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Rational Criminal Addictions

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ARTICLES

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INTRODUCTION

Actors who repeatedly indulge in certain types of goods and activities can develop a habit[1] or addiction[2] to them. Smoking, using drugs, drinking alcohol, overeating, and myriad other types of activities can impose negative externalities on family members, friends, and third parties; for example, actors may hurt others while driving under the influence of drugs or alcohol, or by exposing them to second-hand smoke. They can also impose negative internalities, or self-harm, which reduces their own total utility.[3] Good habits, on the other hand, produce positive internalities.[4] In addition to these negative and positive internalities, habits have a second important characteristic, usually referred to as "reinforcement": consuming a good in the current period increases the marginal utility of consuming it in future periods; or equivalently, the more a person has consumed a good in the past, the greater will be her desire to consume it in the present.[5] The same dynamic applies when the habit involves other types of activities. A person with a bad habit is haunted by her past. Once the habit takes hold, it becomes increasingly painful to

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[1] *See* Gary S. Becker, Habits, *Addictions, and Traditions*, 45 KYKLOS 327, 328 (1992) (defining "habitual behavior" as type that displays "a positive correlation between past and current consumption").

[2] *Id.* at 329 (defining an "addiction" as a "strong habit," in the sense that the shadow cast by past consumption on current consumption is sufficiently strong to sufficiently lock-in the person to continue to engage in the behavior). *See also* B. Douglas Bernheim & Antonio Rangel, *Addiction and Cue-Triggered Decision Processes*, 94 AMER. ECON. REV. 1558, 1558 (2004) (setting forth clinical definition of addiction: "addiction occurs when, after significant exposure, users find themselves engaging in compulsive, repeated, and unwanted use despite clearly harmful consequences, and often despite a strong desire to quit unconditionally").

[3] *See* Richard J. Herrnstein et al., *Utility Maximization and Melioration Internalities in Individual Choice*, 6 J. BEHAV. DECISION MAKING 149, 150 (1993) (defining an "internality" as a "within-person externality" that occurs when individuals "underweights or ignores a consequence of his or her own behavior for him or herself"); Daniel Read, *Intrapersonal Dilemmas*, 54 HUMAN RELATIONS 1092, 1099 (2001) (describing negative internalities as costs that individuals impose on their future selves due to choosing to act against one's considered judgment).

[4] *See* Ted O'Donoghue & Matthew Rabin, *Addiction and Present-Biased Preferences* 6 n.6 (Working Paper, Feb. 2002), *available at* http://escholarship.org/uc/item/3v86x53j#page-1 (describing positive internalities as involving learning or investments that produces a return in the future).

[5] *See* Gary S. Becker & Kevin M. Murphy, *A Theory of Rational Addiction*, 96 J. POL. ECON. 675, 681 (1988) (developing model of rational addiction in which an actor is addicted to a product if an increase in its consumption in the current period increases the actor's future consumption, and due to the fact that past consumption increases the marginal utility of consuming the product in the current period) [hereinafter Becker & Murphy, *Rational Addiction*].

kick it; and continuing to indulge will only continue to pile on the negative internalities.

This article argues that repeated criminal misconduct, at least in some areas, has the characteristics of a habit or addiction. Curiosity or a transient attraction can lead an offender to commit her first crime. This first infraction will give her a sense of how much she enjoyed it, and whether she has the talent, and stomach, to continue down a path of repeated misconduct. If the feedback is sufficiently positive, the offender may commit a second crime, and possibly a third. At some point, the offender will find herself with the opportunity to commit yet another crime, and realize that the immediate disutility of stopping, of going back into a life as a law-abiding citizen, is too great—she may find that the immediate disutility of foregoing a criminal opportunity is too high. Once the habit takes hold, the offender may continue to commit crimes, even if doing so leads her to suffer large aggregate negative internalities. An offender is thus "addicted to criminal misconduct" if her previous history of misconduct increases the marginal utility of committing a crime in the current period by a sufficient amount; that is, if the immediate disutility from stopping has reached a cut-off point, such that she violates the law notwithstanding the fact that but-for the addiction, she would have obeyed the law. The addicted criminal trades off the heightened immediate disutility from obeying the law against the reduction in total utility due to the negative internalities—including expected sanctions.

