).

168.   *See* David I. Laibson, Andrea Repetto, & Jeremy Tobacman, *Self-Control and*

D. The Puzzle of Lawmakers Spending "Too Much" on Enforcement Efforts

The discussion in the previous two sections helps explain why lawmakers spend more on enforcement efforts than what is predicted by neoclassical theory. Sanctions can be seen as the back-end portion of deterrence (and they will always be delayed), while enforcement activities are at the front-end, and thus are more likely to impact the immediate benefits from crime. Enforcement efforts include expenditures in prevention, monitoring, and detection, which if well tailored can help reduce an offender's access to immediate benefits, increase the immediate costs of engaging in misconduct, and in some instances, act as off-the-rack commitment devices. Obviously, not all enforcement expenditures will reduce immediate benefits—merely increasing the probability of detection will not have the desired effect unless the offender is detected immediately. But by drawing this distinction between delayed sanctions and enforcement expenditures, we can rationalize in part the enforcement decisions of real-world lawmakers. Equally important, this distinction helps focus attention on a variety of approaches available to lawmakers to more effectively deter hyperbolic offenders.

E. The Puzzle of Higher Sanctions for Repeat Offenders

The time-inconsistent misconduct theory provides a new and simpler explanation for why previously-convicted offenders are punished more severely. One way to remedy the underdeterrence of hyperbolic offenders is to impose higher incremental sanctions targeted at their short-term preferences. However, hyperbolic offenders will have different short-term discount factors and, to the extent that a lawmaker does not know the exact distribution of offenders with different levels of present-bias, she can use escalating sanctions to "price discriminate" between them. The following is a highly stylized example that illustrates the general intuition.

Suppose that there are four types of offenders: exponential Mary ($\beta = 1$); barely impatient Jack ($\beta = 0.9$); impatient John ($\beta = 0.7$); and very impatient Bob ($\beta = 0.5$). They can each commit a crime four times, which each time would give them an immediate benefit of $100 and create a social harm of $100.

Saving for Retirement, *in* 1 BROOKINGS PAPERS ON ECONOMIC ACTIVITY 91, 96 (William C. Brainard & George L. Perry eds., 1998) (setting forth a hyperbolic model of overconsumption in the context of saving for retirement).

Assuming for purpose of exposition that there is a 100% probability that the crime will be detected and that the offenders will be punished, the optimal sanction is $100.

From the long-term perspective of period 0, all four offenders will conclude that the crime is not long-run worthwhile (assuming that the offenders obey the law if the benefits equal the sanctions). Under the neoclassical approach the optimal sanction will remain the same regardless of how many times an offender commits a crime. As a result, in periods 1 through 4 exponential Mary will obey the law; however, the three hyperbolic offenders will commit the crime all four times:

Jack: $100/0.9 = $111.11 > $100.

John: $100/0.7 = $142.86 > $100.

Bob: $100/0.5 = $200 > $100.

Suppose that a lawmaker adopts the following punishment schedule:

No prior convictions: $100.

Once-convicted: $125.

Twice-convicted: $150.

Thrice-convicted: $200.

Mary never commits the crime and will not be affected by the escalating sanctions. Given this penalty scheme, however, Jack will only commit the crime in period 1, John in periods 1 and 2, and Bob in periods 1 through 3.

In more realistic scenarios, a lawmaker will want to trade off potential under and overdeterrence produced by escalating sanctions, which means that they would want to increase sanctions in small increments. After a while they may want to have a final large increase to weed out hyperbolic offenders with very large self-control problems; instead of three-strikes regimes, one with five or ten strikes would be better.[169]

F. Time-Inconsistent Obedience and the Puzzle of Overly Compliant Offenders

The final puzzle of the neoclassical approach is that people obey the law more than they should: they routinely fail to engage in misconduct notwithstanding the fact that the benefits are much higher than the expected sanctions.[170] This section

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169. *See* Ted O'Donoghue & Matthew Rabin, *Incentives for Procrastinators*, 114 Q.J. ECON. 769, 771–72 (1999) (describing an incentive scheme for agents in which penalties are increased incrementally to separate agents with different levels of time-inconsistent preferences).

