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INCHOATE CRIMES REVISITED: A BEHAVIORAL ECONOMICS PERSPECTIVE

Manuel A. Utset *

INTRODUCTION

Inchoate liability is triggered before an offender has completed the underlying offense. An offender is liable for attempting the underlying offense once he has taken substantial steps toward the commission of the offense:¹ for solicitation, once he has solicited another to commit the underlying offense; for conspiracy, once he has agreed to engage in the underlying offense; for burglary, once he has entered the premises, intending, once inside, to commit an underlying offense. Inchoate crimes create the potential that individuals will be punished not due to their 'bad' actions, but for what they say,² the company that they keep,³ or the false testimony of individuals out to settle a score.⁴ Why does society criminalize conduct that, by itself, does not harm others? Both retributivist and consequentialist theories of criminal liability have struggled to give a sufficiently robust normative justification for inchoate offenses.

From a retributivist perspective, an offender is punished because his actions have harmed others, and thus deserve to be

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1. See MODEL PENAL CODE § 5.01(1)(c) (“[attempts are punished where wrongdoer’s actions constitute] a substantial step in a course of conduct planned to culminate in his commission of the crime”).

2. See 2 WAYNE R. LAFAYE, SUBSTANTIVE CRIMINAL LAW § 11.1(c), at 196–98 (2003) (describing problems that can arise with the types of statements that can trigger criminal solicitation).

3. For example, conspiracy liability has been used to deter group activities, such as strikes, that the government saw as threatening. See Francis B. Sayre, *Criminal Conspiracy*, 35 HARV. L. REV. 393, 407–08 (1922) (summarizing case law on prosecution of unions and strikes).

4. See LAFAYE, *supra* note 2, § 11.1(b), at 193 (discussing the potential for false charges in the context of criminal solicitation).

punished.⁵ A person who shoots at another and misses does not directly harm the intended victim and does not deserve to be punished.⁶ A consequentialist is no better off. Under the consequentialist (and thus the law and economics) approach, a lawmaker should set expected sanctions equal to the harm produced by the illegal behavior. If the inchoate crime by itself creates no harm, it should not be punished.

This article develops a general behavioral theory of criminal misconduct and uses this theory to provide new justifications for the existence of inchoate offenses and for why they are punished less severely than the underlying offense.

Criminal misconduct has four general characteristics that are important for understanding inchoate offenses. First, whenever an offender engages in misconduct, he is in essence making a series of intertemporal decisions. An offender must plan and execute the crime, and will have to take steps to avoid detection after the fact. Additionally, by necessity, there is always a temporal gap between the time that an offender commits a crime and the time when society can try to punish him. Second, criminal misconduct involves great amount of uncertainty, both from the offender's and society's perspective. Offenders and law enforcement spend a large amount of time and effort to achieve secrecy and anonymity; one would thus expect that, compared to other areas of the law, the world of crime and punishment involves greater levels of informational asymmetry and strategic uses of information. Third, crimes are by nature irreversible: Once an offender has triggered criminal liability, he cannot undo his deed. Fourth, as a general matter offenders will have the ability to choose when they will commit a crime.

These four factors, taken together, would lead rational offenders to take advantage of the 'real option' involved: Where there is a large amount of uncertainty and actions, once taken, are irreversible, it pays to wait until the right time—until one has resolved a sufficient amount of the attendant uncertainty to lead to

5. See Leo Zaibert, *The Moralists Strikes Back*, 14 NEW CRIM. L. REV. 139, 145 (2011) (describing how the punishment of the deserving legitimizes the system).

6. See Leo Katz, *Why the Successful Assassin Is More Wicked Than the Unsuccessful One*, 88 CAL. L. REV. 791, 795 (2000) (describing difficulty for retributivist in dealing with inchoate offenses).

the best possible decision to either commit a crime or obey the law.

Uncertainty and the irreversible nature of misconduct will have an additional effect: An offender will have an incentive to invest in planning, executing, and covering up his illegal activities. These transaction costs of crimes impose immediate costs on offenders, costs which have been overlooked by the standard law and economics account of deterrence but which play an important role in a world in which offenders exhibit rationality shortcomings. The behavioral theory of criminal misconduct developed in this article focuses on three principal obstacles to perfectly rational behavior.

First, the uncertainty and strategically managed informational asymmetries involved in the relationship between offenders and law enforcement makes criminal misconduct a relatively complex undertaking. Complexity makes information less transparent and increases the likelihood that at least part of it will be obscured from decision-makers. All other things being equal, offenders will pay greater attention to the more salient aspects of the crime and may fail to fully attend to more complex or hidden pieces of information. As this level of inattention increases, so does the likelihood that offenders will commit crimes that they would have avoided but for their inattention.

Second, offenders, like most individuals, routinely exhibit a preference for immediate gratification. Offenders with even relatively small levels of present-bias who are sufficiently overoptimistic about their future willpower can commit non-worthwhile crimes. That is, they will have a long-term preference to obey the law which they will override when they are presented with the prospect of grabbing the immediate rewards from misconduct. This sort of time-inconsistent misconduct can lead to welfare losses for offenders and for the third parties harmed by their erratic behavior.

Third, when making intertemporal decisions, offenders will have to predict their future tastes and preferences. There is a large empirical literature finding that people routinely mispredict the extent to which their preferences may change over time. This is due to a projection bias: When trying to predict their future tastes and preferences, people will give undue weight to their current tastes and preferences. Even though individuals know

that they may be engaged in this sort of distortion, they still underappreciate the full extent of their projection bias. The projection bias can lead offenders to commit non-worthwhile crimes. For example, offenders who are in a hot psychological state may underappreciate the extent to which their preferences will change after the crime, when they are back in a cold psychological state; they may, moreover, underappreciate the full disutility that they will experience if they are apprehended, convicted, and punished.

After developing this general behavioral theory of criminal misconduct, this article shows how it helps us get a better understanding of inchoate offenses. Inchoate offenses increase the overall complexity of planning and executing the underlying offense. A crime's complexity will increase with the number of factors that an offender must take into account in order to succeed with his underlying goal—executing the underlying offense and escaping detection. As a general matter, the greater the complexity involved the lower the likelihood that an offender will commit the crime successfully and avoid detection. The deterrence effect of inchoate offenses, therefore, is greater than that predicted by the standard economic account, given the way that they interact with complexity and the bounded rationality and potential inattention of offenders.

Additionally, inchoate crimes act as a commitment device to help deter time inconsistent (“TI”) misconduct. Attempts, conspiracy, and solicitation are part of an interconnected duo of crimes (the inchoate offense and the underlying crime). Moreover, they punish behavior that does not provide offenders with an immediate return (it is the underlying crime that may provide an offender with an immediate reward).⁷ By imposing liability before the offender commits the underlying crime, and before he can reap its rewards, inchoate crimes force offenders to precommit to the underlying crime ahead of time. An offender who will engage in TI misconduct vis-à-vis the underlying crime, if there is no inchoate liability, may be effectively deterred by the additional punishment provided by attempt, conspiracy, or solicitation liability.

More specifically, I show that sophisticated TI offenders—those who accurately predict their future self-control problems—will be effectively deterred by inchoate liability, even when this liability

7. See *infra* Section III.C (describing this type of strategy for deterring TI offenders).

is much lower than that for the underlying offense. Second, once offenders have triggered an inchoate offense, they will have to incur immediate costs to avoid being apprehended before they are able to complete the underlying offense. I show that naïve TI offenders—those who incorrectly believe that they will have perfect self-control—will have an incentive to repeatedly procrastinate making these prophylactic investments; this will either lead them never to trigger the inchoate offense or will increase the likelihood that they will be arrested before engaging in TI misconduct. In either case, naïve offenders are made better off by the existence of the inchoate offense. For example, as long as the punishment for the inchoate offense is sufficiently lower than that for the underlying offense, TI offenders will be better off if they are prevented from engaging in a non-worthwhile underlying offense. Finally, and for similar reasons, offenders who commit non-worthwhile crimes due to the projection bias would be better off if they are stopped before they commit the underlying offense; inchoate offenses can thus act as a second-best solution for these offenders.

Section I provides a general overview of inchoate offenses. It also summarizes the standard law and economic approach to criminal misconduct and explains the general difficulty it faces in trying to explain why inchoate offenses exist and why they are punished less harshly than the underlying offense. Section II develops the behavioral theory of criminal misconduct. Section III shows how this theory helps explain aspects of inchoate offenses that cannot be fully explained by the standard economic approach.

I. INCHOATE CRIMES: BACKGROUND

The criminal law imposes liability on those whose actions cause a harm if the offender, at the time of acting, has the requisite culpable state of mind.⁸ Sometimes, however, an offender may act with the requisite culpable state of mind but fail to cause a harm. For example, Bob points a gun at Mary, shoots, but misses. An offender may act in a manner that reveals an intent to harm, but be stopped short by the police, the victim, or his own conscience. For example, suppose that Bob points a gun at Mary, but before

8. See 1 WAYNE R. LAFAVE, *SUBSTANTIVE CRIMINAL LAW* § 3.4, at 296 (1986).

he can shoot, the police arrest him, or Mary wrestles the gun from him, or he has second thoughts about shooting Mary, re-holsters the gun, and walks away. In both of these cases, Bob's actions trigger liability for criminal attempt⁹ even though they failed to harm Mary. Similarly, if Bob wanted Mary dead, but, for whatever reason, he did not want to do the deed himself, he may ask Frank to kill Mary on his behalf. The very act of asking Frank to commit a crime opens Bob to a charge of criminal solicitation.¹⁰ If Bob decides to shoot Mary himself but believes that he is most likely to avoid detection if he has Frank act as a lookout, and Frank agrees to join in this scheme to kill Mary, they both will trigger liability for conspiracy at the point that they agree to act jointly.¹¹

Because criminal convictions can lead to imprisonment, stigma, and a continuing impact on the convict after he has served his sentence, the criminal law provides, at least in theory, clear statements of the types of events that will trigger liability. Where there is ambiguity or vagueness, courts will interpret the law narrowly.¹² Modern criminal law, therefore, is codified in statutes which, compared to the judge-made rules, allow for clearer specification, greater constancy, and a higher level of invariance in their interpretation and application.¹³ For example, substantive crimes, such as murder, rape, and robbery, have clear triggering conditions, and the criminal events themselves last for relatively short periods.¹⁴ Inchoate crimes, on the other hand, tend to have less clearly defined triggering conditions and can last for longer periods of time. In other words, while the underlying offense may occur within a relatively small time period, the planning of the underlying offense will often take much longer, and at some point

9. See MODEL PENAL CODE § 5.01 (2001) (defining criminal attempt).

10. See *id.* § 5.02 (defining criminal solicitation).

11. See *id.* § 5.03 (defining criminal conspiracy).

12. See *Rose v. Locke*, 423 U.S. 48, 49 (1975) (noting that criminal law must give adequate warning of what is prohibited); *Papachristou v. City of Jacksonville*, 405 U.S. 156, 170-71 (1972) (striking down an ordinance for giving too much discretion to police in its application).

13. See generally ROBERT NOZICK, *INVARIANCES: THE STRUCTURE OF THE OBJECTIVE WORLD* 1-11, 75-83 (2001) (arguing that, of the various ways of identifying the objectivity of something, a fundamental truth is that an objective fact remains invariant in the face of well-defined, meaningful transformations).

14. An individual may also commit the same crime repeatedly over a short period of time, such as repeated rape or a murder spree.

during this planning phase, an offender may trigger one of the inchoate offenses.

A. *Solicitation*

An offender triggers liability for solicitation to commit a crime “if with the purpose of promoting or facilitating its commission he commands, encourages or requests another person to engage in specific conduct that would constitute such a crime.”¹⁵ An offender may commit the crime himself or delegate its execution to a second party. A rational offender will delegate the commission of a crime whenever he determines that the expected benefits are greater than the aggregate expected cost from delegation. Suppose that A wants to break into B’s house and steal a valuable Picasso painting. If A carries out the crime alone, he will keep all of the proceeds and bear the expected cost from the burglary—the planning, execution, and cover-up costs, as well as the expected sanctions for stealing the Picasso. A, however, may decide that he prefers to delegate the criminal task to C. He may do so because he believes that C is a more efficient thief, in the sense that he can accomplish the crime at a lower expected cost—including the likelihood of being detected. A may also decide to delegate because he does not want to bear the direct and salient disutility from committing the crime. Direct involvement is more likely to trigger disutility from violating moral strictures, for example.¹⁶ Suppose that A approaches C and solicits him to steal the Picasso. If C agrees to do so, then A and C will become co-conspirators;¹⁷ if C rejects A’s offer, then C escapes liability, but A triggers the inchoate offense of solicitation.

Why is solicitation a crime? One reason is to provide a disincentive for A to approach third parties to encourage them to act as his agent in committing a crime. Second, by turning solicitation into a criminal event, law enforcement is able to intervene earlier in the process and detect and prevent potential crimes. Third, a party who solicits another to commit a crime has re-

15. MODEL PENAL CODE § 5.02(1) (2001) (defining criminal solicitation and also defining solicitation to mean an act that would constitute an attempt or would trigger complicity liability).

16. Individuals are unlikely to fully incorporate the full magnitude of hidden costs. See Brian Galle, *Hidden Taxes*, 87 WASH. U. L. REV. 59, 112 (2009).

17. See *infra* Section I.C.

vealed an intention to see that crime committed. However, it is possible to argue that the fact that A has solicited C means that A is unlikely to commit the crime himself or that he believes that he does not have the requisite skill. Nonetheless, it is plausible that if A is rejected by C, he may still approach D, and, if need be, E and F, to commit the crime. Finally, solicitations create a number of negative externalities and, thus, social costs. First, some individuals who had no intention of committing a crime and would have obeyed the law may be convinced to engage in criminal misconduct. Second, if the person solicited is not a repeat player in committing crimes and, thus, is unfamiliar with the ins and outs of criminal law, he may not know what to do and may experience disutility if he does nothing (he may believe that doing nothing violates the law),¹⁸ or he may fear if he reports it to the authorities, he will be persuaded or required to help the authorities (if, for example he is called as a witness). Third, if the person solicited is a repeat criminal and under probation, the very act of being solicited may trigger some liability or additional costs—he may violate probation if he is deemed to be consorting with known criminals or if he fails to report it or if he reports it and it leads to greater scrutiny from his probation officers.

B. Attempt

An individual will trigger inchoate liability for criminal attempt whenever he has taken substantial steps toward the commission of the underlying crime.¹⁹ If A shoots at B with the intent of killing her but misses, he is chargeable for attempted murder.²⁰ If it turns out that who A thought was B was really a “dummy”

18. In some instances, such as when a patient tells a therapist that he intends to commit a crime, the therapist may be required to report this to the authorities. See *Tarasoff v. Regents of the Univ. of Cal.*, 551 P.2d 334, 343 (Cal. 1976); Timothy E. Gammon & John K. Hulston, *The Duty of Mental Health Care Providers to Restrain Their Patients or Warn Third Parties*, 60 MO. L. REV. 749, 749–50 (1995). In general, however, there is no duty to report crimes. See, e.g., Matthew R. Hall, Note, *An Emerging Duty to Report Criminal Conduct: Banks, Money Laundering, and the Suspicious Activity Report*, 84 KY. L.J. 643, 643–445 (1996) (discussing the general historic rule that there is no duty to report crimes).

19. See MODEL PENAL CODE § 5.01(1)(c) (2001) (“[Criminal attempt is] an act or omission constituting a substantial step in a course of conduct planned to culminate in [the offender’s] commission of the crime.”).

20. See *id.* § 5.01(1)(b) (including cases in which the action of omission is done with belief that “without further conduct on his part” it would result in crime).

that looked like B, A nonetheless triggers attempt liability.²¹ Finally, if A raises his rifle and takes aim at B, but the police intervene in the nick of time, before he has fired, A is once again chargeable for attempt, given that aiming the rifle at B is sufficient to constitute a substantial step.²²

Why criminalize attempts? The arguments are similar to those for making solicitation a crime. First, when A attempts to murder B and misses, is mistaken about whom he is shooting at, or is stopped before he is able to complete the underlying crime, he has indicated an intention and predisposition to commit that crime. Even though he failed this time around, he may attempt the crime again. Second, as we have seen, a criminal event occurs in a very small window of time—it may take only seconds for A to aim the rifle and shoot at B. On the other hand, A will spend more time preparing for the crime: Purchasing the weapon, taking it with him in preparation for shooting B, lying in wait, or engaging in other preparatory steps aimed at increasing the likelihood of success. Attempt liability allows the police to intervene during this earlier, larger window. This allows the police to stop a crime before it has reached a point of no return, when the harm has been unleashed. Moreover, even if the police were able to stop A right before he has fired the weapon—giving them a larger window of time to intervene and arrest A for attempt makes sense from the perspective of coordination—a crime can be stopped only if the police and the perpetrator are in the same place at the same time, during a period in which the police have the legal authority to stop the offender from continuing.