Criminal misconduct, therefore, has the characteristics of a consumption good, in the sense that it involves a decision to consume in period t, in order to receive immediate utility; but that consumption triggers expected sanctions and other potential intangible losses in the future. As with addicts in other areas, a crime-addict is more likely to act on her addiction when she is in environments that expose her to cues that trigger her desire to commit a crime, or, equivalently, put her in a hot psychological state that distorts her short-term, cost-benefit analysis. Similarly, peer pressure can increase the likelihood that an individual will re-offend, notwithstanding a long-term, detached desire to abstain from additional criminal activities. Finally, life-shocks, such as unemployment, divorce, or periods of increased pressure, can act as a catalyst that pushes an individual into an initial foray into crime or leads her to re-offend, in the same way that life-shocks can have analogous effects in other addiction contexts.

The principal contribution of this article is to show that the act of consuming criminal offenses can have addictive properties. More specifically, the article makes two contributions to the literature on criminal deterrence and repeated misconduct. First, it provides a theory of criminal addiction. Second, it uses the theory to explain various empirical puzzles that arise in the standard law and economics theory of deterrence. In particular the theory helps explain why repeat

offenders get penalized more harshly, why lawmakers routinely ratchet up criminal sanctions in some areas, even though the harm created by the outlawed behavior is still the same, and why criminals may sometimes engage in repeated misconduct when the aggregate benefits are less than the aggregate expected costs. As with the standard account, the article assumes that offenders are rational actors.

Part I provides an overview of the standard law and economic account of criminal misconduct. Such an approach, which is best suited for explaining independent instances of misconduct—by "episodic offenders"—cannot explain a number of common practices in criminal law. The part concludes by providing an overview of these extant empirical puzzles. Part II develops the theory of rational criminal addiction. Part III develops some of the legal implications of the rational criminal addiction theory; in particular it shows how it can help explain the puzzles introduced in Part I. Part IV concludes.

I.   OPTIMAL DETERRENCE OF RATIONAL "EPISODIC" OFFENDERS

This Part begins by describing the standard law and economics approach to optimal deterrence. It then describes various empirical puzzles under the standard account.

A.   Standard Law and Economics Approach to Optimal Deterrence

The standard law and economics theory of criminal misconduct (the "standard account" or "standard theory") utilizes a utilitarian social welfare maximizing[6] approach in which the goal is to cause an offender to internalize the harm produced

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[6] 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., 1970) (1789). Bentham's basic insights were formalized by economist Gary Becker and further elaborated by law and economics scholars. *See* Gary S. Becker, *Crime and Punishment An Economic Approach*, 76 J. POL. ECON. 169, 191–95 (1968) (incorporating Bentham's ideas into a discussion regarding the optimal amount of criminal sanctions); RICHARD A. POSNER, ECONOMIC ANALYSIS OF LAW 4 (6th ed. 2003) (recognizing Becker's work as a fundamental aspect of applying economic reasoning to a broad range of legal questions); Nuno Garoupa, *The Theory of Optimal Law Enforcement*, 11 J. ECON. SURV. 267, 267–69 (1997) (acknowledging Becker in discussion of the optimal law enforcement model); Richard A. Posner, *An Economic Theory of Criminal Law*, 85 COLUM. L. REV. 1193, 1194 (1985) (arguing that Becker's theory can be extended to various areas of substantive criminal law).

by her misconduct at the minimum cost to society.[7] The state includes lawmakers, the police, prosecutors, and judges. Lawmakers identify a set of harms that they wish to deter using criminal sanctions, set the magnitude and type of punishment, and allocate resources to law enforcement.[8] The police use the funds allocated to them by lawmakers to prevent future crimes and detect past crimes, and identify and apprehend the offender or offenders. Prosecutors decide which crimes to prosecute, how many resources to dedicate to prosecutions, and whether to enter into plea bargains. Judges are responsible for a number of tasks during and after a trial, including sentencing offenders who are found guilty. We can refer to this group collectively as the "criminal justice system."