170. *See* Polinsky & Shavell, *supra* note 18, at 72 (discussing the low expected

examines a counterintuitive result that follows when one allows for hyperbolic offenders and which provides at least a partial explanation for the puzzle. The intuition is straightforward: many types of criminal activity require offenders to incur immediate costs, costs which, if sufficiently great, can lead them to repeatedly procrastinate committing crimes that are long-run worthwhile.[171] In other words, if the immediate costs are sufficiently great, a hyperbolic offender may repeatedly conclude that following through with the planned misconduct is not short-run worthwhile. Because these hyperbolic offenders have a long-term preference to engage in misconduct, I refer to their short-term decisions to obey the law as time-inconsistent obedience.

When people consider committing crimes, they take into account both the expected sanctions and a number of fixed costs that they have to incur whether or not the crime is detected and punished. Whenever a hyperbolic offender has to incur immediate costs to commit a crime, she will determine that misconduct is long-run worthwhile whenever the following inequality holds:

(benefits) – [(immediate costs) + (expected sanctions)] > 0

However, she will conclude that misconduct is *not* short-run worthwhile, whenever:

(benefits)/β – [(immediate costs/β) + (expected sanctions)] $\leq$ 0

As a result, a hyperbolic offender will engage in time-inconsistent obedience whenever the following inequalities hold:

(benefits) – [(immediate costs) + (expected sanctions)] > 0 $\geq$ (benefits)/β – [(immediate costs/β) + (expected sanctions)]

There are various types of immediate costs that can lead a hyperbolic offender to engage in time-inconsistent obedience. Offenders have to incur search costs to acquire information about possible crimes and determine whether they are worthwhile. As we saw in Part III, an offender's decision to embark on a path of serial misconduct can be very complex and can require taxing deliberation efforts. Moreover, if the offender decides to commit

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sanctions for tax violations and the fact that one would expect a greater level of underpayment).

171. More specifically, offenders will make short-term decisions to procrastinate following through with planned misconduct if the immediate costs (with the added present-bias premium) are sufficiently great to override the (delayed) benefits of misconduct. In more realistic situations, offenders will face both immediate benefits and immediate costs and the immediate benefits are likely to predominate; that is, however, not always the case—there are many regulatory and white-collar crimes that yield delayed benefits.

the crime, she would have to exert effort to follow through and may experience the anxiety of being detected. She may also experience the immediate disutility that often flows from moral conflicts and an actor's recognition that she has ethical shortcomings.[172] Even when moral strictures are not sufficient to deter criminal activity, they can still create sufficiently large internal moral discord to produce time-inconsistent obedience. While some criminals are morally bankrupt, or at least moral agnostics, one can plausibly assume that some offenders give weight to moral norms, or at least deliberate in their shadow.[173]

Committing a crime also requires an offender to expend resources and exert effort to avoid detection, such as disposing of incriminating evidence and taking other measures to cover her tracks.[174] The avoidance activity of a serial offender will require greater planning and coordination—greater levels of deception, anxiety, and greater effort keeping stories straight and remembering who has been told what, and who may have overheard, detected inconsistencies, or otherwise become suspicious.[175] Finally, when crimes involve more than one offender, the immediate costs of misconduct will increase, given that offenders must coordinate their behavior and monitor each other to assure that no one will opt for leniency in sanction over loyalty to the group.[176]

Finally, sophisticated hyperbolic offenders who want to make sure that they follow through with their planned (worthwhile) crimes may adopt commitment devices. This type of commitment device is more common than may initially appear. The mafia and certain gangs use formal initiation rites—killing someone, for example—and other institutional strategies that act as commitment devices.[177] These features of criminal

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172. *See* George A. Akerlof & Rachel E. Kranton, *Economics and Identity*, 115 Q.J. ECON. 715, 728 (2000).

173. The cognitive dissonance literature attempts to explain how individuals may change their internalized moral rules over time in order to make them comport more closely with their acts of misconduct. Whether or not a person engages in this type of moral arbitrage in response to their acts of misconduct, it is unlikely that a person can completely turn off her moral compass. For an overview of the cognitive dissonance literature, see JONATHAN BARON, THINKING AND DECIDING 208–11 (2000).