C. Conspiracy

Conspiracy liability is triggered whenever two or more individuals agree to engage in criminal conduct or aid in the commission of a crime.²³ Unlike attempts, there is no need for conspirators to

21. *See id.* § 5.01(1)(a) (including cases in which offender believes that his actions would result in crime but is mistaken).

22. *See id.* § 5.01(1)(c) (including cases in which offender is interrupted in the criminal act and cannot complete it).

23. *See id.* § 5.03 (“[C]onspiracy liability is triggered when a person agrees with another to engage in conduct that constitutes [a] crime or an attempt or solicitation to commit such crime [or] agrees to aid [another] in the planning or commission of such crime or an attempt or solicitation to commit such a crime.”); *see also* Pettibone v. United States, 148 U.S. 197, 203 (1893) (“Conspiracy is . . . a combination of two or more persons, by concert-

take substantial steps toward the commission of the underlying crime; all that is needed is for them to reach an agreement.²⁴ Moreover, while a wrongdoer may only be charged for an attempt or the actual offense,²⁵ 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.²⁶ Finally, the law provides much greater leeway for a single wrongdoer to abandon an attempt than for a co-conspirator to withdraw from a conspiracy.²⁷

Why are conspiracies punished and why are co-conspirators treated more harshly than someone charged with an attempt? The standard justification is that group misconduct poses a greater threat to society than do the actions of lone criminals.²⁸ Some crimes, the argument goes, can be carried out more efficiently if two or more individuals join forces, due to the division of labor.²⁹

D. *Standard Economic Model of Criminal Misconduct*

The standard law and economics model of criminal misconduct³⁰ assumes that rational offenders will engage in criminal

ed action, to accomplish a criminal or unlawful purpose, or some purpose not in itself criminal or unlawful, by criminal or unlawful means. . . .”).

24. See MODEL PENAL CODE § 5.03. This is the case in common law conspiracies; however, some conspiracy statutes require some overt action toward commission of the underlying crime. See, e.g., N.Y. PENAL LAW § 105.20 (Consol. 1998).

25. See LAFAVE, *supra* note 2, § 11.5(c), at 250–51 (describing the merger rule for criminal attempt).

26. See *Pinkerton v. United States* 328 U.S. 640, 643–44, 646–47 (1946) (holding a defendant can be convicted for both conspiracy and the underlying offense); LAFAVE, *supra* note 2, § 12.2(b), at 271–75.

27. LAFAVE, *supra* note 2, § 12.4(b), at 308–11 (discussing restrictions on withdrawing from conspiracies).

28. See *Krulwitch v. United States*, 336 U.S. 440, 448–49 (1949) (Jackson, J., concurring) (arguing that group misconduct is more dangerous given the “strength, opportunities and resources” of a group of offenders); Neal Kumar Katyal, *Conspiracy Theory*, 112 YALE L.J. 1307, 1339 (2003) (providing cognitive psychology explanations for the dangerousness of conspiratorial groups).

29. See, e.g., Shachar Eldar, *Punishing Organized Crime Leaders for the Crimes of their Subordinates*, 4 CRIM. L. & PHIL. 183, 192–93 (2010) (discussing division of labor within criminal groups).

30. The standard utilitarian approach to criminal behavior and deterrence is based on the principles of punishment proposed by British philosopher Jeremy Bentham in the late eighteenth century. 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’s basic insights were formalized by economist Gary Becker and further elaborated by law and economics scholars. See RICHARD A. POSNER, ECONOMIC ANALYSIS OF LAW 4 (6th ed. 2003) [hereinafter ECONOMIC ANALYSIS OF THE LAW] (recognizing Beck-

misconduct whenever the expected benefits exceed the expected sanctions.³¹ The benefits can be either tangible or intangible in nature.³² It is usually assumed that the offender will know what they are, but to the extent that he is uncertain, he will discount the gross benefits to account for this uncertainty. For example, a bank robber may be uncertain about how much money is in the bank vault and a mugger, about the contents of a victim's wallet.³³ Committing a crime exposes the offender to fines and imprisonment, as well as informal sanctions, such as shaming, ostracism, and loss of reputation.³⁴ Since not all criminal misconduct will be detected and punished, potential wrongdoers will discount criminal sanctions to account for the probability that they will escape detection.³⁵ Society can increase expected sanctions by increasing the magnitude of the penalty or the probability of detection, which would require society to spend more on law enforcement.

er's work as fundamental to the application of economic reasoning to a broad range of legal questions); 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); Nuno Garoupa, *The Theory of Optimal Law Enforcement*, 11 J. ECON. SURV. 267, 267–69 (1997) (acknowledging Becker in a discussion of the optimal law enforcement model); Richard A. Posner, *An Economic Theory of Criminal Law*, 85 COLUM. L. REV. 1193, 1193–94 (1985) [hereinafter ECONOMIC THEORY OF CRIMINAL LAW] (arguing that Becker's theory can be extended to various areas of substantive criminal law).

31. See ECONOMIC ANALYSIS OF THE LAW, *supra* note 30, at 219–20 (stating that the economic approach to criminal law assumes that offenders are rational actors who commit crimes when the expected benefits exceed expected costs and respond to changes in the magnitude of criminal sanctions and the probability of detection and prosecution); A. Mitchell Polinsky & Steven Shavell, *The Economic Theory of Public Enforcement of Law*, 38 J. ECON. LITERATURE 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 he would get from obeying the law).

32. See ECONOMIC ANALYSIS OF THE LAW, *supra* note 30, at 219 (“[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.”).

33. See James Q. Wilson & Allan Abrahamse, *Does Crime Pay?*, 9 JUST. Q. 359, 375 (1992) (finding that criminals consistently miscalculate the net expected benefits of committing crimes). Throughout the article, I refer to “benefits” instead of expected benefits, but the general conclusions will not change if we allow for expected benefits. The principal difference is that a TI offender who miscalculates the actual benefits from future misconduct may reach different conclusions regarding the need to adopt commitment devices.

34. 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).

35. If the monetary fine for speeding is \$200 and a person believes that the probability that she will be caught is 10%, the expected sanction is \$20. See STEVEN SHAVELL, FOUNDATIONS OF ECONOMIC ANALYSIS OF LAW 503–04 (2004) (noting that, for deterrence purposes, an offender's belief about the probability of detection is more important than the actual probability).

The standard model takes a utilitarian social welfare maximizing approach in which the goal is to cause an offender to internalize the harm produced by his misconduct at the minimum cost to society.³⁶ It therefore focuses primarily on the question of determining the harm produced by misconduct, choosing the magnitude and type³⁷ of criminal sanctions so that offenders are properly deterred,³⁸ and identifying ways in which society can minimize enforcement costs.³⁹ Finally, and importantly for our purposes, the model implicitly assumes that offenders have time-consistent ("TC") preferences. It does so by either using an exponential discount function or, more commonly, assuming that an offender's impatience does not play a material role in his decisionmaking process.⁴⁰

E. *The Conceptual Problems with Inchoate Offenses*

One economic rationale for punishing attempts is that punishment increases the expected sanctions from the underlying crime

36. See Becker, *supra* note 30, at 180–81 (describing the goal of minimizing the social costs of crimes).

37. 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).

38. 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 $p \cdot p \cdot s$ —and if we set $p \cdot s = h$, then the optimal sanction is reached by multiplying the harm by the probability multiplier $1/p$. Therefore, the optimal sanction is h/p . SHAVELL, *supra* note 35, at 482 (discussing underdeterrence when offenders do not have sufficient levels of wealth to pay fines necessary to properly deter them).

39. If the expected harm of an offense is \$1000 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 30, 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 on the probability of detection).

40. 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—for example, some offenders are risk neutral while others are risk averse).

without increasing the actual sanctions.⁴¹ Punishing wrongdoers whether or not the underlying crime succeeds has the effect of increasing the probability that criminal sanctions will be imposed. Attempts, however, are punished less severely than the underlying crime. If punishing attempts allows society to increase expected sanctions in an efficient manner, why not punish attempts as severely as the underlying crime?⁴² Two principal economic justifications have been offered. The first justification is based on fairness concerns: A person who shoots into a bed believing that someone is asleep should be punished, even though no one was in the bed, since the person has exhibited a level of dangerousness that requires deterrence. It does not follow that he should be punished to the same extent as if he had actually succeeded in killing the intended target.⁴³ The second justification is based on the concept of marginal deterrence.⁴⁴ An offender who has taken substantial steps and triggered inchoate liability is unlikely to change his mind and forego committing the underlying offense if the penalty for attempt is the same as that for the underlying offense.⁴⁵

II. A BEHAVIORAL MODEL OF CRIMINAL MISCONDUCT

This Section develops a general model of criminal misconduct based on the certain rationality shortcomings documented in the behavior economics literature on (1) bounded rationality and limited attention, (2) time-inconsistent preferences and the propensity of individuals to procrastinate in certain contexts and overcon-

41. For a discussion on the general constraints on increasing the actual magnitude of sanctions, see *infra* Section III.C.

42. See Omri Ben-Shahar & Alon Harel, *The Economics of the Law of Criminal Attempts: A Victim-Centered Approach*, 145 U. PA. L. REV. 299, 332–36 (1996) (summarizing various approaches used by deterrence proponents to justify having lower sanctions for attempts); Steven Shavell, *Deterrence and the Punishment of Attempt*, 19 J. LEGAL STUD. 435, 435, 446–56 (1990) (describing criminal attempt as inchoate crime triggered even though no harm is produced and setting forth a model of optimal deterrence aimed at justifying punishment attempts, and doing so with lower expected sanctions than for the underlying offense).

43. See ECONOMIC ANALYSIS OF THE LAW, *supra* note 30, at 299–30 (setting forth examples and rationale).

44. Society has an interest in effecting marginal deterrence: if a criminal who rapes someone will receive the same punishment for rape and murder, he will have no reason not to murder the person he rapes, since it will reduce the probability that he will be identified as the perpetrator. See SHAVELL, *supra* note 35, at 518–19 (discussing marginal deterrence).

45. See ECONOMIC ANALYSIS OF THE LAW, *supra* note 30, at 229 (providing marginal deterrence explanation for lower sanctions).

sume (or act too quickly) in other contexts, and (3) projection bias that leads individuals to mispredict their future tastes and, thus, their future preferences.

A. *Four General Characteristics of Criminal Misconduct*

This Section identifies four characteristics of criminal misconduct that play an important role in offenders' reactions to potential sanctions, decisions about whether to commit a crime, and the optimal time to engage in misconduct

1. Intertemporal Nature of Criminal Misconduct

In order to plan, execute, and cover-up a crime, an offender will have to make a series of intertemporal decisions, where the payoff of an intertemporal decision—both costs and benefits—materialize over time. In other words, an offender's decision in one period can affect his welfare in that period and in one or more future periods.⁴⁶ A rational offender will choose his course of criminal misconduct so as to maximize his intertemporal utility (the sum of his current and future well-being),⁴⁷ taking into account how he expects to act in the future.⁴⁸ In making these intertemporal decisions, an offender will take into account the 'instantaneous utility' that he expects to receive in the current period and all relevant future periods. This utility can be positive, such as the benefits from committing a crime, or negative, such as the costs of planning, executing, and covering up a crime, the

46. Intertemporal decisions are those that have deferred consequences; they involve the general problem of how to choose between outcomes that are distributed over time. See George F. Loewenstein & Drazen Prelec, *Preferences for Sequences of Outcomes*, in CHOICES, VALUES, AND FRAMES 565, 565 (Daniel Kahneman & Amos Tversky eds., 2000); George Loewenstein & Richard H. Thaler, *Anomalies: Intertemporal Choice*, 3 J. ECON. PERSP. 181, 181 (1989) (“[I]ntertemporal choices [are] decisions in which the timing of costs and benefits are spread out over time.”). For a general discussion of various roles played by time in decision-making, see Dan Ariely & Dan Zakay, *A Timely Account of the Role of Duration in Decision Making*, 108 ACTA PSYCHOLOGICA 187 (2001).

47. See Ted O'Donoghue & Matthew Rabin, *Choice and Procrastination*, 116 Q. J. ECON. 121, 128 (2001) [hereinafter *Choice and Procrastination*] (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).

48. Under the standard intertemporal model, individuals are assumed to use an intertemporal utility function that captures the sum of their utility over their whole life. See Stefano DellaVigna, *Psychology and Economics: Evidence from the Field*, 47 J. ECON. LITERATURE 315, 316–17 (2009) (discussing general model and its limitations).

immediate disutility if he is arrested, and the punishment he will receive if he is convicted.

2. Uncertainty as to Expected Payoffs

At the time an offender commits a crime, he will be uncertain about the expected payoffs of the crime. The offender will be uncertain about the likelihood that he will be caught, convicted, and punished. This uncertainty, in turn, will depend both on factors within his control and unforeseen contingencies. For example, the victim may be an undercover police officer or a homeowner with an elaborate alarm system and a gun on her night table; there may or may not be witnesses, surveillance cameras, or other means of capturing and preserving other characteristics of an offender that can later be used to identify and convict him. If an offender has accomplices, he will have to take into account the likelihood that they will be caught and agree to cooperate with the police. An offender may also be uncertain about the magnitude of the punishment that he will face if caught, which will depend on the intricacies of sentencing guidelines or norms and whether the crime results in injuries, death, or collateral damage to property. Finally, an offender may be uncertain about the expected benefits from committing a crime. For example, a bank robber may be uncertain about how much money is in the bank vault, a mugger, about the contents of a victim's wallet, and a murderer, about the utility that he will receive from seeing the victim dead.⁴⁹

3. Irreversibility of Crimes

Once an offender has taken all the requisite steps to trigger criminal liability, he cannot undo his crime.⁵⁰ For example, an offender who robs a bank and returns a minute later to return the cash is still subject to liability. An offender who has committed a crime and discovered after the fact that it was a bad idea may try to reduce some of the losses from having made a bad decision: He may turn himself in, enter into a plea bargain, offer an excuse, provide restitution, or apologize to the victims. Alternatively, the

49. See Wilson & Abrahamse, *supra* note 33, at 367–68, 375 (finding that criminals consistently miscalculate the net expected benefits of committing crimes).

50. Cf. LAFAYE, *supra* note 2, § 11.1(d), at 198–201 (discussing that once criminal liability for solicitation is triggered, the offender is typically unable to undo this liability by simply renouncing the crime).

offender may expend additional resources trying to cover up the crime. In choosing between these two general mitigation strategies, a rational offender will choose the one that will minimize the expected loss from the crime, taking into account that attempts to cover-up the crime may trigger additional liability. One of the difficult conceptual issues surrounding inchoate crimes involves the ability of an offender to renounce the inchoate offense *ex post* and the consequences of such a change of heart.

4. Ability to Choose Optimal Timing for Committing a Crime

In most instances, an offender has flexibility in choosing when to commit a crime; while there are crimes of opportunity that are a 'now-or-never' proposition, most crimes do not have such strict time constraints. In fact, it is difficult to think of many crimes in which an offender has such constraints, at least if one allows for offenders who want to achieve a particular goal and can achieve that goal through multiple means. If Andrew wants the crime to yield \$100, he can rob a bank, mug a pedestrian, or burglarize a home. He will have n banks, n pedestrians, and n homes to choose from—he does not have to settle for the first one that comes along. Moreover, each of these possible targets may provide him with different time windows. A bank, for example, is closed during certain hours, and a home is likely to be empty during the day or when the occupants are traveling. More generally, an offender will choose which crime to commit and the optimal time to follow through with the planned misconduct so as to maximize his intertemporal utility.