The ultimate goal is to create a system that will maximize the aggregate social welfare of all involved: state actors, general law-abiding citizens, victims, and offenders. The standard model assumes that an offender has a set of preferences or tastes that do not change during the relevant period.[9] Given these fixed preferences, as captured by a utility function,[10] and the underlying desire of rational actors to maximize their utility, rational offenders will choose to violate if and only if their expected utility is positive; or, equivalently, for our purposes, if the expected benefits from violating the law exceed the expected sanctions.[11] A lawmaker, knowing this, will set the expected sanctions equal to the expected harm from the outlawed behavior. An offender then will violate the law only if she receives a

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[7] *See* Becker, *supra* note 6, at 181–85 (describing the goal of minimizing the social costs of crimes). 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, she incorporates into her cost-benefit analysis the expected harm that she may produce. *See* STEVEN SHAVELL, FOUNDATIONS OF ECONOMIC ANALYSIS OF LAW 474–79 (2004) (discussing analogous strict liability and fault-based rules in tort and criminal law contexts).

[8] *See* A. Mitchell Polinsky & Steven Shavell, *The Economic Theory of Public Enforcement of Law*, 38 J. ECON. LIT. 45, 49 (2000) (stating that lawmaker faces problem of choosing the level of sanctions, enforcement expenditures, and the probability of detection in such a fashion that it maximizes social welfare) [hereinafter Polinsky & Shavell, *Public Enforcement*].

[9] *See* ANDREU MAS-COLELL ET AL., MICROECONOMIC THEORY 6–8 (1995) (defining a rational preference relation as one in which, among other things, an actor's preferences are transitive, in the sense that if it prefers A to B and B to C, then it prefers A to C; and stating that transitivity rules out changes of tastes).

[10] *Id.* at 8–9 (stating that economic models describe an actor's preference relations over possible outcomes, using a utility function that attaches a numerical value to the elements in a choice set in a manner that allows the actor to rank those elements in accordance to her preferences).

[11] *See* POSNER, *supra* note 6, at 219–20 (asserting that individuals commit crimes when the expected benefits exceed expected costs).

benefit greater than or equal to the harm produced by her actions—assuming that, if they are indifferent, offenders will commit the crime.

From a social welfare perspective this is the right result, given that society, in a sense, is made whole: the expected sanctions will compensate society, and the net benefit will be a surplus, which the offender gets to keep. If the expected sanctions are set higher than the harm produced by an offender, it will lead to overdeterrence; this will yield a net loss to society given that some offenders will abstain from committing crimes that would yield them a greater benefit than the loss incurred by society. Similarly, if the expected sanctions are lower than the harm, some offenders will be underdeterred, committing crimes that would produce a net loss to society. Implicit in this account is the notion that offenders are part of society and their welfare matters.[12]

For example, suppose that a lawmaker has determined that a certain type of behavior creates a harm to society of $1,000, and, as a result, creates a crime C, which prohibits that behavior. Not all crimes are detected and successfully prosecuted, and the likelihood of detection will depend on how much society invests in law enforcement; the likelihood of a successful prosecution and imposition of punishment will depend, in turn, on how much society invests in the criminal justice system as a whole. In order to properly deter an offender the lawmaker will need to set the gross sanctions high enough, so that the expected sanctions equal the expected harm. So if the probability of detecting and successfully prosecuting an offender is 0.5, the lawmaker will set the gross sanctions equal to $1,000/0.5 = $2,000. If the sanctions are higher—let us say, $3,000—then offenders will perceive expected sanctions of $1,500 and will obey the law, even when crime C would yield a benefit that is greater than the harm created; offenders who receive a benefit between $1,000 and $1,499 will obey the law.[13] If, on the other hand, the gross sanctions are set below $2,000, some offenders will commit crime C, even though they receive a benefit that is lower than the $1,000 loss flowing from crime C.