174. *See* Sanchirico, *supra* note 22, at 1352–61 (discussing evidence on avoidance investments by offenders).

175. *See* Manuel A. Utset, *Towards A Bargaining Theory of the Firm*, 80 CORNELL L. REV. 540, 594–98 (1995) (arguing that the de facto requirement in *Smith v. Van Gorkom*, 488 A.2d 858 (Del. 1985), that managers leave a paper trail, increases future costs of changing stories).

176. *See* Katyal, *supra* note 134, at 1350–53 (describing monitoring costs within conspiracies to prevent defections).

177. Having group members engage in murder is a particularly powerful

organizations are usually explained as devices that group members adopt to make sure that *other* group members do not defect.[178] However, hyperbolic offenders may also independently value them as a way of committing to a path of worthwhile misconduct.

V. OTHER CRIMINAL LAW IMPLICATIONS OF TIME-INCONSISTENT MISCONDUCT

A. Entry and Exit in Conspiracies

From an economic perspective, one of the puzzles of substantive criminal law is why inchoate crimes such as solicitation, attempt, and conspiracy are punished. These crimes punish offenders even when their behavior has not created harm. For example, a person who shoots to kill but misses may be charged with attempted murder given that she has taken a "substantial step" towards the commission of the underlying crime.[179] On the other hand, the crime of conspiracy only requires that the co-conspirators have reached an agreement.[180] Moreover, while an offender may only be charged for an attempt or the actual offense, co-conspirators can be charged and convicted for being part of the conspiracy, as well as for any offense committed by any of the conspirators. Finally, the law provides much greater leeway for a single offender to abandon an attempt than for a co-conspirator to withdraw from a conspiracy.[181]

Why are conspiracies punished and why are co-conspirators treated more harshly than someone charged with an attempt? The short answer is that group misconduct poses a greater threat to society than do the actions of lone criminals.[182] The time-inconsistent misconduct theory helps explain some of the group

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commitment device because there is no statute of limitations.

178.   These entry rites can also increase a sense of group identity, which, as a result, decreases the potential of defections. *See* Katyal, *supra* note 134, at 1355–58 (discussing various ways to destabilize group identity to encourage defections from conspiracies).

179.   *See* MODEL PENAL CODE § 5.01 (2001) (providing that attempts are punished where an offender's actions constitute "a substantial step in a course of conduct planned to culminate in his commission of the crime").

180.   This is the case in common law conspiracies; however, some conspiracy statutes require some overt action toward the commission of the underlying crime. *See, e.g.*, TEX. PEN. CODE ANN. § 15.02(a)(2) (Vernon 2003) ("A person commits criminal conspiracy if, with intent that a felony be committed . . . , he or one or more of them performs an overt act in pursuance of the agreement.").

181.   WAYNE R. LAFAVE, 2 SUBSTANTIVE CRIMINAL LAW § 12.4, at 308–11 (2001) (discussing restrictions on withdrawing from conspiracies).

182.   *See* Katyal, *supra* note 134, at 1322–23 (providing cognitive psychology explanations for the dangerousness of conspiratorial groups).

dynamics in conspiracies and the legal reactions to them. In particular, it shows that forming conspiracies is more difficult than traditionally thought; at the same time, the theory helps explain the cohesiveness of conspiracies and why they are punished separately.

1. Immediate Costs and Delays in Forming Conspiracies. Conspiracies come into existence with an explicit or implicit "agreement"[183] between two or more individuals to carry out an unlawful act (or a lawful act through unlawful means).[184] Any time that individuals, such as co-conspirators, come together to form a group, they need to incur organizational costs that, if high enough, can lead to collective action problems that prevent the group's formation.[185] While these organizational costs are incurred immediately, the rewards to the members are necessarily delayed, given that a group must first be formed before a surplus can be produced and distributed. This means that, even when each potential co-conspirator believes that forming a conspiracy will provide her with positive expected returns, if the immediate costs of agreeing to conspire are sufficiently great, they each may have an incentive to procrastinate following through. More generally, it follows that overcoming collective action problems will be more difficult than predicted by the standard account because, even when a sufficient number of potential members are willing to contribute to produce a public good, their present-bias can get in the way.[186]

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183.   *See* Iannelli v. United States, 420 U.S. 770, 777 n.10 (1975) (stating that the agreement does not need to be explicit, but may be inferred from the surrounding facts and circumstances of the particular conspiracy).