B. *Consequences of These Four Characteristics of Criminal Misconduct*

Given the uncertainty about the payoffs from criminal misconduct, the irreversibility of criminal liability, and an offender's general ability to decide when, if at all, to commit a crime, one would expect that rational offenders make certain investments to plan, execute, and cover up their crimes and to trigger criminal liability only when they are sufficiently certain of the consequences that will flow from their misconduct. More specifically, in making a decision at time t , an offender will take into account the instantaneous utility, if any, that she will receive immediately, u_t , and the effects of her current decision on her, $t + 1$, instantaneous

utility, u_{t+1} . In making this decision, the offender will need to predict his future utility, which will depend on the state of the world that arises, s_{t+1} , and the payoffs, x_{t+1} , given that state of the world. In period t , therefore, the offender will have a subjective probability assessment of which state of the world may arise, and a sense of how his instantaneous utility can vary, under the various possible states of the world. More precisely, given n possible states of the world, the offender will have a probability distribution, $p(s)$, over those n states. For example, a potential bank robber may believe that there is a 0.5 probability that the robbery will yield \$50,000 and a 0.5 probability that it will yield \$10,000, for an expected benefit of $[(0.5 \times \$30,000) + (0.5 \times \$10,000)] = \$15,500$. He may also believe that the gross sanctions for bank robbery are (translating for the sake of simplicity the disutility from imprisonment into a dollar amount) $[(0.25 \times \$200,000) + (0.25 \times \$100,000) + (0.5 \times \$10,000)] = \$50,000 + \$25,000 + \$5,000 = \$80,000$. Finally, the offender may believe that he has a 0.9 probability of getting away with the crime and a 0.1 probability of being apprehended and punished. The offender will thus conclude that the expected benefits of \$15,500 are greater than the expected sanctions of $(\$80,000 \times 0.1) = \$8,000$.⁵¹ It does not necessarily follow, however, that a rational offender will also conclude that he should rob the bank immediately.

1. Real Options: The Value of Waiting to Commit Crimes

Given the irreversibility of criminal liability, the offender may conclude that it is worthwhile to wait and acquire additional information about the amount of money in the bank, the gross sanctions, and the likelihood that the police will identify him as the bank robber and arrest him. For example, suppose that, by waiting and acquiring more information about the bank, the offender will know whether the bank is of the type that will have \$30,000 or \$10,000 in cash. The offender now has an option value that he needs to incorporate into his decision calculus: If he learns that this type of bank keeps only \$10,000 in cash then he will decide not to rob it, given the expected sanctions of \$8,000. So even though, under the standard account, the offender would rob the bank im-

51. I will assume throughout this article that the offender is risk neutral; an offender who is risk averse would add an additional premium to the disutility associated with the variance around these expected values.

mediately as long as the costs of delaying the bank robbery are not too great, the offender would make use of this real option embedded in the bank robbery decision.⁵² In other words, one can view the decision to rob a bank as having an exercise price that is equal to the expected sanctions triggered by the crime and, that by paying that exercise price, the bank robber receives an asset equal to the proceeds from the robbery. At time t , robbing the bank has a positive net present value of \$7500. But at time $t + 1$, the bank robber will have more accurate information and will decide to exercise the option only if the bank is of the \$30,000 type. While I will not develop the argument further in this article, it should be noted that one justification for imposing inchoate liability on offenders is to make them pay for this option to delay, particularly when the information acquired by the offender allows them to make more accurate decisions at the expense of society.⁵³

2. Discounting to Account for Impatience

In deciding whether a crime is worthwhile and its optimal timing, an offender will also take into account his general impatience; that is, as a general matter, his preference to receive rewards earlier and defer costs until future periods.⁵⁴ Economists model this impatience using an exponential discount function in which the discount factor, δ , captures how much a person discounts a one-period delay in receiving a reward or incurring a cost. An offender who discounts the future using an exponential discount function will, at time t , give full weight to an immediate payoff; he will, in addition, discount a period $t + 1$ payoff by δ , a period $t + 2$ payoff by δ^2 , a period $t + 3$ payoff by δ^3 , and so on—where δ , is set to less than 1. Suppose that an offender discounts a one-period delay using a discount factor, $\delta = 0.5$. A time t , he

52. Cf. AVINASH K. DIXIT & ROBERT S. PINDYCK, INVESTMENT UNDER UNCERTAINTY 27–41 (1994) (developing real option analysis for a plant investment project, and contrasting it with standard net present value approach to making investment decisions).

53. See Manuel A. Utset, *Inchoate Liability: A Real Options Approach* (Mar. 28, 2013) (unpublished manuscript) (on file with author).

54. A person whose discount factor is 1 does not discount delayed payoffs, and the closer a person's discount factor gets to 0, the greater the amount that he discounts for a one-period delay in receiving a payoff. For a general discussion of time discounting, see Frederick et al., *Time Discounting: A Critical Review*, in ADVANCES IN BEHAVIORAL ECONOMICS 162, 167 (Colin F. Camerer et al. eds., 2004). A number of explanations have been offered for this general impatience. See, e.g., Derek Parfit, *Personal Identity*, 80 PHIL. REV. 3 (1971) (arguing that individuals discount future payoffs because of changes in identity over time—i.e., a diminution of the connection between our present and future selves).

would value \$1000 received immediately at its full value, and would value delayed \$1000 payoffs in periods $t + 1$, $t + 2$, and $t + 3$, respectively, at: $\$1000 \times 0.5 = \500 ; $\$1000 \times 0.25 = \250 ; and $\$1000 \times 0.125 = \125 .

3. Investing in Planning, Executing, and Covering Up Criminal Misconduct

Given the uncertainty and irreversibility of criminal misconduct and an offender's ability to time his misconduct, one would expect a rational offender to invest time and money to plan, execute, and cover-up his crimes. These transaction costs of criminal misconduct are best labeled as investments since they require an offender to incur immediate costs at time t in order to produce delayed rewards at time $t + 1$. As a general matter, an individual will make an investment at time t if the immediate costs are less than the delayed future payoffs, properly discounted to take into account the uncertainty regarding the delayed payoffs and to account for the offender's impatience.⁵⁵ An offender will make investments during the planning phase, the actual execution of the crime, and afterwards to cover-up the crime and avoid being identified, apprehended, and convicted.⁵⁶

a. Investments During the Planning Phase

Planning a crime requires an offender to incur immediate costs, an investment that he will make with the expectation that they will produce a net positive return in the future, when he executes the underlying offense. Rational offenders will acquire information and make other up-front investments in order to make a better decision about a potential crime. They will incur a cost at time t , to search for, acquire, and process information⁵⁷ in order to

55. This long-term impatience, modeled in the usual fashion, using an exponential function, includes not just psychological based impatience, but also the general time value of money—which captures the return from investing instead in a risk free asset, at the market risk-free return.

56. 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).

57. See, e.g., Kenneth J. Arrow, *Information and Economic Behavior*, in COLLECTED PAPERS OF KENNETH J. ARROW: THE ECONOMICS OF INFORMATION 136, 138–40 (1984) (discussing the role of information in reducing uncertainty and its value to economic actors who are thus willing to pay to acquire it); LOUIS PHILIPS, THE ECONOMICS OF IMPERFECT INFORMATION 23–24 (1988) (discussing costs of time spent by individuals searching for information). For a general discussion of the decision-making process in acquiring infor-

maximize the expected returns from a crime that will yield returns at time $t + 1$.

For example, an offender will need to invest in information about possible crimes, the punishment attached to each, the likelihood of detection, and the costs and benefits of relying on accomplices.⁵⁸ An offender who chooses to rely on accomplices will have to search for possible candidates and screen them to assure that they possess the requisite skills and trustworthiness.⁵⁹ An offender must also acquire self-evaluative information about his skills, moral compass, and future willpower.⁶⁰ However, the earliest the offender will receive the benefits from these planning investments will be at the time that he commits the crime. On occasion, some or all of the returns may not materialize until after the crime—one can think of the bank robber who delays using the proceeds from the robbery so as not to invite suspicion or the burglar who must convert the stolen items into cash.⁶¹ These immediate planning expenditures may also produce negative returns if

mation, see JACK HIRSHLEIFER & JOHN G. RILEY, *THE ANALYTICS OF UNCERTAINTY AND INFORMATION* 167–208 (1992). On the costs associated with processing information, see Herbert A. Simon, *Alternative Visions of Rationality*, in *RATIONALITY IN ACTION: CONTEMPORARY APPROACHES* 189, 197–200 (Paul K. Moser ed., 1990) (describing role of bounded rationality in decision-making process).

58. As a general matter, people invest in information in order to make better decisions—making an informed purchase, getting an education, choosing a spouse, or planning future activities. See, e.g., GARY S. BECKER, *A TREATISE ON THE FAMILY* 327–31 (1991) (discussing informational imperfections in marriage market); GARY S. BECKER, *HUMAN CAPITAL* 33–51 (3d ed. 1993) (discussing the value of education as investment in humans); MICHAEL E. BRATMAN, *INTENTIONS, PLANS, AND PRACTICAL REASON* 10–11 (1999) (discussing the role of planning as a mechanism for dealing with bounded rationality); George J. Stigler, *The Economics of Information*, 69 *J. POL. ECON.* 213 (1961) (discussing consumer search decisions).

59. See *infra* Section II.B.3.c. (discussing role of immediate costs when offenders rely on accomplices and co-conspirators).

60. In addition to the external informational asymmetries discussed in the contracting literature, transacting parties also face internal informational asymmetries: an individual's informational deficits about his talents and propensity to succumb to self-control problems. See, e.g., Ronald Bénabou & Jean Tirole, *Self-Knowledge and Self-Regulation: An Economic Approach*, in *THE PSYCHOLOGY OF ECONOMIC DECISIONS* 137, 138 (Isabella Brocas & Juan D. Carrillo eds., 2003) (“[Actors] who usually populate economic models have little doubt about ‘who they are’: they know their own abilities and basic preferences.”). A TI offender may procrastinate acquiring self-evaluative information not just due to its actual cost, but also because it may challenge her positive self-image or undermine her self-confidence, both of which can impose immediate disutility. See Roy F. Baumeister, *The Self*, in 1 *THE HANDBOOK OF SOCIAL PSYCHOLOGY* 680, 688–92 (Daniel T. Gilbert et al. eds., 4th ed. 1998) (summarizing literature on value attached to positive self-image and strategies used by individuals to insulate it against negative information).

61. In both of these cases, the offender may also enjoy some immediate utility when he commits the crime.

the offender decides not to commit the crime or is caught before he has completed it or right afterwards, before he has received the full fruit from his labors. As we will see, an offender will voluntarily abandon his original plan to carry out the underlying offense if during the planning phase he discovers new information showing that the underlying offense is not economically worthwhile because the expected costs are greater than the expected benefits.

b. Investment During the Execution Phase

Carrying out a crime requires the offender to incur immediate costs. Even if there are no immediate monetary outlays, the offender will still experience immediate disutility from the exertion of effort, the anxiety of getting caught, and moral conflict.⁶² One would expect that the amount of effort and level of anxiety, both with their attendant disutility, will increase the greater the likelihood that the offender will be caught in the act; what is important, of course, is the offender's subjective probability⁶³ that he will encounter resistance from a victim or that the police will arrest him *in medias res* or right after completing the crime.

c. Investment in Detection Avoidance

Criminals must also expend resources and exert effort to avoid detection after the crime, such as disposing of incriminating evidence and doing other things to cover-up their tracks.⁶⁴ These

62. Even when moral strictures are not sufficient to deter criminal activity, they can still create internal moral discord. While some criminals are morally bankrupt or at least morally agnostic, one cannot adopt a blanket assumption. One can plausibly assume that some potential wrongdoers give weight to moral norms or at least deliberate in their shadows. The cognitive dissonance literature is concerned with explaining how individuals may, over time, change their internalized moral rules in order to make them comport more closely with his acts of misconduct. Whether or not a person engages in this type of moral arbitrage in response to their acts of misconduct, it is likely that such a person had moral reasons, at least in the back of his mind, when deciding whether or not to engage in misconduct. In other words, it is unlikely that a person can completely turn off his moral compass, at least in the deliberate types of misconduct that concern us and which are the ones likely to lead to dissonance adjustments. For an overview of the cognitive dissonance literature, see JONATHAN BARON, THINKING AND DECIDING 208–11 (3rd ed. 2000).

63. See SHAVELL, *supra* note 35, at 503–04 (noting that, for deterrence purposes, an offender's belief of the probability of detection is more important than the actual probability).

64. See Sanchirico, *supra* note 56, at 1352–60 (discussing evidence on avoidance investments by offenders).

immediate costs can be higher for repeat offenders and co-conspirators at least to the extent that their activities involve greater levels of deception, anxiety, and effort at keeping stories straight and remembering who has been told what, as well as who may have overheard, detected inconsistencies, or otherwise become suspicious.⁶⁵ Moreover, co-conspirators will need to monitor each other to assure that no one will defect in order to get a more lenient sentence.⁶⁶

C. *A Restatement of the Offender's Decision-Making Problems*

We can now summarize the general intertemporal decision-making process of rational offenders. In making a decision at time t , an offender will take into account the instantaneous utility, if any, that he will receive immediately, u_t , which will depend on the current state of the world, s_t , and the payoffs, x_t , given that state of the world is $u_t(x_t | s_t)$. The offender's goal is to maximize his intertemporal utility over all relevant periods,⁶⁷ which is the sum of the instantaneous utility in each of these periods, properly discounted to account for (1) the uncertain results due to the uncertainty regarding future states of the world, which the offender would consider using his subjective probability distribution over these future states and (2) the offender's long-term impatience, as captured by his discount factor, δ . If we let $p(s_{t+1})$ capture the probability distribution over possible states in period $t + 1$, then, in period t , the offender will first figure out the expected value of the uncertain payoffs, given this subjective probability assessment, and then discount those expected payoffs by δ to account for his impatience. The offender will figure out his expected payoffs for period $t + 2$ in the same way, and again discount them, this time by δ^2 . He would do the same for period $t + 3$, and so on. After carrying out these calculations, the offender will choose the

65. 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).

66. See Katyal, *supra* note 28, at 1350-53 (describing monitoring costs within conspiracies to prevent defections).

67. In theory, a fully rational decision-maker will choose the course of action in any one period that would maximize her intertemporal utility over her whole life, taking into account how she expects to act in future periods. See DellaVigna, *supra* note 48, at 316-17 (discussing general intertemporal model and its limitations, given the complexity involved in making such long-term plans).

course of action that maximizes the sum of these discounted expected payoffs. With this in mind, we now turn to three general obstacles faced by intertemporal decision-makers generally and analyze how these systematic divergences from the full rationality model can affect the decisions of criminal offenders.

D. *Complexity, Bounded Rationality, and Limited Attention*

A rational offender will attach subjective probability assessments based on the beliefs he holds at the time.⁶⁸ The process of taking in one's environment and observing it is an important type of interaction since it can lead to a realization that our original beliefs do not comport with reality.⁶⁹ Such a realization will lead a rational actor to update his beliefs to account for any discrepancies.⁷⁰ In the end, people choose how to act based on a set of beliefs regarding (1) the current state of the decision environment and (2) how their actions will affect that environment.⁷¹ A decision-maker who has no beliefs about his environment will find it impossible to choose between different courses of action.⁷² At the

68. A belief is a type of disposition to assent to certain propositions about it. If A believes that X is true, then A would assent to the following proposition: "X is true." To say that X believes that Napoleon lost at Waterloo just means that X has the disposition to answer yes if asked: "Did Napoleon lose at Waterloo?" See W.V. QUINE & J.S. ULLIAN, *THE WEB OF BELIEF* 10 (2d ed. 1978) (stating that a person has belief X if he has a disposition to assent to questions regarding those beliefs); Radu J. Bogdan, *The Manufacture of Belief*, in *BELIEF: FORM, CONTENT AND FUNCTION* 149, 160–61 (Radu J. Bogdan ed. 1986) (stating that beliefs "track" certain facts or information about the real world).

69. We can view beliefs as "tracking" certain facts about the real world.

70. See ROBERT NOZICK, *THE NATURE OF RATIONALITY* 67–69 (1993) (discussing various reasons for privileging true beliefs, but stating that in some rare contexts having false beliefs can make someone better off); HIRSHLEIFER & RILEY, *supra* note 57, at 170–78 (describing the process by which people revise their beliefs to account for new information). People sometimes take the opposite tack—they revise their observations to make them conform with their previous beliefs. In short, they engage in cognitive dissonance. See, e.g., Donald C. Langevoort, *The Epistemology of Corporate-Securities Lawyering: Beliefs, Biases and Organizational Behavior*, 63 *BROOK. L. REV.* 629, 647–48 (1997) (describing cognitive dissonance).

71. See NOZICK, *supra* note 70, at 99 ("Beliefs about the world feed forward into actions, and the (perceived) results of these actions . . . feed back, positively or negatively, upon beliefs.").