More generally, let: p be the probability of detection and successful prosecution; h, the harm created by crime C; and b, the benefit received by an offender. The gross sanction, s, should be: $s = h/p$, which would assure that a

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[12] *See* Becker & Murphy, *Rational Addiction*, *supra* note 5, at 181–85 (calculating aggregate welfare by taking into account the benefits offenders receive from their criminal activity).

[13] This holds under the assumption that they violate the law, if indifferent; if they obey the law, when indifferent, then they will obey the law, up to a $1,500 benefit.

rational offender will commit a crime if and only if $b \geq h/p$, or equivalently, if $p \times b \geq h = p \times b \geq p \times s$, which is the desired result. The benefit received by a specific offender will depend on her preferences, which are taken as a given. A lawmaker will thus choose the best combination of p and s to achieve the proper level of deterrence, at the lowest cost. Offenders are assumed to know what the expected sanctions are, or if they are uncertain, to take into account that uncertainty, at the time of making a decision.[14]

In theory, society should not care about the inputs into an offender's utility function. If an offender gets an intrinsic thrill from harming others, that should not matter. However, society routinely draws value judgments on what counts as socially useful personal utility. An offender's utility from some acts, such as murder and rape, receives no value in the social welfare calculus, and thus, a lawmaker needs to assure that the expected sanctions are high enough so that a rational offender will never consider committing such crimes.[15]

B. *Ratcheting-Up of Sanctions, Over-Incapacitation, and Over-Enforcement Puzzles*

There are a number of limitations to the standard deterrence account. First, once a lawmaker has determined the harm produced by crime C, and set the optimal expected sanctions, it will not change those sanctions, unless it gets new information showing that the actual harm is higher than originally believed. However, lawmakers routinely ratchet-up expected sanctions beyond the optimal level—that which equals the expected harm from the outlawed behavior—because they believe that offenders as a group are "underdeterred;" that is, out of a belief that the number of offenders committing crime C is "too high."[16] This type of

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[14] *See* Lucian Arye Bebchuk & Louis Kaplow, *Optimal Sanctions When Individuals Are Imperfectly Informed About the Probability of Apprehension*, 21 J. LEG. STUD. 365 (1992) (describing the optimal trade-off between higher sanctions and enforcement costs when offenders are imperfectly informed of probability of detection).

[15] *See* Steven Shavell, *Criminal Law and the Optimal Use of Nonmonetary Sanctions as a Deterrent*, 85 COLUM. L. REV. 1232, 1234 (1985) (stating that the social benefits flowing from an offense can be less than the private benefits received by the offender, and that in some instances it can be zero). *See also* Posner, *supra* note 6, 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).

[16] *See* John M. Darley, *On the Unlikely Prospect of Reducing Crime Rates by Increasing the Severity of Prison Sentences*, 13 J.L. & POL'Y 189, 190 (2005) (describing this problem of perceived underdeterrence and stating that since the early 1970s the average prison sentence in the United States nearly tripled in length). Of course relatively small levels of underdeterrence can be justified under the standard account. A lawmaker who believes that the population is comprised of more risk-averse than

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reasoning has led lawmakers to repeatedly ratchet-up fines and prison sentences for white collar criminals.[17] Call this the "ratcheting of sanctions" puzzle.

Second, society can punish offenders using fines and/or incapacitation. All other things being equal, fines are less costly to implement, given the administrative costs associated with running prisons and the added procedural safeguards that are triggered when a defendant faces the possibility of losing her freedom.[18] It follows that in order to maximize social welfare a lawmaker should use a fine to punish offenders that have sufficient wealth to pay it.[19] That notwithstanding, offenders are routinely punished with prison sentences, even though they are not wealth-constrained.[20] Call this the "over-incapacitation" puzzle.

Third, as we saw above, in order to increase the probability of detection and of a successful prosecution, society has to invest in law enforcement and the rest of the criminal justice system. At the same time, as long as offenders are not wealth-constrained, society can set the gross fine high enough to assure that they violate the law only when it is socially beneficial. In theory, therefore, if the harm from crime C is $1,000 and all offenders have at least $100,000 in wealth, society can impose a fine of $100,000 and set the probability of detection at 0.01, which produces the required expected sanctions of $1,000. Any investment in enforcement that increases the probability of detection above that amount would be

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risk-neutral individuals will adopt lower sanctions than the standard optimal one. It may also create expected sanctions that are slightly lower than the expected harm, up to the point that the savings in enforcement costs are greater than the marginal harm that is not deterred.