184.   *See* Pettibone v. United States, 148 U.S. 197, 203 (1893) (defining conspiracy as "a combination of two or more persons, by concerted action, to accomplish a criminal or unlawful purpose, or some purpose not in itself criminal or unlawful, by criminal or unlawful means").

185.   *See* RUSSELL HARDIN, COLLECTIVE ACTION 38–49 (1982) (examining the role of group size in overcoming collective action problems); TERRY M. MOE, THE ORGANIZATION OF INTERESTS 103–08 (1980) (discussing the role of "political entrepreneurs" in overcoming collective action problems); MANCUR OLSON JR., THE LOGIC OF COLLECTIVE ACTION: PUBLIC GOODS AND THE THEORY OF GROUPS, 44–47 (1965) (exemplifying the classical treatment of group dynamics, which emphasizes the role of group size in overcoming collective action problems).

186.   Notice that in this case, the failure to "produce" a public good is not due to the self-interested actions of free-riders or other transaction costs, but rather the to the intrapersonal intertemporal conflicts of each potential group member. *See* Manuel A. Utset, *Producing Information: Initial Public Offerings, Production Costs, and the Producing Lawyer*, 74 OR. L. REV. 275, 287–95 (1995) (drawing a distinction between transaction costs, which are interpersonal in nature, and production costs, which can be either inter or intrapersonal and influence the activity of groups even when transaction costs, as usually understood, are not a factor).

This means, moreover, that policymakers can positively or negatively affect the formation of groups by subsidizing or increasing organizational costs.

In order to reach an "agreement," potential co-conspirators must incur a series of immediate organizational costs in time, effort, and monetary outlays.[187] Potential members must first search for co-conspirators[188] and then acquire and verify information about their skill sets and trustworthiness.[189] They must then delineate the group's goals and identify the extent to which their intentions intersect; in other words, they must make some sense of their "shared intentions."[190] Finally, members must also agree on how to divide tasks and allocate costs and surpluses.[191]

It follows that policymakers can exploit the present-bias of potential co-conspirators by making them liable from the point that they reach an agreement. This strategy increases the immediate costs of organizing conspiracies, because potential members may want to limit their interactions with each other until they are sure that they would benefit from joining. This, in

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187.   *See* Manuel A. Utset, *A Theory of Self-Control Problems and Incomplete Contracting: The Case of Shareholder Contracts*, 2003 UTAH L. REV. 1329, 1358–68 (2003) (arguing that time-inconsistent preferences can lead parties, at the time of bargaining and entering into contracts, to procrastinate making their contracts sufficiently complete and acquiring information about transactional hazards, including the skill and trustworthiness of other parties, and about their *own* abilities).

188.   These search costs are no different than those incurred by consumers (when comparing products and merchants) and unemployed workers searching for employment. *See* LOUIS PHLIPS, THE ECONOMICS OF IMPERFECT INFORMATION 23–24 (1988) (discussing costs of time spent by individuals searching for information); George J. Stigler, *The Economics of Information*, 69 J. POL. ECON. 213, 213–14 (1961) (discussing consumer search decisions). On the interaction between search costs and procrastination, see DellaVigna & Paserman, *supra* note 139, at 563–65 (finding that unemployed workers with higher levels of present bias—impatience, for example—exhibit lower search intensity due to immediate costs of looking for jobs).

189.   *See* Margaret M. Blair & Lynn A. Stout, *Trust, Trustworthiness, and the Behavioral Foundations of Corporate Law*, 149 U. PA. L. REV. 1735, 1803–07 (2001) (discussing social science literature on self-selection by transacting parties and group members along dimensions of trust and trustworthiness).