72. See FRED DRETSKE, *EXPLAINING BEHAVIOR: REASONS IN A WORLD OF CAUSES* 79 (1988) (arguing that a model of belief should, in the end, "reveal the way in which what we believe helps to determine what we do"); FRANK RAMSEY, *THE FOUNDATION OF MATHEMATICS AND OTHER LOGICAL ESSAYS* 238 (1931) ("A belief [is a] map of the neighbouring space by which we steer.").

same time, a person who believes that his actions will have no effect whatsoever will have no reason to act.⁷³

1. The Precision of Information About the Offender's Environment

When an offender interacts with his environment, he will bear certain observation costs. These costs will tend to increase with the amount of precision of the observation. A rational offender will acquire information before making a decision in order to get a better sense of the true state of his environment.⁷⁴ However, as a general matter, information will only provide him with a partial view of the environment.⁷⁵ An observation is more precise if it leads to a conclusion that is closer to the true state of the environment. By increasing the level of precision of his observations, an actor will be better able to make decisions that will meet his underlying goals. As the level of precision decreases, the potential for erroneous beliefs increases—i.e., the potential that a person will believe certain things about his environment that are in fact false. An observer will invest in increasing the precision of his observations only to the point that the marginal benefits equal the marginal costs of added precision.⁷⁶

73. Of course, the person may be mistaken in his belief that his actions are futile, but since his actions are based on his current beliefs, he will nonetheless not have any reason to act. On the other hand, a third-party who holds a correct belief about how that person's intervention can affect the environment may correctly conclude that the person has a reason to act.

74. More generally, a person will want to know whether or not certain propositions about his environment are true—i.e., that they are true in the current state of the environment. See Eddie Dekel & Frank Gul, *Rationality and Knowledge in Game Theory*, in *ADVANCES IN ECONOMICS AND ECONOMETRICS: THEORY AND APPLICATIONS, SEVENTH WORLD CONGRESS 87, 99–101* (David M. Kreps & Kenneth F. Wallis eds., 1997) (describing the Kripke model of knowledge)

75. See JACOB MARSCHAK & ROY RADNER, *ECONOMIC THEORY OF TEAMS* 47 (1972) (“[As a general matter,] information will give only a partial description of the state of the world.”).

76. An actor will use the information to make a decision that will produce a consequence that will affect his overall utility. The actor's goal is to maximize his utility. One way to ascertain the value of more precise information is to assume that an actor can acquire additional pieces of information in order to make his overall information set a more accurate representation of the true state of the environment. For each additional piece of information, the actor can compare the expected utility if he acts knowing that information with the expected utility if he acts without the information. A more formal treatment would require taking into account the fact that an actor may not know ahead of time the actual content, and thus the value of a piece of information. See, e.g., *id.* at 85–86 (describing a way of comparing different types of information structures to ascertain the value of information).

2. The Timeliness of Information

A second factor in judging observations is the timeliness of an observation. An observation is timely if it is made on or before the point in time in which a decision-maker has to use the information. If it is made ahead of time, then one also has to account for the potential that the accuracy of the information will decline with the passage of time. Since acquiring information is costly, an offender will want to take into account the potential that the information will go stale before he uses it. An offender will have two choices. He can either wait to acquire the information at the last possible moment or he may acquire and process the information ahead of time and, then, update the information before he uses it.⁷⁷ Just as the value of information that is acquired too soon may depreciate with the passage of time, information that is needed for a specific point in time and is acquired after the set deadline may lose value the greater the delay in acquiring it.⁷⁸

3. The Inherent Complexity of Criminal Misconduct

Committing crimes is a complex undertaking. As a general matter, the complexity of a decision depends on the number of factors that a decision-maker needs to take into account and the way in which those factors interact.⁷⁹ As we have seen, a fully rational offender will need to make probability assessments about the expected benefits and expected costs of committing a crime,

77. For example, the statements of fact subject to the representation and warranties of financial contracts, such as underwriting agreements, are processed incrementally—at the time of bargaining over the contract, during the due diligence process, when drafting the prospectus, when agreeing to the price of the stock being sold, and at the closing. At each point, the representation and warranties will be updated to reflect changes between the different periods. The philosopher Michael Bratman has argued that one reason why people make plans which they may later abandon is that by planning, an actor can process ahead of time some of the information that he will need to make a final binding decision. Thus, planning is one way of dealing with bounded rationality through the incremental processing of information. See BRATMAN, *supra* note 58, at 10–11, 29 (1987).

78. Cf. Steve Furr, *What is Real Time and Why Do I Need it?*, QNX, www.qnx.com/developers/articles/article_298_1.html (last visited Apr. 5, 2013) (drawing a distinction between hard and soft real-time systems; in the former case, information that is not acquired by a specified deadline loses all its value, while in the soft system information depreciates in value).

79. Herbert Simon defined a complex system as “one made up of a large number of parts that have many interactions,” where its complexity will increase whenever, 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.” HERBERT A. SIMON, *THE SCIENCES OF THE ARTIFICIAL* 195, 207 (2d ed. 1981).

both of which require further probabilistic assessments regarding such matters as the level of law enforcement and vigilance, prophylactic actions of potential victims, and gross sanctions. The police can choose two general law enforcement strategies: to make their presence salient, such as through beat patrolling by uniformed officers or to make themselves invisible, carrying out undercover patrolling or sting operations. This dual law enforcement strategy increases the complexity faced by an offender in assigning a subjective probability assessment to the likelihood of avoiding detection.

Similarly, potential victims can advertise their crime avoidance strategies by making salient that they have alarm systems and guard dogs. A victim may, in addition, have certain hidden crime prevention abilities, such as carrying a concealed weapon or keeping one in an easily accessible place at home. Again, the various prophylactic strategies available to victims will increase the level of complexity faced by a potential offender. This complexity is further exacerbated by the fact that individuals without alarm systems may put stickers on their windows or signs on their front lawn indicating that they have an alarm or may own a loud but otherwise useless crime-fighting dog. In other words, the offender will face a pooling problem similar to those in other areas, such as in the purchase of health insurance or of a used car.⁸⁰

Finally, determining the gross sanctions for a particular crime is no easy feat. Prosecutors have great discretion at the time of charging. They may choose to charge an offender with a single count or break down the offense into multiple counts, depending on the context. Prosecutors also have discretion in agreeing to a plea and a reduced sanction under such an agreement. If the offender is convicted, the judge in turn will have discretion in sentencing, particularly now with the Supreme Court's reigning in of sentencing guidelines.⁸¹ While a judge's discretion without any guidelines increases the complexity for offenders making predictions regarding the gross sanctions that they may face, that com-

80. See George A. Akerlof, *The Market for "Lemons": Quality Uncertainty and the Market Mechanism*, 84 Q.J. ECON. 488 (1970) (describing an adverse selection problem and pooling equilibrium when parties who do not have certain properties can mimic parties who do have those properties—and the general inability of third parties to tell the two apart).

81. See *United States v. Booker*, 543 U.S. 220, 226–27 (2005) (holding that mandatory sentencing guidelines violate the Sixth Amendment)

plexity is arguably less than that under the highly complex mandatory sentencing guidelines in force before *Booker*.

4. Bounded Rationality

Offenders face time and computational constraints⁸² when trying to pierce through this complexity and will often be unable to process and use all of the information in their possession, which is valuable to making optimal decisions and that they would use if they had unlimited time and computational ability. Offenders faced with these constraints, however, will make decisions not as fully rational actors, but as boundedly rational ones.⁸³ A fully rational offender would acquire additional information if it would lead to a better decision, but only to the extent that the added benefits exceed the costs of acquiring, processing, and using that information. An offender who is faced with bounded rationality constraints would do the same, but only up to the point that it is feasible given his timing and computational constraints.⁸⁴ One important constraint is that, all other things being equal, the greater the amount of information available to an offender, the greater the complexity he will face. As a result, an offender constrained by bounded rationality will make use of heuristics and other decisional shortcuts⁸⁵ that can, in certain instances, lead to systematic deviations from the fully rational actor model.⁸⁶

82. See, e.g., STUART RUSSELL & PETER NORVIG, *ARTIFICIAL INTELLIGENCE: A MODERN APPROACH* 845–46 (1995) (discussing a challenge of bounded rationality for artificial intelligence).

83. Herbert Simon's work in this area starts with the "observation that human thinking powers are very modest when compared with the complexities of the environment in which human beings live." HERBERT A. SIMON, *MODELS OF THOUGHT: VOLUME I* 3 (1979).

84. See ARIEL RUBINSTEIN, *MODELING BOUNDED RATIONALITY* 87–93 (Karl Gunnar Persson ed., 1998) (developing an economic model of information acquisition by decision-makers with bounded rationality).

85. See HERBERT A. SIMON, *THE SCIENCE OF THE ARTIFICIAL* 36 (2d ed. 1981) (describing the boundedly rational decision-maker as "a satisficer, a person who accepts 'good enough' alternatives, not because he prefers less to more, but because he has no choice"); BRATMAN, *supra* note 58, at 10–11 (developing a planning theory in which rational actors make contingent plans in order to deal with bounded rationality—i.e., to space out the decision-making process and make better use of complex information).

86. See AMOS TVERSKY & DANIEL KAHNEMAN, *Judgment Under Uncertainty: Heuristics and Biases*, in *JUDGMENT UNDER UNCERTAINTY: HEURISTICS AND BIASES* 3 (Daniel Kahneman, Paul Slovic, & Amos Tversky eds., 1982) (arguing that heuristics have benefits and costs, and can lead to systematic—i.e., non-random—deviations from rational behavior); Christine Jolls, Cass R. Sunstein & Richard Thaler, *A Behavioral Approach to Law and Economics*, 50 *STAN. L. REV.* 1471, 1477–78 (1998) (discussing bounded rationality and heuristics issues within a legal context).

5. Complexity, Informational Opacity, and Inattention

A number of studies have found that the opacity of information—the lack of transparency and of informational overload—can exacerbate the bounded rationality problem and lead to further systematic mistakes in making decisions.⁸⁷ These more recent models build on Herbert Simon's work on bounded rationality, but focus on the fact that an important chain in any decision process is paying attention to relevant information. An offender who has a greater capacity for focusing his attention on piercing through the complexity and opacity of important decisional information is more likely to make accurate, rational decisions than offenders with a lesser capacity for tackling opaque information in a sustained, systematic fashion.

Let v_1 be the benefit from the crime received at time 1, and c_2 , the expected sanctions. A rational offender will commit the crime only if

$$v_1 - c_2 > 0$$

Suppose that an offender who has a limited capacity for attention is making a cost-benefit analysis regarding a potential crime and that the information that he has about the expected benefits and expected sanctions is complex. One way of modeling the effects of this inattention and parsing out the various components that can affect the level of inattention is by introducing an additional parameter, θ , that captures the level of inattention. Here, inattention means that an offender observes a piece of information but fails to fully process it and incorporate it into his deci-

87. Studies have found that consumers are less likely to pay attention to hidden taxes, hidden shipping costs, and financial information revealed on Fridays that is presented in a nontransparent manner or that requires a decision-maker to draw inferences based on the interconnection between companies. See Raj Chetty et al., *Saliency and Taxation: Theory and Evidence*, 99 AM. ECON. REV. 1145, 1145–46 (finding that consumers are less likely to pay attention to hidden taxes); Lauren Cohen & Andrea Frazzini, *Economic Links and Predictable Returns*, 63 J. FIN. 1977, 1978–79 (2008) (finding slow reaction by investors in company A of incorporating information from company B that has an indirect effect on the future value of company A); David Hirshleifer et al., *Driven to Distraction: Extraneous Events and Underreaction to Earnings News*, 64 J. FIN. 2289, 2323 (2008) (finding greater inattention when too much information about different companies is released on the same day); Tanjim Hossain & John Morgan, . . . *Plus Shipping and Handling: Revenue (Non) Equivalence in Field Experiments on eBay*, 6 B.E. J. ECON. ANALYSIS & POL'Y: ADVANCES IN ECON. ANALYSIS & POL'Y 1 (2006) (finding that to the extent that those charges are bundled with the price of the item being sold, purchasers in eBay auctions are less likely to incorporate the shipping charges into their decision process, as opposed to being presented as an independent cost).

sion. He may do so because he does not have the time, the computational ability, or the requisite incentive and ability to try to pierce through opaque information to try to make sense of it. Let o be information that is opaque, and suppose that the information about the expected benefits and expected sanctions is partially opaque. The offender would then make a decision based on the following cost-benefit calculus

$$[v_1 + (1 - \theta) \times o_{v1}] - [c_2 + (1 - \theta) \times o_{c2}] > 0$$

If $\theta = 1$, the offender is fully inattentive; and if $\theta = 0$, he is fully attentive. As the level of inattention increases, so will the likelihood that an offender will make sub-optimal decisions about criminal misconduct. One would expect that an offender who is making a decision based on a large number of parameters—or one in which his attention is diverted to other stimuli—will exhibit a greater level of inattention. Moreover, one way of reducing the level of inattention is to make the opaque information more salient. It follows that society is able to increase an offender's level of inattention by increasing the complexity—the opacity—of information about expected sanctions. Similarly, a potential victim can increase the level of opacity by increasing the costs and difficulty of determining the expected benefits from committing a crime affecting that victim. Similarly, society can reduce the inattention problem by making more salient the gross sanctions and increasing the visibility of law enforcement activities.

E. *Time-Inconsistent Preferences and Criminal Misconduct*

Intertemporal decisions have a long-term and short-term component: A person makes 'long-term decisions' on behalf of his future self based on the information and preferences he has at the time, but it is that future self who makes 'short-term decisions' about whether or not to follow through with those long-term preferences. In doing so, however, the individual will be guided by the information that he has about the current state of the world and his preferences at the time.⁸⁸

88. The standard rational choice model assumes that a person's decision to take an action is sufficient to cause him to act. However, people change their minds all the time and fail to take planned actions, sometimes for no apparent reason. Thus, it is helpful to distinguish between a person's decision to take an action and his decision whether or not to follow through with that action. See BRATMAN, *supra* note 58, at 4–5, 29 (discussing the contingent, reversible nature of plans) ("plans [are defined as] mental states involving an

A rational offender, therefore, has to predict, at time t , the likely state of the world and state of his preferences, at time $t + 1$, and, in particular, anticipate and guard against potential conflicts between their long-term and short-term preferences.⁸⁹ The fully rational offenders of the standard model are uncertain about the future states of the world and thus make decisions based on their subjective probabilities of the expected benefits and expected costs from committing a crime; however, these fully rational offenders are not uncertain about their future preferences: At time t they can, with complete accuracy, predict their preferences at time $t + 1$. As a result, these perfectly rational offenders will exhibit p , perfect self-control—at time t , they make accurate predictions about their level of impatience (and willpower) and of their tastes (and thus their preferences) at time $t + 1$. However, there is a large body of empirical work finding that individuals routinely make mispredictions about their future impatience/willpower—which can lead them to exhibit TI preferences and future tastes which can lead them to exhibit a projection bias. This Section develops a model of criminal misconduct that allows for offenders with TI preferences. The following Section develops a model of criminal misconduct that takes into account the projection bias.

1. Exponential Discounting and TC Preferences

Recall that a rational offender chooses his behavior over time, so as to maximize his intertemporal utility, and does so taking into account the uncertainty regarding future payoffs, as well as his level of impatience. The standard model assumes that offenders discount delayed payoffs using an exponential discount function. Under this approach, the offender is assumed to have a discount factor $\delta > 1$, that captures his level of impatience between any two periods. As a result, from the perspective of period t , immediate payoffs are given full weight, and the instantaneous utility in pe-

appropriate commitment to action; for example, I have plan A only if it is true of me that I plan to A"); JOHN R. SEARLE, *RATIONALITY IN ACTION* 14–15 (2001) (discussing the gap between the time a person makes decision and time he follows through) (“[Y]ou cannot sit back and let the decision cause the action, any more than you can sit back and let the reasons cause the decision.”).

89. See George F. Loewenstein et al., *Projection Bias in Predicting Future Utility*, 118 Q.J. ECON. 1209, 1210 (2003) (stating that when an individual makes an intertemporal choice, he must account not only for his current preferences, but must also predict how changes in future states will affect future preferences).

riods $t + 1, t + 2, t + 3, \dots t + n$, are discounted by $\delta, \delta^2, \delta^3, \dots \delta^n$, respectively. The exponential function has an important characteristic: It will lead to the same discounting results between any two periods, regardless of when the discounting is carried out, which is the same as saying that an exponential discounter's utility vis-à-vis delayed payoffs declines at a constant rate over time.⁹⁰ As a result, by assuming that offenders make intertemporal decisions using an exponential function, the standard model implicitly assumes that offenders will always exhibit TC preferences.⁹¹

2. Time-Inconsistent Preferences

However, there is a large amount of empirical evidence finding that, in the real world, individuals have a long-term preference to behave in a TC manner but make repeated short-term decisions to override their long-term preference due to the pull of immediate gratification.⁹² When an individual reverses his long-term

90. More formally, suppose that in period 0, a person discounts between a payoff of \$1000 in period 5 and \$1,500 in period 6. From the perspective of period 0, the person will make a long-term decision to wait to receive the payoff in period 6 only if $(\delta^6 * \$1500) - (\delta^5 * \$1000) > 0$. When period 5 arrives, the person will confirm his long-term decision and wait for the higher payoff in period 6 only if $(\delta * \$1500) - \$1000 > 0$. Exponential discounting guarantees that a person's long-term and short-term decisions will always coincide, since $(\delta^6 * \$1500) - (\delta^5 * \$1000) > 0$ implies that $(\delta * \$1500) - \$1000 > 0$. This follows from the fact that dividing both parts of the left-hand side of the first equation by δ^5 yields the second equation: in other words, $[(\delta^6 * \$1500)/\delta^5] - [(\delta^5 * \$1000)/\delta^5] = (\delta * \$1500) - \$1000$. It is this characteristic of exponential discounting that guarantees a person will exhibit time-consistent preferences.