[17] For example, the Sarbanes-Oxley Act provides for enhanced criminal penalties for white-collar offenders. *See* Sarbanes-Oxley Act of 2002, Pub. L. No. 107-204, § 807, 116 Stat. 745, 800 (2002) (codified at 18 U.S.C. § 1348) (detailing corporate and criminal fraud accountability); Sarbanes-Oxley Act of 2002, Pub. L. No. 107-205, §§ 902–905, 116 Stat. 745, 804 (codified at 18 U.S.C. §§ 1341, 1343, 1349, and 29 U.S.C. § 1131) (providing penalty enhancements for white-collar crime); Sarbanes-Oxley Act of 2002, Pub. L. No. 107-205, § 1106, 116 Stat. 745, 807 (codified at 15 U.S.C. § 78ff) (providing penalties for any person who willfully and knowingly provides a false and misleading statement to the Securities Exchange Commission).

[18] Imprisonment creates other deadweight losses. For example, prisoners are not socially productive while incapacitated. *See* POSNER, *supra* note 6, at 223 (arguing that imprisonment impairs a convict's productivity).

[19] *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).

[20] *See* Garoupa, *supra* note 6, at 271 (explaining that in the United States, and much less in Europe, policymakers resort to prison sentences before exhausting fines).

wasteful.[21] However, society routinely sets the probability of detection higher than predicted by the standard account—the "over-enforcement" puzzle.[22]

C. Punishing Career Criminals and Habitual Offenders

The standard law and economics account has relatively little to say about repeat offenders. Under this account, each instance of crime C is independent from other instances.[23] So if Anne commits crime C ten times, she produces the same harm each time. As a result, the optimal expected sanctions are the same for each instance of the crime.[24] For example, if crime C has expected sanctions of $100, which equals its expected harm, and Anne receives a benefit of $110 from committing C, society should be indifferent if Anne commits the crime once or ten times. In fact, Anne should commit the crime as often as possible, since each time she does so she creates a social windfall of $10. That notwithstanding, society routinely punishes repeat offenders more severely than first-time offenders; that is, the punishment includes a premium that is added not because her actions created a

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[21] *See* Becker, *supra* note 6, at 190–93 (describing the trade-off between the magnitude of sanctions and enforcement expenditures to increase probability of detection). This assumes that offenders are risk neutral. Risk averse offenders prefer lower gross sanctions and a higher probability detection. For example, if the actual fine is $100,000, a risk averse person who is caught will perceive a loss greater than $100,000, but society will only get the $100,000 fine. As a result, policymakers who believe that the population is comprised of more risk averse than risk neutral individuals will adopt lower sanctions. Second, policymakers may want to adopt expected sanctions that are slightly lower than the expected harm, up to the point that the savings in enforcement costs are greater than the marginal harm that is not deterred. *See* Polinsky & Shavell, *Public Enforcement*, *supra* note 8, at 54 (stating that if offenders are risk-averse the gross sanctions would be lower than in cases in which offenders are risk-neutral). The argument regarding the maximal gross fine, also assumes 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).

[22] *See* Polinsky & Shavell, *Public Enforcement*, *supra* note 8, at 72 (stating that in many enforcement contexts, society seems to invest more on raising the probability of detection than makes sense from a social welfare maximizing perspective).