190.   The concept of "shared intentions" developed by analytic philosophers can valuably apply to the area of conspiracy law, as it helps clarify a number of difficult questions regarding what it means to be a part of a group and the relationship between interpersonal and intrapersonal coordination in groups. *See* MICHAEL E. BRATMAN, *Shared Intention*, *in* FACES OF INTENTION: SELECTED ESSAYS ON INTENTION AND AGENCY 110–13 (1999) (developing the theory of shared intentions that emphasizes the role of such intentions in intra and interpersonal coordination, as well as in intragroup bargaining and conflict resolution); JOHN R. SEARLE, *Collective Intentions and Actions*, *in* CONSCIOUSNESS AND LANGUAGE 90 (2002) (developing an account of collective intentions that draws sharp distinction between individual and collective intentions).

191.   *See* Utset, *supra* note 175, at 589–92 (describing how strategic behavior of firm members when making distributional decisions can lead to bargaining breakdowns).

turn, increases search and coordination costs and, concomitantly, the potential that one or more co-conspirators may procrastinate following through.

2.   *The Problem of Exit: Immediate Punishment and Group Cohesiveness.* We have already seen that, even when offenders want to deviate from a path of criminal misconduct, they will have an incentive to delay if the immediate costs of exit are sufficiently high. One implication of this fact is that the punishment needed for conspiracy leaders to keep members from defecting, if immediate enough, will be *lower* than those predicted by standard collusion models.[192] In other words, the punishment only has to be high enough to foster procrastination, not necessarily to make the costs of exit greater than the benefits from continuing in the conspiracy. The point is not that all members who want to exit will procrastinate until the conspiracy has completed its tasks, although some may; nor is it that procrastination is the only reason members continue in the group (for many, the benefits will exceed the costs). Instead, what the time-inconsistent theory allows us to see is that members who have concluded that they would be better off leaving the conspiracy may nonetheless repeatedly procrastinate following through. This is something that neoclassical offenders, at least in theory, would never do. More generally, it follows that once formed, hate groups, gangs, cartels, and criminal organizations will be more cohesive than standard economic theory predicts.

As a result, a lawmaker who wants to cause group members to defect will need to adopt policies that decrease the immediate costs of exit, or alternatively, that increase its immediate benefits—for example, witness protection, anonymous whistle-blowing, monetary rewards for defectors, public praise, and reductions in sentences.

B.   *Present-Bias and the Entrapment Defense*

The police sometimes resort to undercover techniques that induce or encourage people to commit crimes that they would otherwise not commit (at least, not at that particular point in time). While these techniques are useful for a variety of crimes that are not susceptible to traditional enforcement procedures, they increase the potential for police misconduct.[193] The

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   192.   *See* Becker, *supra* note 15, at 205–07 (discussing the theory of criminal collusion).

   193.   *See* Sorrells v. United States, 287 U.S. 435, 441–45 (1932) (stating that "[a]rtifice and stratagem may be employed" by police because they are often necessary "to

entrapment defense has been developed in part to constrain the ability of the police to overstep the boundary between detecting crime and encouraging criminal misconduct.

Under the Model Penal Code, the defense is available when the police employ "methods of persuasion or inducement that create a substantial risk that such an offense will be committed by persons other than those who are ready to commit it."[194] Although there are no hard-and-fast rules, strategies such as "appeals to sympathy or friendship, offers of inordinate gain, or persistent offers to overcome hesitancy" may be deemed inappropriate inducement, depending on the context.[195] The entrapment defense makes economic sense: the goal of deterrence is to deter offenders who planned to commit crimes that would harm third parties, not to use enforcement resources to stimulate unplanned criminal activity.[196]

Justice Frankfurter provides another justification for the entrapment defense: "Human nature is weak enough and sufficiently beset by temptations without government adding to them and generating crime."[197] The time-inconsistent misconduct theory gives further insight into how the police can tempt people to engage in crime that they would not have otherwise committed and, thus, has implications for the scope of the defense. Even relatively small, immediate inducements can be enough to cause an offender to make a short-term decision to commit a nonworthwhile crime. Moreover, the problem is not just that the police may tempt offenders with immediate benefits: reducing immediate costs would have the same result. For example, the exception to the entrapment defense for situations where police officers "merely afford opportunities or facilities for the commission of the offense"[198] is untenable under the theory, at least when an opportunity sufficiently reduces immediate costs to trigger misconduct.

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reveal the criminal design," but not "when the criminal design originates with the officials of the Government, and they implant in the mind of an innocent person the disposition to commit the alleged offense").