91. Unlike the large body of evidence supporting the TI 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 419, 422 (George Loewenstein et al. eds., 2003) (stating that exponential discounting "has not been empirically supported by behavioral research" conducted in humans and animals); GARY S. BECKER, ACCOUNTING FOR TASTES 11 (1996) ("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 et al., *supra* note 54 at 167 (noting that Samuelson and Koopman, the two economists most responsible for formalizing the TC model, never endorsed the exponential discount function as an accurate representation of myriad psychological factors that motivate individuals to discount future payoffs).

92. The original challenge to the TC assumption came from a series of experiments finding that people value immediate gratification. See Ted O'Donoghue & Matthew Rabin, *Doing It Now or Later*, 89 AM. ECON. REV. 103 (1999) [hereinafter *Doing It Now or Later*] ("[TI 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."). In an early experiment, economist Richard Thaler asked subjects to imagine that they had won a lottery and gave them the choice of receiving the money immediately or leaving it in the bank, earning in-

preferences in this manner, he exhibits TI preferences. It follows that TI individuals do not have a constant discount rate.⁹³ Instead, from a long-term perspective, they discount the future in the same manner as an exponential discounter, their impatience increases the closer that they get to immediate payoffs, and it is this increased impatience that can lead them to exhibit self-control problems.⁹⁴

terest. The subjects were then asked how much they would require in interest to make them indifferent between receiving the money immediately rather than later. Thaler found that the implicit discount rate dropped as the length of the delay in receiving the money increased. For example, when subjects were given the choice between receiving \$15 immediately or in 3 months, 1 year, or 3 years, they required median return required was \$30 for a 3 month delay, \$60 for a 6 month delay, and \$100 for a 1 year delay. When this is translated into an explicit continuously compounded discount rate of 277%, 139%, and 63% for a wait of 3 months, 6 months, and a year, respectively. As can be seen, the discount rates of the participating subjects declined over time, something that would not be allowed under exponential discounting. See RICHARD H. THALER, *Some Empirical Evidence on Dynamic Inconsistency*, in QUASI RATIONAL ECONOMICS 127, 128–30 (1991); see also Uri Benzion et al., *Discount Rates Inferred from Decisions: An Experimental Study*, 35 MGMT. SCI. 270 (1989) (experiment finding declining discount rates); Gretchen B. Chapman, *Temporal Discounting and Utility for Health and Money*, 22 J. EXPERIMENTAL PSYCHOL.: LEARNING, MEMORY, & COGNITION 771, 771 (1996) (finding steeper discounting over short delays than longer delays for money rewards and hypothetical health outcomes); Kris N. Kirby et al., *Heroin Addicts Have Higher Discount Rates for Delayed Rewards than Non-Drug-Using Controls*, 128 J. EXPERIMENTAL PSYCHOL.: GEN. 78, 78 (1999) (finding greater amount of short-term impatience among heroin addicts); Kris N. Kirby & Nino N. Maravovic, *Modeling Myopic Decisions: Evidence for Hyperbolic Delay-Discounting within Subjects and Amounts*, 64 ORGANIZATIONAL BEHAV. & HUM. DECISION PROCESSES 22, 24 (1995) (finding, in an experiment with 22 college students, that hyperbolic function was a better fit); Kris N. Kirby & Richard J. Herrnstein, *Preference Reversals Due to Myopic Discounting of Delayed Reward*, 6 PSYCHOL. SCIENCE 83 (1995) (discussing a similar experiment and results, that 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); Joel Myerson & Leonard Green, *Discounting of Delayed Rewards: Models of Individual Choice* 64 J. EXPERIMENTAL ANALYSIS BEHAV. 263 (1995) (finding in an experiment with 12 undergraduates that hyperbolic function better fit the results than exponential function).

93. Unlike the TC actors of exponential models who have constant discount rates, people actually exhibit *declining* discount rates. Economists model declining discount rates using a hyperbolic discount function instead of an exponential one. See GEORGE AINSLIE, *PICOECONOMICS* 63–80 (1992) (describing evidence of declining discount rates and the use of hyperbolas to model them); Christopher Harris & David Laibson, *Hyperbolic Discounting and Consumption*, in 1 *ADVANCES IN ECONOMICS AND ECONOMETRICS: THEORY AND APPLICATIONS, EIGHTH WORLD CONGRESS* 258, 258 (Mathias Dewatripont et al. eds., 2003) (stating that generalized hyperbolic discount functions decline at a faster rate in the short-run than in long-run scenarios, matching key feature of experimental data); George Loewenstein & Drazen Prelec, *Anomalies in Intertemporal Choice: Evidence and an Interpretation*, 107 Q.J. ECON. 573, 579–80 (1992) (setting forth the hyperbolic discount function).

94. As a general matter, people exhibit self-control problems when they “would ‘like’ to behave in one manner, but instead ‘choose’ to behave in another.” Ted O’Donoghue & Matthew Rabin, *The Economics of Immediate Gratification*, 13 J. BEHAV. DECISION

One way to combat potential self-control problems is to take prophylactic action. For example, a person who is sufficiently aware of his future self-control problems can adopt a commitment device, a mechanism that restricts his ability to yield to the transient pull of immediate gratification when making short-term decisions in the future.⁹⁵ Some of the strongest evidence that people have TI preferences comes from the fact that they routinely adopt such devices.⁹⁶ Commitment devices are costly to implement, and, even if they were available at zero cost, people are reluctant to

MAKING 233, 233 (2000); see also George Loewenstein, *Out of Control: Visceral Influences on Behavior*, 65 ORGANIZATIONAL BEHAV. & HUM. DECISION PROCESSES 272, 272 (1996) [hereinafter *Out of Control*] (stating that an individual exhibits self-control problems when there is a gap between “perceived self-interest and behavior”).

95. 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 push to act in ways that diverge from what they really want).

96. See O’Donoghue & Rabin, *Doing It Now or Later*, *supra* note 92, at 105 (describing economists’ use of commitment devices as evidence—“smoking guns”—of TI preferences). People with long-term preferences to eat healthily, exercise, and lose weight, but who repeatedly yield to immediate gratification, join health clubs and go to special weight-loss spas, both of which require costly up-front commitments. See, e.g., Thomas C. Schelling, *Economics, or the Art of Self-Management*, 68 AM. ECON. REV. 290, 290 (1978) (discussing “Christmas Savings” bank accounts, whereby individuals commit to make regular deposits that cannot be withdrawn until November and individuals who have their employers over withhold their taxes in order to reduce their tax liability in April); see also Dan Ariely & Klaus Wertebroch, *Procrastination, Deadlines, and Performance: Self-Control by Pre-commitment*, 13 AM. PSYCHOL. SOC’Y 219, 220–23 (2002) (discussing role of self-imposed deadlines in addressing temptation to procrastinate); Klaus Wertebroch, *Consumption Self-Control by Rationing Purchase Quantities of Virtue and Vice*, 17 MARKETING SCI. 317, 317 (1988) (discussing paying a premium to acquire cigarettes as a commitment device). 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 30-day minimum stay and requires patients to pay for that 30-day period at the time that they check in. See *Admission Guidelines: Cirque Lodge, Sundance, Utah*, CIRQUE LODGE, <http://www.cirquelodge.com/Admission/AdmissionGuidelines.php> (last visited Apr. 18, 2013) (patients are required to make a deposit of \$34,800 for Lodge and \$27,750 for studio at time of check-in).

restrict their ability to act freely in future periods⁹⁷ unless they believe that they will have self-control problems.⁹⁸

3. TI Misconduct: Criminal-Overconsumption and Criminal-Procrastination

An important characteristic of criminal misconduct is that there is always a temporal gap between the time the offender commits a crime and the first possible moment in which he 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 he can be punished. Moreover, an offender will often receive an immediate return from committing a crime in the form of money, property, and intangible utility.⁹⁹ For example, researchers have found that some criminals get immediate pleasure from violating the law, either from retaliating against perceived social unfairness or from the esteem received from fellow criminals.¹⁰⁰

In order to model TI offenders, it is helpful to introduce a second discount factor, $\beta < 1$, which captures an offender's preference for immediate gratification. This short-term discount factor is only operative when an offender is contemplating an action in the current period that will allow him to grab an immediate benefit or incur an immediate cost. If an offender has a short-term discount factor $\beta = 0.5$, then from a short-term

97. 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, 504-07 (2002) (finding that individuals who were given the choice to change their minds about which photography prints to keep liked their choices less than those who had no ability to change, and yet individuals still preferred having option to change).

98. See Ariely & Wertenbroch, *supra* note 96, at 223 ("A rational decision maker with time-consistent preferences would not impose constraints on . . . her choices.")

99. See MICHAEL R. GOTTFREDSON & TRAVIS HIRSCHI, A GENERAL THEORY OF CRIME 89 (1990) (cataloguing immediate rewards of crime).

100. See e.g., JACK KATZ, SEDUCTIONS OF CRIME: MORAL AND SENSUAL ATTRACTIONS IN DOING EVIL 312, 312 (1988) (internal quotation marks omitted)("[Criminals take] delight in deviance [and] take pride in a defiant reputation as bad."); 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, 1225 (1982) (finding that revenge is one of the major motivators of employee theft).

perspective he gives twice as much weight to the immediate benefits from misconduct than he does from a long-term perspective. For example, assume that the immediate benefits from committing Crime A are \$100, then, from a long-term perspective, the offender perceives those benefits at their face value but gives them twice the weight when faced with the opportunity to commit a crime.

Assume that the benefits from a crime will be received immediately, but the sanction will not be imposed until at least one period after the crime is committed. A TI offender gives full weight to benefits and costs when they are immediate but discounts them by their short-term discount factor if they are delayed by one or more periods. The first thing to note is that TC *and* TI offenders will form long-term and short-term intentions to commit crimes only if the expected benefits exceed the expected sanctions. Let v_1 be the benefits from a crime, which are received in period 1, and c_2 the expected sanctions that are incurred, if at all, in period 2. From a long-term perspective of period 0, TC and TI offenders will form an intention to commit the crime only if

$$(1) v_1 > \delta c_2$$

This is because, from a long-term perspective, all benefits and sanctions are in the future, and as a result, the short-term discount factor does not play a role.¹⁰¹ This should be comforting given that this is the principal behavioral assumption of the standard law and economics model; moreover, it is one that makes intuitive sense.

From a short-term perspective, TC offenders will always keep to their original decision (unless they have acquired new information)—i.e., they will make a short-term decision using equation (1).¹⁰² On the other hand, TI offenders make short-term deci-

101. More formally, assume that the long-term expected returns from misconduct are denoted by v , the long-term expected sanction by s , and cost by c . From a long-term perspective the net expected returns from committing a crime in periods 1 through n are: $\beta v_1 - \beta c_1, \beta v_2 - \beta c_2, \dots, \beta v_n - \beta c_n$. A TI offender will have a long-term preference to abstain from misconduct in any period i in which $\beta v_i - \beta c_i < 0$ and to engage in misconduct if $\beta v_i - \beta c_i > 0$. Since, β is constant over all periods we can cancel them out, both types of offenders will have a long-term preference to abstain from misconduct in any period i in which $v_i - c_i < 0$ and to engage in misconduct if $v_i - c_i > 0$.

102. For example, if a TC person has concluded that the long term expected returns from misconduct in period i are $v_i - s_i < 0$ he will necessarily conclude that the short-term expected returns are $v_i - s_i < 0$, and vice-versa.

sions to engage in criminal misconduct whenever the benefits from the crime exceed the discounted delayed sanctions

$$(2) v_1 > \beta\delta c_2$$

Since both the long-term discount factor, δ , and the short-term discount factor, β , are less than 1, it has to be the case that $\beta \times \delta < \delta$. As a result, if equation (1) was such that

$$(1a) v_1 < \delta c_2$$

a TC and a TI offender would make a long-term decision to obey the law, and while a TC offender will end up abstaining from misconduct, a TI offender will override his long-term preferences whenever β is sufficiently less than 1, such that equation (2) holds. When an offender reverses his long-term preference in this manner, he engages in TI misconduct and incurs a welfare loss (under the standard assumption that both TC and TI offenders have a long-term preference to act in a TC manner—i.e., a long-term preference not to yield to the pull of immediate gratification).

In conclusion, an offender will engage in TI misconduct whenever

$$(3) v_1/\beta - \delta s_2 \geq 0 > v_1 - \delta s_2 \text{ (condition for TI misconduct)}$$

Here, $1/\beta$ is the offender's 'immediacy multiplier;' if he has a $\beta = 0.5$, his immediacy multiplier is $1/0.5 = 2$. The difference between an offender's long-term, undistorted, perception of the expected benefits from misconduct, v_1 , and his short-term perception, as distorted by his immediacy multiplier, is what leads an offender to engage in TI misconduct. I will refer to this difference between the distorted and undistorted perception of the benefits from misconduct as the offender's "immediacy premium": $v_1/\beta - v_1 > 0$.

Finally, the immediate benefits from misconduct are of two types. First, when a law prohibits a certain type of behavior—such as embezzlement, burglary, and murder—an offender may receive immediate utility from engaging in that behavior. Compared to TC offenders, a TI offender will have an incentive to overconsume prohibited actions of this sort. Secondly, when a law requires an actor to do something by a specific date—such as filing a tax return, renewing a driver's license, or making a corporate disclosure—the immediate benefit in question is the delay in incurring the immediate disutility of complying with the legal

rule. Again, compared with TC offenders, a TI offender will have an incentive to procrastinate complying with this sort of legal rule.

4. Awareness of Self-Control Problems

We will say that a TI offender is either sophisticated, naïve, or partially naïve about his self-control problems.¹⁰³ A sophisticated offender correctly predicts both his future immediacy premium and thus can anticipate his incentive to make short-term decisions to commit negative-return-crimes.¹⁰⁴ Knowing this, he will adopt a commitment device to foreclose his future TI misconduct, as long as it costs less than the aggregate welfare losses from that misconduct.¹⁰⁵ On the other hand, a naïve TI offender believes incorrectly that he will act in a TC manner in the future¹⁰⁶ and will not see the need to pre-commit.¹⁰⁷ A naïve offender thinks that he has an immediacy premium of \$0 and thus will perceive immediate costs and benefits at their face value. Finally, a partially naïve offender knows that he has self-control problems but miscalculates the true magnitude of his immediacy premium.¹⁰⁸ He will therefore underinvest in commitment devices or may not adopt them at all. Importantly, even relatively small prediction errors can lead a partially naïve offender to act in the same manner as a naïve offender.¹⁰⁹

103. See *Choice and Procrastination*, *supra* note 47, at 126–27 (developing a model of partially naïve TI actors and distinguishing sophisticated and naïve individuals from partially naïve individuals who are aware of future self-control problems but underestimate the magnitude of their future temptation to procrastinate).

104. See *Doing It Now or Later*, *supra* note 92, at 108–09 (describing sophisticated individuals as those who can correctly predict the magnitude of TI preferences).

105. *Id.* at 113–14.

106. See *id.* at 108 (stating that naïve procrastinators act as if in future periods they will have TC preferences and will face no self-control problems).

107. Even if a commitment device is free, it still limits the offender's freedom in future periods. See *supra* notes 101–02 and accompanying text (discussing the option value of not precommitting unless offender believes that he will exhibit self-control problems in the future).

108. *Choice and Procrastination*, *supra* note 47, at 122.

109. This will occur whenever a partially naïve offender's miscalculations lead him to incorrectly believe that his short-run self will conclude that engaging in criminal misconduct has negative expected returns. See *id.* at 126–27, 141 (concluding that even small amounts of overoptimism can lead a partially naïve person to act in the same manner as a naïve one).