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

[24] Similarly, if Anne commits crime C and is punished; and subsequently commits crime D, her punishment for the second crime should equal the optimal expected sanction for crime D.

greater amount of harm, but because she is a repeat offender.[25] Call this the "repeat offender punishment premium" puzzle.[26]

D. The Over-Obedience Puzzle

Under the standard approach, an offender will violate the law whenever the benefits exceed the expected sanctions. In fact, given that the optimal sanctions are set equal to the expected harm, any net gain from committing a crime that exceeds the optimal expected sanctions will lead to an increase in aggregate social welfare. For example, suppose that John receives a $100 benefit from crime C, and society has determined that the crime creates a harm or social loss of $75 and has set the expected sanctions at $75. Under the standard account, John will violate the law, and the extra $25 that he receives over the expected sanctions of $75 makes him better off; and since his welfare is part of the society's welfare calculus, social welfare would also increase by $25. We can call this sort of behavior "social-gain-misconduct." But there is a problem: people routinely fail to engage in social-gain-misconduct. For example, in some areas, such as tax compliance, people obey the law much more often than predicted by the theory.[27] This sort of over-obedience poses two potential problems for the standard account. First, it raises the question of why rational, utility maximizing offenders will obey the law in instances in which the expected benefits of committing a crime exceed the expected sanctions. Although one can understand why an offender may pass on a potential crime if the net gains are only marginal, given risk aversion or the potential for error in predicting the expected sanctions, it is more difficult to explain why citizens are over-obedient in contexts in which the benefits far exceed the expected sanctions. Second, to the extent that the goal is to maximize aggregate social welfare, society has an interest in encouraging overly obedient potential offenders to violate the law.

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[25] *See infra* Part III.D.

[26] A possible explanation is that these offenders are systematically underdeterred due to a lack of knowledge about the true magnitude of the expected sanctions. This explanation has three shortcomings. First, repeat offenders are the least likely to make systematic mistakes of this type, given that each conviction provides them with information about the expected sanctions. Second, the account does not explain why these mistaken beliefs will necessarily lead to systematic underdeterrence. In other words, it is just as likely that offenders will be mistaken in the opposite direction and be overdeterred. Third, even if one assumed that offenders were underdeterred, it does not explain why policymakers would resort to increasing sanctions instead of providing offenders with more accurate information.

[27] *See* Polinsky & Shavell, *Public Enforcement*, *supra* note 8, at 72 (noting that given the penalties for tax avoidance, one would expect a greater level of underpayment).

Such a claim may sound strange, if one starts from a normative perspective that once an activity has been labeled criminal citizens have an affirmative duty to obey the law (regardless of whether they get a net gain from committing the crime); however, under the utilitarian approach over-obedience is inherently wasteful. It is useful to unpack this distinction. Suppose that crime C produces a harm of $500, that the probability of detection and successful prosecution is 100%, and that it is punished with a fine of $500; suppose that crime C reads: "thou shalt not kick a police officer." If John gets a benefit of $2,000 from kicking police officers, then under the utilitarian approach he, and society, would be better off if he kicks, pays the fine, and enjoys the additional utility of $1,500 (this amount is merely a translation into a monetary metric of the intangible utility that John receives). Under the utilitarian approach therefore the $500 fine is just like a license—if you want to commit the crime, you must purchase the license. As such it is analogous to an efficient breach under the law and economics account of contract law. On the other hand, under some non-utilitarian theories of criminal law, when society criminalizes an activity, the benefit received by the offender is irrelevant. In our example, the law would read: "thou shalt *never* kick a police officer." If John kicks and pays the fine, there is still a residual, intangible "badness" that attaches to his behavior. As such committing a crime is like breaking a promise under contract law accounts that make use of analogous deontological frameworks. Agreeing to live in a society, in short, creates an implicit promise not to violate the law.

This article is concerned with the utilitarian account of criminal law. But the above example helps bring out an important distinction helpful for the analysis below. Implicit in the example is the fact that the cost of achieving full enforcement is very low—given the very nature of the crime. But suppose instead that increasing the probability of detection is costly. In a world in which all citizens are equally over-obedient, it may make sense for society to take that fact into account when setting the optimal sanctions. For example, if the crime produces a harm of $500 and people will obey the law unless they receive a benefits of $3,000, then society can reduce enforcement expenditures for the overly-obedient. As long as the benefits from reducing enforcement costs are greater than the social welfare losses produced by over-obedience, society would in fact be better off. But once one starts looking at the characteristics of offenders—the extent to which they are overly obedient—then the standard account loses one of its most attractive characteristics: the fact that a lawmaker can set the optimal sanctions without knowing anything about the population of offenders. A lawmaker only needs to identify the harm produced by a particular activity, and set the expected sanctions equal to the harm. The over-obedience puzzle, therefore, needs to be explained.