194.   MODEL PENAL CODE § 2.13(1)(b) (2001).

195.   WAYNE R. LaFAVE, 2 SUBSTANTIVE CRIMINAL SANCTIONS §9.8(c) (2d ed. 2003).

196.   *See* SHAVELL, *supra* note 19, at 564–65 (arguing that individuals who had not intended to commit crimes do not need to be deterred).

197.   Sherman v. United States, 356 U.S. 369, 384 (1958) (Frankfurter, J., concurring).

198.   *Sorrells*, 287 U.S at 441.

C. *Domestic Violence and Time-Inconsistent Exits*

Domestic violence is a leading cause of injury to women.[199] A common domestic violence scenario is the following: a woman is abused by her husband in repeated, albeit intermittent, fashion over a long period. The abuse occurs in cycles in which a period of abuse is followed by a period of nonabusive interactions.[200] Finally, it may be physical or psychological, and may be directed at both the woman and children.

Abusers are motivated by a variety of reasons, including a desire to exercise power and control over their victims,[201] but regardless of the underlying motive, engaging in abuse is likely to provide them with immediate benefits. At the same time, not all abusers will have a long-term preference to harm their victims; in fact, under the cycle-of-abuse scenario, abusers alternate between periods of harmful and nonharmful (or more likely, less-harmful) behavior. It follows that those who have a long-term preference to abstain from abuse and are sufficiently aware of their self-control problems would want to adopt commitment devices to prevent themselves from engaging in future abuse.

In a recent article, Jeannie Suk describes the growing use of protection orders and misdemeanor domestic-violence prosecutions as part of a concerted effort to criminalize an abuser's presence in the home[202] and, in essence, effect state-imposed "de facto divorces."[203] Because the home is the place where abusers can experience the immediate benefits from abuse, such a ban takes away the locus of temptation.[204] In any type of relationship, the immediate costs associated with bringing it to an end can lead even loving, but disillusioned, partners to repeatedly procrastinate going their separate ways. The immediate costs of exit for abusers include losing the abusive and nonabusive benefits from the relationship, as well as the

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199. Martha R. Mahoney, *Legal Images of Battered Women: Redefining the Issue of Separation*, 90 MICH. L. REV. 1, 10–11 (1991).

200. *See* Judith Koons, *Gunsmoke and Legal Mirrors: Women Surviving Intimate Battery and Legal Doctrines*, 14 J.L. & POL'Y 617, 671 (2006) (describing the three stages of abuse).

201. *See* Mahoney, *supra* note 199, at 5 (recognizing that "batterer's quest for control of the woman" is central to the "battering process" (emphasis omitted)).

202. *See* Jeannie Suk, *Criminal Law Comes Home*, 116 YALE L.J. 2, 21 (2006) (stating that by excluding abusers from the home, "the protection order identifies the home itself as a dangerous place").

203. *Id.* at 42 (describing the use of criminal courts to "end intimate relationships").

204. For example, Suk notes that "[b]anning the abuser's presence seems a logical way of attempting to make the home free of fear." *Id.* at 21.

effort and other costs of finding a new place to live. A state-imposed "de facto divorce" acts as a sort of deadline to end delays in exiting from the cycle of abuse.

For battered partners, the immediate costs of exit are even higher. Therefore, women who have made long-term decisions to leave their abusers may also repeatedly delay ending the relationship. Even a woman who has begun the process may change her mind once the abuse has subsided and the immediate benefits from exit are not as salient.

Moreover, an abuser can cause a battered partner to stay in the relationship longer than she otherwise wanted by increasing the immediate costs of leaving. For example, an abuser can threaten to withhold economic support, evict the partner, take children away, and, of course, to inflict violence. For the same reason as in conspiracies, the punishment (actual or threatened) necessary to keep a partner in an abusive relationship is lower than that required under the standard account; it definitely does not require threats of violence. The state-imposed divorce described by Suk helps reduce some of these immediate costs of leaving abusers and thus has policy implications that would otherwise remain obscure if one were to adopt the standard time-consistency assumption.