5. Detering Criminal-Overconsumption and Criminal-Procrastination

In designing an optimal deterrence scheme, a lawmaker would identify harmful behavior that he wants to deter and set the expected sanctions equal to the expected harm.¹¹⁰ The aim of such a scheme is not to foreclose all criminal activity but to cause offenders to take into account the harm that they produce.¹¹¹ For example, if securities fraud produces a harm of \$10,000, and there is a 50% probability that a violation will be detected and punished, then the optimal fine is \$20,000.¹¹² This will assure that the expected sanctions and harm both equal \$10,000 and that a utility-maximizing offender will engage in fraud only if the benefits he receives exceed the harm created.

Society can provide TI offenders with mandatory commitment devices in the form of criminal sanctions. TI offenders who are sufficiently sophisticated will adopt commitment devices on their own, but, all other things being equal, they should be indifferent between private and public devices. From a social welfare point of view, however, a lawmaker should choose the approach that would minimize the costs of commitment and that effectively deter TI offenders without over-detering TC offenders (at least past the point in which the social loss from over-deterrence is greater than the social gains from deterring TI misconduct).

110. By setting the expected sanctions equal to the expected harm, the lawmaker assures that an offender internalizes the harm from his activities. If the offender receives a benefit that exceeds the expected harm then society would be better off if he commits the crime. See Becker, *supra* note 30, at 181–85 (calculating aggregate welfare by taking into account the benefits offenders receive from their criminal activity). As a result, the law and economics approach to criminal sanctions mirrors that for choosing the optimal damages for tort violations. In both scenarios, the aim is to make sure that, at the time that an actor chooses to engage in an activity, he incorporates into his cost-benefit analysis the expected harm that he may produce. See SHAVELL, *supra* note 35, at 456–57, 474–79 (discussing analogous strict liability and fault-based rules in tort and criminal law contexts).

111. 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. In order to affect complete deterrence, these crimes require the maximum sanction. See ECONOMIC THEORY OF CRIMINAL LAW, *supra* note 30, 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). However, the crimes involved in corporate settings rarely call for total deterrence.

112. 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 .

Because TI offenders engage in TI misconduct whenever the delayed sanctions are less than the immediate benefits, as distorted by his immediacy multiplier, lawmakers can use five general strategies to deter TI offenders. Three strategies target offenders' short-term preferences, and two strategies target offenders' long-term preferences.

a. Targeting Short-Term Preferences

First, in the case of criminal-overconsumption, a lawmaker can adopt legal rules and enforcement strategies that delay when an offender receives the proceeds from misconduct; and in the case of criminal-procrastination, a lawmaker can delay when an individual has to incur the immediate costs to comply with the legal rule. Second, if it is not possible to completely delay the receipt of immediate benefits or incurrance of immediate costs, lawmakers can still deter TI misconduct by reducing these immediate benefits/costs by an amount that extinguishes the immediacy premium. Suppose that an offender has an immediacy multiplier of 2 and that the delayed sanction for burglary and filing late tax returns is \$150. If a burglary would yield an immediate benefit of \$100, then the offender is under-deterred by \$50. Since the offender gives twice as much weight to each \$1 reduction in the immediate benefits, reducing them by \$25.25 would deter him.¹¹³ Similarly, if the TI individual has to pay \$100 in taxes at the time of filing, he will have an incentive to procrastinate. However, if he is allowed to delay paying \$25.25 of those taxes until a later date, he will file on time. Third, a lawmaker can deter a TI offender by offsetting the immediate benefits/costs that are motivating him to engage in misconduct. As we just saw, a lawmaker can deter the burglary by decreasing the immediate benefits by \$25.25; however, the lawmaker can achieve the same results by increasing by the same amount the immediate costs the offender must incur to commit the crime. Similarly, in order to foreclose the incentive to procrastinate filing taxes, the government can provide the taxpayer with an immediate benefit of \$25.24 at the time of filing and later increase the taxes by that same amount.¹¹⁴

113. In this case the offender would perceive distorted immediate benefits of $\$74.75 \times 2 = \149.50 , which is less than the delayed sanctions of \$150. A lawmaker can achieve the same result by delaying the receipt of \$25.50 of the proceeds from the crime.

114. The TI individual's incentive to procrastinate is due to the fact that $\$100 \times 2 =$

b. Targeting Long-Term Preferences

Another strategy for deterring TI misconduct is to increase the delayed sanctions. In the above example, the delayed sanctions for burglary or filing a late tax return will have to be increased by more than \$50 (assuming that the offender will commit the crime if he is indifferent), which, as can be seen, is greater than the change needed, if the lawmaker directly targets the short-term preferences of TI offenders. It follows that in a world with TC and TI offenders, it is impossible to achieve optimal deterrence by relying solely on delayed sanctions. The intuition behind this result is the following: The harm produced by both types of offenders is the same, but given the immediacy multiplier of TI offenders, the delayed sanctions needed to effectively deter each are different. As a result, if the delayed sanctions are set equal to the expected harm, as prescribed by the standard law and economics approach, TC offenders will be optimally deterred, but their TI counterparts will be necessarily underdeterred (whenever the TI misconduct conditions are met). On the other hand, if the delayed sanctions are set sufficiently high to effectively deter TI misconduct, then the TC offender will be overdeterred since those sanctions will be greater than the expected harm from misconduct. As a result, a final strategy for deterring TI misconduct that alleviates this general problem is to increase the salience of the delayed sanctions when offenders are making short-term decisions whether or not to commit a crime.¹¹⁵

F. *The Projection Bias*

When an offender makes an intertemporal choice at time t , he has to try to predict the preferences that he will have at time $t + 1$, when he receives the payoffs from that decision or has to make a short-term decision to follow through with a planned course of action. Numerous empirical studies have found that when individuals try to predict their future preferences, they tend to project their current preferences (as influenced by the psychological

\$200, which exceeds the delayed sanctions by \$50. The TI individual would perceive an immediate benefit as $\$25.24 \times 2 = \50.48 . By complying on time, the individual receives \$50.48 and avoids sanctions of \$150, which together provides him with net benefit greater than \$200.

115. See George A. Akerlof, *Procrastination and Obedience*, 81 AM. ECON. REV. 1, 2-4 (1991) (discussing the role of salience in combating incentive to procrastinate).

states that they are in at the time) onto those future preferences. This leads them to systematically mispredict how their preferences, as well as those of others, will evolve over time.¹¹⁶ This Section begins by discussing the projection bias in the context of intra-personal predictions. It then describes the evidence on inter-personal projection bias, which arises when one person is trying to predict how someone else's preferences will evolve over time.

The projection bias is particularly prominent when people are in a 'hot' psychological state either at the time when they make an intertemporal decision *or* when they are called to follow through with one of their past decisions.¹¹⁷ Hot psychological states include such states as anger, hunger, fear, depression, jealousy, infatuation, curiosity, anxiety, sleepiness, pain, sexual arousal, and the craving of addictive substances such as drugs, alcohol, and nicotine.¹¹⁸

116. For example, a study of the preferences of pregnant women regarding the use of anesthesia during labor found that when the women were asked about their preferences one month before labor, while they were in a cold psychological state, the women preferred not to use anesthesia; however, when the women were in the pain of active labor, their preferences changed to wanting anesthesia. J.J. Christensen-Szalanski, *Discount Functions and the Measurement of Patients' Values: Women's Decisions During Childbirth*, 4 MED. DECISION MAKING 47, 50–53 (1984). Sexual arousal can also lead to incorrect predictions regarding future preferences. See George F. Loewenstein et al., *The Effect of Sexual Arousal on Expectations of Sexual Forcefulness*, 34 J. RES. CRIME & DELINQ. 443, 455–56 (1997) (describing a study finding that male subjects who were shown sexually arousing photographs were more likely to predict that they would act sexually aggressively on a date than those who were not shown arousing photographs). There is evidence that individuals also tend to underestimate how much they will crave drugs, alcohol, and nicotine when they are exposed to drug, alcohol, and cigarette "cues." See David Laibson, *A Cue-Theory of Consumption*, 116 Q.J. ECON. 81, 81–82 (2001) (discussing role of environmental "cues" on habit-forming behavior such as smoking and addiction); *Out of Control*, *supra* note 94, at 272–80 (discussing role of visceral factors on impulsivity).

117. See George Loewenstein et al., *Projection Bias in Predicting Future Utility*, 118 Q. J. ECON. 1209, 1212–16 (2003) [hereinafter *Projection Bias*] (developing projection bias model to provide theoretical underpinning for evidence on hot state decision-making). Under the projection bias model, an individual's predictions of his future preferences will tend to lie somewhere in between the true preferences that he will have in the future and his current preferences. *Id.* at 1210–11.

118. See George Loewenstein & David Schkade, *Wouldn't It Be Nice: Predicting Future Feelings*, in WELL-BEING: THE FOUNDATION OF HEDONIC PSYCHOLOGY 85, 98 (Daniel Kahneman et al. eds., 1999) [hereinafter *Wouldn't It Be Nice*] (discussing "hot" states, such as anger, hunger, pain, and sexual excitement). An individual may go from being in a cold psychological state to being in a hot one when he experiences certain emotional or biological triggers. See *Out of Control*, *supra* note 94, at 273 (discussing how visceral factors are triggered by such factors as stimulation and deprivation). All of these hot states and analogous ones share three important characteristics. First, they are temporary or transient. Hot states do not last forever; eventually a person will find himself back in a cold, unperturbed state, although how long hot states last may vary. Second, hot states focus the decision-maker's attention: They motivate him, whether consciously or unconsciously, to act

For example, assume that an individual is to attend a meeting and has to order his lunch one week in advance. He can choose either the spartan one-course lunch or the gargantuan four-course one. In making this intertemporal choice, the individual should try to predict how hungry he will be the following week and choose accordingly—if he expects to be in a hungry state, he should choose the gargantuan package, but if he expects to be sated, he should choose the spartan one. His choice should not be influenced by whether, at the time of ordering, he happened to be hungry or sated: if he puts in his order early in the morning when he is full from a hearty breakfast, his choice should coincide with the one he would make if his orders late in the day, when he is starving and looking forward to a large dinner.

However, a number of studies have found that individuals suffer from a projection bias in such instances—they tend to allow the state they were in at the time they ordered (hungry or sated) to unduly affect their intertemporal choice.¹¹⁹ This is the case even though being hungry or sated are feelings that individuals experience daily and which one would expect they would become bet-

or refrain from acting. Hot states may distract or intercept a decision-maker's deliberations, prod him to act without giving much thought to the consequences, or take over complete control of the reasoning process. Third, hot states are not isolated perturbations of our psyches; they pervade the lives of individuals, they appear, disappear, and they recur. See *id.* at 272–74 (discussing the differences between visceral factors and preferences).

119. A number of studies have found that individuals tend to project their current level of hunger or satedness onto their predictions of how hungry or sated they expect to be in future periods, as well as onto other related preferences. In one study, individuals had to choose between fruit or junk food to be received in one week. Daniel Read & Barbara van Leeuwen, *Predicting Hunger: The Effects of Appetite and Delay on Choice*, 76 ORGANIZATIONAL BEHAV. & HUM. DECISION PROCESSES 189, 196–97 (1998). Some individuals made the choice while hungry, others while sated. *Id.* at 196. The study found that a larger proportion of the hungry group than the sated group chose the unhealthy junk food over the fruit. *Id.* at 200. In another study, supermarket shoppers were asked before they went into the store to make a shopping list of the items that they intended to purchase. Daniel T. Gilbert et al., *The Future is Now: Temporal Correction in Affective Forecasting*, 88 ORGANIZATIONAL BEHAV. & HUM. DECISION PROCESSES 430, 437–38 (2002). Some shoppers were given a muffin to eat before shopping (the sated group), while other shoppers were not given a muffin (the hungry group). *Id.* at 438. Shoppers who did not eat a muffin before entering the store purchased a larger proportion of unplanned items (items not on their shopping list) than shoppers in the sated group. *Id.* at 439. The result held true independently of whether or not the shoppers were allowed to take the shopping list into the store. *Id.* Shopping lists, however, may act as a sort of self-regulation mechanism. See Russell Abratt & Stephen Donald Goodey, *Unplanned Buying and In-Store Stimuli in Supermarkets*, 11 MANAGERIAL & DECISION ECON. 111, 117–18 (1990) (presenting a study of supermarket shoppers in which shoppers without shopping lists claimed that twenty-five percent of their purchases were unplanned, while shoppers with shopping lists claimed that only sixteen percent of their purchases were unplanned).

ter at predicting.¹²⁰ A projection bias has also been found in instances when hot psychological states are not present, such as when individuals try to predict the full magnitude of the endowment effect.¹²¹

Two principal types of hot-state distortions can lead decision-makers to incorrectly predict their future preferences. First, a decision-maker making an intertemporal choice while in a cold psychological state will tend to underappreciate the full magnitude of changes in his preferences caused by future hot states.¹²² Second, a decision-maker making an intertemporal choice while in a hot psychological state will tend to mispredict how long the hot state

120. While one would expect that repeated exposure to the same or analogous hot states will lead to a learning effect, the evidence suggests otherwise. See Christensen-Szalanski, *supra* note 116, at 51 (finding that pregnant women who mispredicted that their preferences regarding anesthesia would change when in active labor again mispredicted when asked a month after labor); Leaf Van Boven et al., *Mispredicting the Endowment Effect: Underestimation of Owners' Selling Prices by Buyer's Agents*, 51 J. ECON. BEHAV. & ORG. 351, 362–63 (2003) (discussing learning limitations in endowment-effect projection bias). Moreover, even though some individuals are aware at some level that they will experience a projection bias in the future, when they are in the midst of hot states they once again succumb to the bias. See also *Projection Bias*, *supra* note 117, at 1215 (illustrating an example of folk wisdom to “never shop on an empty stomach” as evidence of awareness of projection bias).

121. Numerous studies have found an endowment effect, which leads individuals to value things more when they own them than when they do not own them. See, e.g., Daniel Kahneman et al., *Anomalies: The Endowment Effect, Loss Aversion, and Status Quo Bias*, 5 J. ECON. PERSP., 193, 193–96 (1991) (showing that the endowment effect didn't disappear when there was a market with ample learning opportunities); Daniel Kahneman et al., *Experimental Tests of the Endowment Effect and the Coase Theorem*, 98 J. POL. ECON. 1325, 1325 (1990) (using a test of randomly given coffee mugs to show that willingness to accept greatly exceeds willingness to pay); George Loewenstein & Daniel Adler, *A Bias in the Prediction of Tastes*, in CHOICES, VALUES, AND FRAMES 726, 730–34 (Daniel Kahneman & Amos Tversky eds., 2000) (finding that individuals, when asked to predict how much they would charge to sell an item once they owned it, underappreciated how attached they would become to the item and how much they would then wish to charge for the item when selling it). In addition, predictions regarding future curiosity can also be distorted by a projection bias. In one study, individuals were asked to answer ten geography questions and asked to choose whether they wanted to receive a candy bar or the answer to the questions. *Wouldn't It Be Nice*, *supra* note 118, at 93. One group was first shown a randomly chosen question and asked, before they had seen the rest of the questions, to choose between receiving the answers to the ten questions or a candy bar; a second group was shown all ten questions first and only afterwards asked whether they preferred the answers to the questions or a candy bar. *Id.* Those individuals who had to choose between the candy bar and the answers before receiving the rest of the questions were significantly more likely to choose to receive the candy bar rather than the answers. *Id.* Compared to the other group's action, they seemed to be underestimating how curious they would be to receive the answers once they had seen all of the questions. *Id.* at 94.

122. See *Out of Control*, *supra* note 116, at 281 (arguing that individuals tend to underestimate the impact of hot states on their future actions).

will last¹²³ and how different he will feel in the future when he is back in a cold state; this is true even though the decision-maker knows that the hot state is transient in nature and will eventually come to an end.¹²⁴ For example, an individual who is trying to quit smoking may determine to meet a friend at a smoky bar, even though he knows that seeing others smoke may make him feel like smoking. At the time he agrees to go to the bar, his cold-state prediction—that once in the bar he would be able to abstain—will tend to underappreciate how much his preferences will actually change once he is exposed to the cues of others smoking.¹²⁵ Moreover, once he is in the bar, feeling the full pull of nicotine and smoke, he may decide to light up for the first time in a year, underappreciating how he will feel the next day when he is back in a cold state and realizes that he smoked the night before.