Similarly, the time-inconsistent misconduct theory sheds new light on the "transition role" played by battered-women shelters. Shelters of course protect women from the violence that may follow their announcement to leave an abusive relationship; however, they also reduce the immediate costs of exit and, thus, the incentive to procrastinate affecting a final severance. In other words, women who believe that the benefits of staying with their abusers exceed the costs are unlikely to change their minds merely because of temporary reduction in costs that shelters provide.

D. *Obstacles to Time-Inconsistent Explanations of Criminal Misconduct*

Before concluding, we must address some of the reasons why, notwithstanding the criminology evidence on self-control problems of recidivists, criminal law scholars and policymakers have, as a general matter, resisted giving too much weight to the role played by self-control in an offender's decision to violate the law. One reason is that notions of criminal responsibility developed against the background conception of moral responsibility that, from Plato and Aristotle onward, equated

weakness of will with moral failing,[205] and characterized personal autonomy and the ability to act upon one's will as the paradigm of the rational moral actor.[206]

A second reason is that neoclassical theory is based on the premise that offenders are instrumentally rational: if a person is observed violating the law, claims that she really wanted to do otherwise will be met with skepticism, given that rational actors (at least in theory) do not systematically override their preferences in response to transient temptations.[207] Related to this is the claim that paternalistic "interferences" with a person's self-control problems undermine their autonomy as a rational actor.[208] Therefore, even when self-control problems are acknowledged, the cure (paternalistic intervention) is often deemed costlier than the problem. As I have argued, however, in many instances, it is possible to address self-control problems with minimal state intervention—for example, by providing

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205.   *See* ARISTOTLE, *supra* note 1, at 1811 (stating that "[w]e must consider first, then, whether incontinent people act knowingly or not, and in what sense knowingly"); PLATO, PROTAGORAS, *reprinted in* THE COLLECTED DIALOGUES OF PLATO 308, 338 (Edith Hamilton & Huntington Cairns eds., 1989) (stating that "no wise man believes anyone sins willingly or willingly perpetrates any evil or base act. They know very well that all evil or base action is involuntary."); *see also* J.L. AUSTIN, *A Plea for Excuses*, *in* PHILOSOPHICAL PAPERS 198 n.1 (2d ed. 1970) (arguing that it is an error to equate weakness of will with moral weakness and stating that this "confusion" of collapsing "succumbing to temptation" into losing control is one handed down by Plato and Aristotle).

206.   *See* IMMANUEL KANT, GROUNDWORK OF THE METAPHYSIC OF MORALS 114 (H.J. Paton trans., Harper & Row 1964) (1785) (stating that "a free will and a will under moral laws are one and the same").

207.   Under rational choice theory, rational actors have preferences that are stable over time. *See* DAVID M. KREPS, A COURSE IN MICROECONOMIC THEORY 19–22 (1990) (providing that the general economic model assumes that actors have preferences that are transitive and stable over time).

208.   *See, e.g.*, Anne M. Coughlin, *Excusing Women*, 82 CAL. L. REV. 1, 6 (1994) (arguing battered woman syndrome reinforces "invidious understanding of women's incapacity for rational self-control"); Anthony T. Kronman, *Paternalism and the Law of Contracts*, 92 YALE L.J. 763, 794 n.94 (1983) (arguing that persons who lack the "quality of critical reflectiveness may also be said to lack self-control and even autonomy"). Justice Holmes's concurring opinion in *United States v. Reynolds*, the case striking down the Alabama law allowing individuals to enter into service contracts backed by the threat of imprisonment, provides a standard example of such a paternalistic argument:

   [I]mpulsive people with little intelligence or foresight may be expected to lay hold of anything that affords a relief from present pain even though it will cause greater trouble by and by. The successive contracts, each for a longer term than the last, are the inevitable, and must be taken to have been the contemplated outcome of the Alabama laws [being struck down].

United States v. Reynolds, 235 U.S. 133, 150 (1914). Nonetheless, as can be seen, Justice Holmes's general insight on the self-harm created by repeatedly yielding to immediate gratification is in the same spirit as the arguments advanced in this Article. The difference is that, as I have argued, intelligence has little to do with the problem; in the end, awareness is the key.

default commitment devices, which are analogous to the default rules used in many areas of the law.

A third concern is that strategic offenders will try to avoid responsibility by making self-control excuses.[209] The argument continues that, if self-control problems are as ubiquitous as the evidence indicates, it will be difficult for judges to make meaningful, nonarbitrary distinctions between weak-willed offenders who can plead leniency or a bona fide excuse and those who deserve harsher treatment for failing to address their self-control problems.[210]

It may be that some of these reasons for ignoring the self-control problems of offenders are persuasive, but only, I would grant, when they are being used to question the imposition of legal responsibility. When the concern is deterrence the matter is different. In fact, it is this type of deliberate self-control problem that is most likely to be amenable to changes in deterrence policy, or at least that is what this Article has tried to demonstrate.

VI. CONCLUSION

The time-inconsistent misconduct theory developed in this Article is a relatively straightforward and intuitive explanation for the underdeterrence problem described in Part II. The theory starts with the same basic motivational premise as neoclassical theory: from a long-term perspective, rational criminals *want* to commit only economically worthwhile crimes; unlike the

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209.   A true weak-willed offender has to be able to credibly communicate or signal to judges that they are in fact weak-willed. To achieve this, they have to be able to send signals that cannot be mimicked by strong-willed offenders. This creates a standard "market for lemons" adverse selection problem. *See* George A. Akerlof, *The Market for 'Lemons': Quality Uncertainty and the Market Mechanism*, 84 Q.J. ECON. 488, 493 (1970) (discussing the adverse selection principle in an insurance context).

210.   This problem is captured by the following quotation from a judge considering a downward departure in a convict's sentence:

> [M]any of the offenders that we see commit what we would consider almost irrational crimes. They're impulsive, they have difficulty controlling their impulses, and they exercise poor judgment. That's a characteristic of their lives. . . . I think that what [the Guideline's drafters are] getting at is something less than the old definition of insanity but something that is out of the ordinary, something that is—I won't say "unique," but at least is rare, separating people that would fall within this guideline from the large category of defendants that we see who repeatedly commit crimes . . . .

United States v. Gulley, 29 F. App'x 228, 230 (6th Cir. 2002). This judge's concern with being able to draw proper boundaries is captured more picturesquely by the futile results of the mapmaker in the Borges story who was asked to produce as precise a map as possible and wound up producing a map of the size of the kingdom. *See* JORGE LUIS BORGES & ADOLFO BIOY CASARES, EXTRAORDINARY TALES 123 (Anthony Kerrigan ed. & trans., Herder and Herder 1971).

neoclassical approach, it allows for *almost*-rational (but more realistically rendered) criminals who may yield to the pull of the immediate benefits from misconduct. One important result is showing that the deterrence prescriptions of neoclassical deterrence will, all other things being equal, underdeter hyperbolic offenders. In order to efficiently deter hyperbolic offenders, a lawmaker must directly target their short-term preferences.

A second objective of the Article has been to isolate the factors that affect a hyperbolic offender's decision to engage in repeated misconduct. While it is an offender's present-bias that leads her to commit nonworthwhile crimes, it is her awareness of her future self-control problems and the availability of commitment devices that will ultimately determine whether she engages in occasional or repeated misconduct. Therefore, a principal contribution of the time-inconsistent misconduct theory is to show that a lawmaker can provide cost-effective deterrence by mimicking the commitment devices that sophisticated offenders would adopt for themselves.

The neoclassical approach rules out, by fiat, the potential that offenders will engage in time-inconsistent misconduct. On the other hand, the Article's theory incorporates all of the insight of neoclassical theory for any offender who has no preference for immediate gratification—who has time-consistent preferences. It also provides a new way of thinking about the behavior of all other offenders. Even if it could be empirically verified that almost all criminals have no preference for immediate gratification, the time-inconsistent misconduct theory would still help policymakers design deterrence schemes to effectively deter the remaining offenders.

However, the evidence described in Part III, as well as the criminology self-control literature, would make one suspect that the opposite, positive claim is closer to the truth: that many criminals have time-inconsistent preferences and that, assuming that they do not can make them and any time-consistent offenders worse off; the indiscriminate ratcheting-up of criminal sanctions described in Part II.C is but one example.