Importantly, the claim is not that individuals do not know they are experiencing potentially transient feelings, although if they are in the midst of a visceral state of high enough intensity—for example, infatuation—they may not be fully cognizant of it. Instead, the problem is that, while individuals may fully understand that going from cold states to hot ones, or vice versa, will have some effect on their preferences, they still tend to underappreciate by how much their preferences will change.¹²⁶

G. *The Projection Bias and Criminal Misconduct*

When deciding whether to commit a crime x , at time t , an offender has to try to predict his instantaneous utility at time $t + 1$. Suppose first that an offender is trying to predict the disutility that he will feel if he is caught, convicted, and punished. Let v_1 be the benefit from the crime received at time 1, and c_2 be the ex-

123. Individuals tend to incorrectly predict how long certain feelings will last, even though they experience those feeling repeatedly. See Timothy D. Wilson et al., *Lessons from the Past: Do People Learn from Experience that Emotional Reactions are Short-Lived?*, 27 PERSONALITY & SOC. PSYCHOL. BULL. 1648, 1648 (2001).

124. See *Projection Bias*, *supra* note 117, at 1228–29 (discussing irreversible decisions made by individuals while in hot states, believing incorrectly that hot states would persist for longer periods).

125. For a discussion of the way that environmental cues can lead to changes in preferences, see Laibson, *supra* note 116, at 108.

126. See *Projection Bias*, *supra* note 117, at 1210 (stating that under the projection bias model, a decision-maker correctly predicts the direction of his changes in preferences but underappreciates the full magnitude of those changes).

pected sanctions (to isolate the projection bias problem, I will assume that the offender knows that there is a 100% probability that he will be apprehended). So the optimal gross sanctions are equal to the harm from the offender's misconduct. A rational offender will commit the crime only if

$$v_1 - c_2 > 0$$

Moreover, setting the sanctions equal to c_2 will lead an offender to violate the law only when it would maximize social welfare.

However, an offender subject to the projection bias measures his utility based both on the actual payoff as well as the state that he is in at the time of receiving that payoff. So let s_1 and s_2 be the offender's state at times 1 and 2, respectively; the states capture the offender's tastes at the time, which can be distorted by emotions and hot psychological states, as well as the fact that he has received an immediate benefit or incurred an immediate cost at the time. The offender will try to predict his instantaneous utility in period 2, where his true utility will be $u_2(c_2, s_2)$. Let α capture an offender's level of projection bias.

Let $u_{2\text{predicted}}(c_2, s_2 | s_1)$ be the offender's prediction of his period 2 utility given that at the time that he makes the prediction in period 1 the state is s_1 .

Then the offender's projection bias is captured by

$$u_{2\text{predicted}}(c_2, s_2 | s_1) = (1 - \alpha) u_2(c_2, s_2) + \alpha u_2(c_2, s_1)$$

If $\alpha = 0$, then the offender has no projection bias and accurately predicts his period 2 utility: $u_2(c_2, s_2)$. On the other hand, if $\alpha = 1$, then the offender's prediction is fully distorted by his current state, in that he perceives his future tastes to be identical to his current tastes: $u_2(c_2, s_1)$.

An offender who were to accurately predict the future disutility from the expected criminal sanctions would violate the law only in cases in which

$$u_1(v_1, s_1) - u_2(c_2, s_2) > 0$$

However, given the projection bias an offender will commit a crime whenever

$$u_1(v_1, s_1) - u_{2\text{predicted}}(c_2, s_2 | s_1) > 0$$

And since $(1 - \alpha) u_2(c_2, s_2) + \alpha u_2(c_2, s_1) > u_2(c_2, s_2)$, whenever $\alpha < 1$, it follows that an offender with the projection bias will some-

times violate the law in cases in which a fully rational offender—one not subject to the projection bias—would obey the law.

III. INCHOATE OFFENSES UNDER THE BEHAVIORAL THEORY OF CRIME

This Section uses the behavioral theory of criminal misconduct developed in Section II to provide a set of new explanations for the existence of inchoate offenses and for why they are punished less harshly than the completed underlying offense.

A. *The General Problem*

Before turning to the behavioral explanations of inchoate offenses, it is helpful to further unpack the general problem of justifying these offenses under the standard law and economics approach. A lawmaker who wants to optimally deter offenders from committing an underlying offense will set the expected sanctions equal to the expected harm. If the gross sanction is in the form of a fine, wealth-constrained offenders will be under-deterred. One way to deal with this problem is to create inchoate offenses: an offender then would take into account both the expected sanctions if he succeeds with the underlying offense and the inchoate expected sanctions if he fails. This allows a lawmaker to reduce the gross sanction for the underlying offense. This justification for the existence of inchoate offenses does not, however, explain why they are punished less severely than the underlying offense. If the optimal gross sanctions for the underlying offense are \$200, there is no reason why the gross sanction for the underlying offense has to be greater than \$100; in fact, one can envision a regime in which the expected sanction remain the same, but the gross sanctions for inchoate offenses are set higher than those for the underlying offense.

It is true that punishing inchoate offenses less severely can lead an offender to renounce his plan to commit the underlying offense; but if that is the rationale, one would expect that the lower sanctions would apply only to cases when an offender who has triggered an inchoate offense makes a willful, fully voluntary decision not to follow through with the underlying offense. The sanctions should *not* be lower, however, for an unsuccessful attempt; for an attempt that is interrupted by the police, victim, or

third party; for a solicitation that is rejected; and for a conspiracy in which the co-conspirators are arrested before they have completed the underlying offense. But the penalty for these inchoate offenses are generally lower than those for the underlying offense.¹²⁷

There is an additional limitation to the standard law and economics justification for the existence of inchoate offenses. To the extent that offenders are wealth constrained, there is a more straightforward approach to handle the problem: Society can increase the probability of detecting offenders who have committed the underlying offense. In order to accomplish this, society has to spend more on enforcement, which is what the standard approach is trying to avoid. However, suppose that by making use of inchoate offenses, society is able to reduce the probability of detection for the underlying offense to 0.01. Then the probability of detection for the inchoate offense will also be very low. In theory, society should spend even less on enforcing inchoate offenses, given that those offenses do not create any actual harm that needs deterring. Inchoate offenses, however, are enforcement-intensive crimes, for they leave a relatively faint trace: There are no victims and no harm, only potential offenders and actual or potential accomplices or co-conspirators. Getting it right, moreover, matters for inchoate offenses, if for no other reason than that the social costs from punishing innocent behavior or evil thoughts can be much higher than the cost of under-deterring wealth constrained offenders. Law enforcement therefore has to monitor potential offenders to detect behavior (in real-time—before the commission of the underlying offense) that is sufficient to indicate a high likelihood that an underlying offense will be committed. And to accomplish this, society has to invest in enforcement. But all other things being equal it is better for society to increase enforcement so as to increase the likelihood of detecting the underlying offense; if it does that, then the underlying rationale for punishing inchoate offenses disappears, or is, at the very least, greatly reduced. This inchoate offense paradox can be restated as follows: Society can economize on enforcement costs for the underlying offense by punishing inchoate offenses; but if society economizes on enforcement costs, then it is unlikely to detect, with sufficient accuracy, inchoate offenses.

127. The sanctions for these types of inchoate offenses are generally higher than for those in which the offender voluntarily renounces the underlying offense but is unable to escape liability altogether.

B. *Complexity, Inattention, and Inchoate Liability*

Inchoate offenses increase the overall complexity of planning and executing the underlying offense. A crime's complexity will increase with the number of factors that an offender must take into account in order to succeed with his underlying goal—executing the underlying offense and escaping detection. These factors will interact with each other, and thus a crime's overall complexity will increase the less transparent and more complicated these interactions. Inchoate offenses, therefore, require offenders to take more factors into account, to do so sooner than they would otherwise; and some of these additional factors will interact in non-transparent ways. For example, suppose that Frank asks Anne to kill Brenda on his behalf. Criminal solicitation increases the overall complexity faced by Frank, given that he may not know if Anne is an undercover policewoman. If solicitation is not a crime, Frank can solicit Anne and if she rejects him (or he discovers that she does not have the skill to successfully execute the crime), he can approach others until he finds a right match. If Frank agrees with Anne to kill Brenda, both he and Anne are liable for conspiracy. This too increases the complexity of killing Brenda, given that Frank now has to worry about the likelihood that Anne would turn him into the authorities; if conspiracy is not a crime, things are simpler, since Frank can always back out at any point before the actual underlying offense. If Frank decides to commit the crime alone he has to worry about potential liability for criminal attempt; if on the other hand he can plan, fully prepare, lie in wait, and shoot Brenda only after making sure that there is no one around, the level of complexity is lower.

All other things being equal, one would expect that an offender is more likely to execute a crime successfully and to get away with it, the lower the complexity involved. In other words, complexity not only increases the underlying costs of committing the underlying offense, it also increases the likelihood that the offender will fail or that he will be arrested. Inchoate offenses therefore help deter crimes by increasing the complexity and thus the uncertainty faced by a potential offender.

Society spends more enforcing underlying offenses and inchoate offenses than what one would expect if policymakers were guided by the standard Beckerian account of deterrence. In fact,

society spends large amounts of resources in undercover activities aimed directly at detecting inchoate offenses and apprehending offenders before they have had a chance to commit the underlying offense. Why? As we have seen, one possible explanation is that undercover activities increase a crime's overall complexity by increasing the risk of interacting with others. An offender planning a crime may not only solicit others or conspire with them but may have to reconnoiter or acquire weapons, burglar's tools, or other potentially incriminating equipment, which opens them to liability under possession crimes and/or attempt. But there is a second reason for the relative popularity of undercover activities: An offender intent on committing a crime will give relatively greater attention to the final goal—the underlying offense—than to the preparatory activities. In other words, the salience of committing the underlying offense will be greatest at the point in which the offender is executing the offense—when Frank has aimed his gun at Brenda and is about to shoot. Under the inattention model introduced in Section II, one would expect that the less salient features of committing a crime—during the planning, preparatory stage—will be more opaque and receive less attention from offenders. Co-conspirators are most likely to lower their guard—to be less attentive—while planning a bank robbery than in the middle of it; an undercover agent, who becomes part of the conspiracy during these preparatory stages is more likely to succeed in acquiring valuable evidence, for example. Criminal solicitation is particularly susceptible to this type of inattention problem, since the offender is twice removed from the underlying offense—he is in the process of recruiting an agent to act on his behalf, at some point in the future, to commit the underlying offense. Similar arguments apply to the preparatory stages in which an offender can trigger attempt liability.

There is an additional relationship between complexity and inchoate crimes. All other things being equal, one would expect that the more complex the underlying offense, the more likely that an offender will (1) have to spend more time and effort to plan and prepare for the underlying offense and that he will have to interact with third parties who may either be undercover police, whistleblowers, or untrustworthy or unreliable actors who may expose the offender to liability either intentionally or negligently; (2) require the assistance of an accomplice or co-conspirator; or (3) need to fully delegate the commission of the crime to a third party with the requisite expertise. The first increases the likelihood that an

offender will trigger attempt liability; the second, the likelihood that he will trigger accomplice or conspiracy liability; and the third, the likelihood that he will trigger criminal solicitation.

In conclusion, underlying offenses that are the most likely to trigger inchoate liability are precisely those that are complex enough that they cannot be executed as “on-the-spot” crimes—those in which the offender can, at the same time, learn of the criminal opportunity and *successfully* execute the crime (including avoiding detection). While one expects that there are relatively few on-the-spot crimes, the farther one moves from that ideal, the more likely that inchoate liability will come into play. Moreover, inchoate liability increases the overall complexity of committing an underlying offense, which in turn increases the immediate cost of planning, executing, and covering it up. This will have a direct increasing overall deterrence, since an offender’s will is deterred by the aggregate costs of committing crimes: criminal sanctions and transaction costs. It also allows society to economize on enforcement, given the inattention problem inherent during the inchoate phase of a crime. But as we will now see, increasing the immediate transaction costs of committing crimes will have a disproportionate effect on TI offenders and thus will have a greater deterrence effect than increasing delayed sanctions by the same amount. Inchoate crimes increase transaction costs not only by increasing complexity but by requiring offenders to make immediate prophylactic investments before the commission of the underlying offense.

C. *Inchoate Crimes as Commitment Devices for Time-Inconsistent Offenders*

This Section examines inchoate crimes from the perspective of TI offenders and provides a new justification for inchoate liability—as a commitment device to deter TI misconduct. Recall that an offender has an incentive to engage in TI misconduct whenever two conditions hold: (1) from a long-term perspective (when the crime is in the future), the benefits from misconduct are less than the expected sanctions, and thus the offender has a preference to obey the law; and, (2) at the time when he has the opportunity to commit the crime, the immediate benefits he receives (as distorted by his immediacy multiplier) exceed the delayed expected sanctions. TI misconduct can only occur when there is a temporal

gap between the immediate benefit from misconduct and the delayed sanctions. In a large number of crimes, the offender receives the benefits from committing the offense at the same time that he causes the harm. The bank robber, the burglar, and the drug dealer receive the benefits from their crimes at the same time that they create the harm that society has sought to criminalize and punish, either out of concern for retribution or deterrence. When one combines the immediacy of the benefit with the necessarily delayed nature of the punishment for all criminal offenses, offenders with TI preferences will have an incentive to overindulge on these crimes.

As we saw in Section II, society can effectively deter TI misconduct by delaying all or part of the immediate benefits from misconduct. One way to accomplish this is to divide a crime into two parts. In the first part, the offender triggers a delayed sanction but does not receive an immediate benefit; in the second part of the crime, the offender receives an immediate benefit and triggers a delayed sanction. How can society accomplish this? One way is to introduce inchoate offenses.

An inchoate offense always triggers legal liability *before* the offender is able to receive the benefits from the underlying offense. It is a crime for which an offender will receive a benefit only indirectly, and in the future, if he is able to successfully complete the underlying offense. An offender who takes substantial steps toward carrying out a bank robbery will trigger liability for criminal attempt, but if he is caught before he can commit the robbery, he will incur a penalty without enjoying the benefits from the underlying offense. Moreover, as a general matter, inchoate offenses complicate matters for an offender, who may need to engage in additional planning to assure that he will not be arrested before he has been able to complete the underlying offense and enjoy its rewards. They may also increase the anxiety (the immediate disutility) faced by offenders when they are planning or executing a crime. Inchoate offenses, in short, will, in many instances, increase the immediate costs that an offender must incur before he commits to the underlying offense and before he takes concrete steps to carry it out. They can, therefore, increase the likelihood that an offender will underinvest in planning and executing a crime and the likelihood that she will engage in TI obedience. Insufficient planning will, in turn, increase the likelihood that an

offender will be caught and punished for an inchoate crime, the underlying offense, and, in certain instances, both.

So one can model a crime, A, as having two components: the inchoate offense and the underlying offense. The benefits from the commission of A are received only upon the successful completion of the underlying offense. The delayed sanctions for the inchoate offense are triggered once the offender has taken the necessary steps for criminal attempt, solicitation, or conspiracy. Importantly, the inchoate offense does not produce an immediate benefit to an offender; it is instead an initial investment for the commission of the underlying offense. Since both the benefits and sanctions are all in the future, a TI offender's immediacy multiplier does not come into play. It follows that an offender would never engage in TI misconduct vis-à-vis the inchoate offense. Suppose that an offender is in period 0 considering whether to commit an inchoate offense in period 1 (planning and otherwise preparing for the underlying offense), which in turn would allow him to commit the underlying offense in period 2, where the underlying offense, if successful will provide an immediate benefit, v_2 , of expected sanctions from the inchoate offense, s_{IO} , and the underlying offense, s_{UO} , are incurred, if at all, in period 3. Both TC and a TI offenders will have a long-term preference to commit an inchoate offense only if the future expected benefits at the time of completing the underlying offense exceed the expected sanctions from the two crimes: the inchoate offense and the underlying offense. A TC offender will make short-term decisions that confirm her original long-term one, and, as a result, will commit crime A only if

$$v_2 \geq s_{IO} + s_{UO}$$

On the other hand, a TI offender will have a short-term incentive to commit crime A whenever

$$v_2/\beta \geq s_{IO} + s_{UO}$$

In theory, a TI offender will be under-deterred by the aggregate sanctions for the inchoate offense and the underlying offense that are optimal for a TC offender. However, as we will now see, inchoate liability can act as a commitment device.

An example can help illustrate the general intuition behind this result. Suppose that there is a TC and a TI offender and that the latter has an immediacy multiplier of 2 and is sophisticated in the sense that he can correctly predict his future self-control

problems.¹²⁸ At time 0, both offenders are deciding whether to commit crime A, which will require them to invest in the inchoate offense in period 1 before they can commit the underlying offense at time 2. For example, assume that in order to carry out the underlying offense, the offender has to prepare for the crime in a manner that will trigger attempt liability (although, for now we will also assume that aside from the inchoate liability, these planning costs are \$0). The underlying offense will produce an immediate benefit, at time 2, of either \$100 or \$200, each with a likelihood of 0.5. The offenders will know right before the crime the actual benefit from the underlying offense. The inchoate offense has delayed expected sanctions, in period 3, of \$5, while the underlying offense, has delayed expected sanctions, also in period 3 of \$170. The TC offender will make a long-term decision to invest in the inchoate offense since it would provide her with a 'real option.' It will put her in a position to commit the underlying offense in period 2 if it turns out that the benefits are \$200. Since she has perfect self-control, she will decide to obey the law if the benefits are only \$100. On the other hand, the sophisticated TI offender knows that if he invests in the inchoate offense option at time 1, he will commit the underlying offense in both states of the world. In other words, he knows that given his immediacy multiplier of 2, he will perceive the immediate benefits of \$100 as \$200, which is greater than the delayed sanctions. As a result, the sophisticated TI offender will not invest in the inchoate offense and, since the inchoate offense is a necessary condition for the underlying offense, he will not commit the underlying offense in period 2, even if the benefits are \$200.

As can be seen from this example, even a relatively small inchoate liability can act as a state-provided commitment device for sophisticated TI offenders. If, on the other hand, the TI offender is naïve, he will believe incorrectly that he will act in a TC manner in period 2 and will commit the underlying offense only if the benefits are \$200. However, given the TI offender's immediacy multiplier of 2, he will commit the crime in both states of the world and, thus, will engage in TI misconduct when the benefits are only \$100. But let us enrich this example by assuming that at the time of triggering the inchoate liability the offender has to exert additional effort to avoid detection for the inchoate offense.

128. See *supra* Section II.E (discussing the difference between sophisticated and naïve offenders).

Assume that an offender has to invest an additional \$5, incurred immediately, in period 1, in order to avoid detection. For example, the inchoate offense may involve soliciting a third party to purchase a gun to commit the crime, and the offender has to incur an immediate expense of \$5 to assure that the third party is not an undercover law enforcement agent. The TC offender will incur the additional \$5, since even at \$10, the inchoate offense option has positive value. On the other hand, the naïve TI offender will make a long-term decision in period 0 to invest in the inchoate offense option in period 1, but when period 1 arrives, he will have an incentive to procrastinate making the \$5 precautionary investment. Since he is naïve, he will believe incorrectly that if he procrastinates making the investment, he will do so in the future. But given his naiveté, he will have an incentive to repeatedly procrastinate. As a result, he will never invest in the inchoate offense option and will never commit the underlying offense.

As can be seen, the very fact that inchoate offenses make the underlying crime more complex and create additional immediate expenses for offenders can turn them into effective commitment devices for naïve and sophisticated TI offenders. Moreover, because inchoate offenses can impose immediate costs (in addition to the delayed sanctions), but will never produce immediate benefits, they can lead TI offenders to procrastinate making the investment, but will never lead them to engage in TI misconduct. As a result, in order to act as an effective commitment device for sophisticated TI offenders, the delayed sanctions for the inchoate offense can be much lower than the expected sanctions for the underlying offense. And in order to act as a commitment device for a naïve TI offender, the inchoate offense sanctions can again be relatively low, but the commission of the inchoate offense must impose some sort of immediate cost on the offender—such as the precautionary investments discussed above.¹²⁹

129. Professor Richard McAdams has recently argued that the potential for an early arrest (before the offender can complete the underlying offense) will have a disproportionate impact on TI offenders. See Richard McAdams, *Present Bias and Criminal Law*, 2011 U. ILL. L. REV. 1607, 1618–19 (2011) (arguing that inchoate crimes can have a disproportionate effect on TI offenders due to the immediate disutility from an early arrest). TC and TI offenders who believe that they may be arrested for an inchoate offense before they have completed the underlying offense will react in the same manner: Both face an expected sanction from the inchoate offense, and neither will receive any proceeds from the underlying offense, and thus they will obey the law when the expected sanctions from the inchoate offense and the underlying offense are greater than the expected benefits from the underlying offense. One possible way to interpret Professor McAdams' argument is the

This is an important result because it provides a justification for using inchoate liability instead of increasing the delayed sanctions for the underlying crime. It also helps explain the practice of punishing them less harshly than the underlying crime.¹³⁰

D. *The Projection Bias and Inchoate Crimes*

Under the projection bias explanation of criminal misconduct, an offender commits a crime because he fails to fully account the extent to which his prediction of his future tastes—and thus his future utility—is being distorted by his current tastes. For example, an offender who is in a hot psychological state may commit a crime that he would not have were he able to predict with sufficient accuracy how he will feel after the fact, when he is back in a cold psychological state. The key is that even an offender who knows that he will feel differently, after the fact, may nonetheless mispredict the full extent of the distortion caused by the projection bias. An offender in the heat of passion may lose all ability to make rational decisions, but the more interesting cases involve offenders who know that they are in a hot psychological state that is distorting their cost-benefit analysis but who still commit the crime because of their misprediction. In a second type of case, an offender knows that he will feel a strong disutility if he is caught and prosecuted, but due to the projection bias, he mispredicts the full extent of that disutility. This again can lead an offender to commit a crime when he would have obeyed the law if he were not subject to the projection bias. What is the relationship between inchoate offenses and the projection bias?

An offender who commits a crime due to the projection bias makes a rationality mistake and thus suffers a welfare loss; at least if one adopts the plausible assumption that offenders are more likely to succeed in committing crimes if they are able to accurately predict how their tastes may change over time, and if

following: Inchoate crimes (and underlying offenses), increase the anxiety of TI offenders by increasing the likelihood of an arrest (since an offender is now subject to arrest for either the inchoate crime or the underlying offense); this anxiety imposes an immediate disutility on TI offenders, and thus makes it more likely that they will engage in TI obedience. See Manuel A. Utset, *Hyperbolic Criminals and Repeated Time-Inconsistent Misconduct*, 44 HOUS. L. REV. 609, 666–67 (2007) (arguing that the immediate disutility from anxiety can lead to TI obedience).

130. See, e.g., LAFAVE, *supra* note 2, § 11.5(c), at 251–52 (discussing lower sanctions for attempts).

they are able to plan, execute, and cover up their criminal activities while in a cold, non-distorted psychological state. Under this assumption, a rational offender would have a long-term preference to make decisions about potential misconduct that are based on accurate intertemporal predictions about their future tastes and utility. Suppose that the expected sanctions from the underlying offense will provide an offender a disutility of 150 and that the benefits would provide him a utility of 100. Suppose further that due to the projection bias the offender predicts incorrectly that the disutility from being apprehended and punished is less than 100. He would then commit the underlying offense and suffer an expected welfare loss of 50 utils. However, suppose that the offender triggers inchoate liability, and the expected sanctions from the inchoate offense will provide him with a disutility of less than 50 utils, then the existence of an inchoate offense will increase the offender's overall welfare. In other words, he is better off if he is apprehended before he completes the underlying offense, or even better, if he is able to renounce his plan and escape liability altogether. This helps explain both the existence of inchoate offenses and why they are punished less harshly than the underlying offense. It also helps explain two other features of inchoate offenses: (1) why offenders are sometimes able to escape liability even after they have triggered inchoate liability and (2) why inchoate offenses often require some salient act in furtherance of the plan to commit the underlying offense—a person in a hot psychological state may start with evil thoughts and internal plans to commit a crime but may have time to cool-off before following through with the more salient, externalized behavior that would trigger liability.

As I argued above, the types of crimes that are most likely to trigger inchoate liability are those that are complex enough that they cannot be completed on-the-spot. A person in a hot psychological state is most likely to succumb to on-the-spot crimes or to crimes that require planning but which the individual executes immediately because he believes incorrectly that it does not require planning or miscalculates how he will feel after the fact if he follows through without planning and is caught or he fails to execute it correctly. All other things being equal, an offender is more likely to carry out the underlying offense successfully if he is in a cold psychological state; he is less likely to rush the crime or to miss one or more steps necessary for executing it correctly. An individual who receives inside information indicating that the value

of his stock-holdings are about to decline precipitously may engage in illegal insider trading without giving sufficient thought to the consequences or how to cover-up his tracks. Aiming a gun while in a hot psychological state is more likely to lead to misses. The car thief who comes across an unlocked car or the burglar who comes across an open window may be led to commit crimes of opportunity that are more likely to be unsuccessful than if he had waited, reconnoitered, planned, and coolly executed his crime.

How does one deter this type of offender? In the end, it may be impossible, other than to make them liable both for their successful and unsuccessful attempts to commit the underlying offense. One can make a plausible argument that these types of criminals are more dangerous than cool-headed, calculating ones because they are more difficult to deter and because poorly executed crimes can harm not just the intended victim but third parties: The opportunistic car thief may end up in a car chase that harms third parties; and the opportunistic burglar may discover that an apparently vacant home is in fact inhabited. But even if this were not the case, one would expect that the potential penalty for a failed attempt will help deter criminals whose projection bias is smaller—those who are better able to predict their future preferences and not to yield to the pull of hot psychological states. These offenders will spend more time planning their crimes and choosing the optimal time to execute them. This, of course, will lead to a higher success rate vis-à-vis the underlying offense, but it will also increase the likelihood that they will trigger inchoate liability along the way. A fully rational offender will take both of these facts into account and may decide not to commit crimes that require extensive planning or the assistance of others. The existence of this trade-off between the higher probability of success of the underlying offense and the higher probability of inchoate liability again helps explain both why inchoate offenses exist and why they are punished less harshly. The claim is not that an offender is more likely to change his mind after he has triggered an inchoate offense but, rather, that a fully rational offender may choose to concentrate on crimes that are less susceptible to triggering inchoate liability.

E. *Limitations and Potential Objections*

The behavioral theory of criminal misconduct developed in Section II and the new explanations of inchoate offenses developed in this Section are not meant to provide a complete and final explanation of what motivates offenders to commit crimes or to explain every puzzle and doctrinal wrinkle of inchoate offenses. The goal instead is to supplement the standard law and economic account of criminal misconduct; it does so by providing a theoretical framework that incorporates into the standard account, in a minimalist fashion, the growing empirical evidence on the systematic inattention of decision-makers, TI preferences, and the projection bias. I use this behavioral framework to provide a positive account of inchoate offenses. But the account is limited by the very fact that it is based on a behavioral framework that is by nature incomplete.

A reasonable person may raise the following objection: Given the behavioral economics evidence, it is either impossible (or ill-advised) to try to supplement the standard account. We should either replace it altogether with a full-fledged theory or leave the standard model as is: simple, easy to understand, and easy to apply.

The standard model assumes that offenders are perfectly rational. Even if this assumption makes sense in other areas of human endeavors, it is one that is particularly ill-suited to the area of criminal misconduct. The behavioral approach developed in Section II at least has the advantage of providing an account of offenders that is more in keeping with the type of offenders found in the empirical and theoretical criminology literature.¹³¹ Moreover, even if, on average, criminals come relatively close to acting in a perfectly rational manner, it still makes sense to examine the extent to which well-documented rationality shortcomings can

131. For example, the criminology literature has given a large amount of attention to the extent to which individuals commit crimes due to self-control problems. See, e.g., GOTTFREDSON & HIRSCHI, *supra* note 99, at 232 (“[Self-control problems are,] for all intents and purposes, the individual-level cause of crime.”); Travis C. Pratt & Francis T. Cullen, *The Empirical Status of Gottfredson and Hirschi’s General Theory of Crime: A Meta-Analysis*, 38 CRIMINOLOGY 931, 951–52 (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); Wilson & Abrahamse, *supra* note 33, at 372–74 (discussing the role of self-control problems of criminal activity).

have systematic effects on criminal behavior. If the ultimate goal is to maximize aggregate social welfare, it is necessary to look at aggregate effects. If a sufficiently large number of offenders makes a small rationality mistake, the aggregate effect can be large; if a small number of offenders repeatedly make small or large rationality mistakes, the effect on total social welfare can also be large. The goal of this article, however, is not to provide a full behavioral law and economics analysis of criminal misconduct but, instead, to explain the existence of inchoate crimes and the practice of punishing them with lower sanctions than those for the underlying offense in a world in which offenders are not fully rational.

At the same time, even if some offenders are not perfectly rational, a model that posits offenders are rational will provide a good baseline to identify the extent to which, in the real world, offenders fail to act rationally.¹³² Moreover, even if a theory with perfectly rational offenders fails to provide an accurate positive account, it is still helpful as a normative account of how offenders would want to act. A theory that posits offenders are rational when they commit crimes would find little difficulty in adding the additional assumption that rational offenders have a second-order preference to act rationally. Put slightly differently, rational offenders want to act rationally; they may, on occasion, fail to do so, but from a detached perspective—when deliberating about how they would want to act when faced with an opportunity to commit a crime—they want their future selves to act perfectly rationally and commit crimes only when doing so would maximize their overall utility. Each time an offender fails to adhere to this second-order preference, he incurs a welfare loss, measured as the difference between the utility if he had acted in a perfectly rational manner and the utility that he actually received, due to his less-than-fully-rational behavior. Since the standard economic account includes an offender's utility in the social welfare calculus,

132. Such an approach can help lawmakers design legal rules that are tailored to real world contexts. For example, the Coase Theorem assumes that parties can reallocate entitlements through bargains that they can carry out without the impediments of transaction costs. This zero transaction costs assumption acts as a good baseline for designing legal rules that take into account the transaction costs faced by parties, including finding ways of creating rules that reduce transaction costs and thus help eliminate obstacles to achieving Coasean bargains. See Robert Cooter, *The Cost of Coase*, 11 J. LEGAL STUD. 1, 17 (1982) (discussing bargaining breakdowns due to distributional constraints and other transaction costs, which can lead to a failure of the Coase Theorem to apply).

it would have to include the welfare losses incurred by an offender due to failing to adhere to his second-order preference to act in a fully rational manner. Nonetheless, as this article shows, there are three types of rationality shortcomings that can materially affect the decision-making process of offenders, leading them to violate the law in instances in which the fully rational actors posited by the standard account would have obeyed the law.

One can also reasonably object to the account of inchoate offenses developed in this Section, since it is set forth at a high level of generality and does not attempt to provide concrete answers to every possible doctrinal wrinkle. But my goal is limited to providing an account of why inchoate offenses exist and why they are punished less harshly than the underlying offense. These are the two general issues that provide a general difficulty both for the consequentialist and the retributivist. The account that I provide has the advantage of trying to justify inchoate offenses from the perspective of both society and offenders. Offenders, behind a veil of ignorance, who are unsure of whether they will turn out to be the perfectly rational animal of the economics literature or the *homo economicus* of the behavioral literature would favor a system of criminal law that includes inchoate offenses and that attaches to these sanctions less severely than those for the underlying offense. This is because offenders who turn out to be perfectly rational will not be unduly prejudiced by the existence of inchoate liability—they will incorporate them correctly into their overall cost-benefit analysis; however, offenders who turn out to have TI preferences or are subject to the projection bias would benefit from the commitment aspects inherent in inchoate offenses. Finally, the general framework developed in this article can be easily applied to explain a number of doctrinal aspects of inchoate offenses, including the importance of requiring some sort of behavior in furtherance of the underlying offense and the fact that, unlike other crimes, inchoate offenses can be sometimes undone if they are properly renounced. But these issues are beyond the scope of the current article.

CONCLUSION

Both retributivist and consequentialist-based theories of criminal punishment find it difficult to explain why inchoate crimes, such as attempt, conspiracy, and solicitation, exist. The goal of this article is to provide a deeper understanding of inchoate of-

fenses by taking into account three types of rationality shortcomings: bounded rationality/inattention, TI preferences, and the projection bias. By analyzing the interaction between inchoate offenses and these rationality shortcomings, I have identified a set of new explanations for why inchoate crimes exist and why they are punished less harshly than the underlying offense. The behavioral theory of criminal misconduct developed in Section II by itself provides us with a better understanding of why offenders often commit crimes that in hindsight—or from the perspective of objective third parties—do not make perfect sense; in other words, crimes that do not appear to be of the type that are most likely to maximize the offender's utility. Of course, whenever one starts relaxing the full rationality assumption of the standard economic account, it becomes increasingly difficult to identify the proper baseline by which to judge whether actors are behaving rationally or are engaged in behavior that will, in the long-run, make them worse off. This article has provided an intuitive account of how to set this baseline, assuming that offenders want to behave in the manner predicted by the standard economic account—that they want to give full attention and incorporate into their decision-making process all relevant information, that they want to avoid reversing their long-term preferences when they are faced with the prospect of immediate gratification, and that they want to accurately predict the extent to which their tastes and preferences may change over time.