II. RATIONALLY ADDICTED REPEAT OFFENDERS

This Part develops a rational addiction theory of criminal misconduct in which an offender's past misconduct can lead her to become addicted; this, in turn, will increase the likelihood that the individual will become a repeat offender. The theory builds on the standard law and economics account of crime. It however relaxes the assumption that each instance of criminal misconduct by a repeat offender is independent of other instances.[28] We allow for two interdependencies between crimes. First, an offender's future utility will be lower, the more often that she has engaged in misconduct in the past. Second, the marginal utility from committing a crime at time t will be higher, the more often that an offender has violated the law in the past. Taken together, these two facts lead to the following conclusion: engaging in repeated criminal misconduct will not only trigger potential sanctions, but other losses as well—the negative fallout from a life of crime; but that notwithstanding, the deeper an offender goes down the path of repeated misconduct, the greater the immediate returns from committing the next crime. Repeat offenders, therefore, are subject to an addiction trap. The more they offend the greater the immediate costs of giving up on a life of crime and the worse off that they will end-up in the long run.

This Part will develop this criminal addiction argument in several steps. First, it will describe the way that a rational offender who knows that he will have multiple opportunities to engage in misconduct would go about choosing an optimal path of repeated misconduct. Second, it will show that criminal misconduct has addictive qualities, at least in the way that "addiction" and "habit" are modeled in the economics literature on addiction. The claim is not that engaging in repeated misconduct changes the brain chemistry of offenders in a way that will lead then to crave crime, or violate the law due to a loss of will (although both of these are distinct possibilities); rather the claim is that offenders who have committed ten crimes will incur a greater disutility of foregoing crime number eleven, than individuals who are about to commit their first offense. The repeat offender yields to his addiction knowingly and as part of an attempt to maximize his long-run aggregate utility. Third, the Part describes the negative internalities incurred by repeat offenders and how these increase with the number of crimes committed. It

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[28] Suppose that John robs a pedestrian today, commits a burglary tomorrow, and embezzles funds from his employer the following week. Under the standard account, each of these crimes are independent; one would not raise the expected sanctions for John's embezzlement, due to the fact that he committed two other crimes the previous week. Moreover, if John embezzles 100 times during the next year, his punishment for the 100th time should be the same as the one for first. *See supra* Part I.C.

also identifies the negative externalities flowing from repeated misconduct, and shows that failing to take these into account will lead to systematic underdeterrence. Fourth, the Part then uses these two positive claims to develop a theory of rational criminal addiction.

A.   Intertemporal Choices by Criminal Offenders

A rational offender is forward-looking and thus will take into account the intertemporal nature of her decision:[29] she will choose the course of action that will maximize her intertemporal utility[30]—her current *and* future well-being—given her beliefs of how she plans to act in the future.[31] In making these intertemporal decisions, an offender will take into account the "instantaneous utility" experienced in the current period and in the future. This utility can be positive or negative. An offender will, in most instances, receive an immediate return from committing a crime in the form of money, property, or other forms of utility.[32] The benefits from crime are both tangible and intangible in nature.[33] Committing a crime requires some immediate investments to plan and execute it; it also triggers delayed costs.

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[29] 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 & Dražen 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 (defining intertemporal choices as "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 *passim* (2001).

[30] 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. LIT. 315, 316–17 (2009) (discussing general model and its limitations).

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

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

[33] *See* POSNER, *supra* note 6, at 219 (stating that the benefits from criminal misconduct include "various tangible (in the case of crimes of pecuniary gain) or intangible (in the case of so-called crimes of passion) satisfactions from the criminal act").

These include the expected sanctions and the costs associated with shaming, ostracism, and loss of reputation amongst one's peers.[34]

A rational offender will take into account the future payoffs, discounting them to account for the uncertainty regarding future states of the world and about the actual effect that these will have on her instantaneous utility in future periods.[35] The offender will make one last adjustment to her intertemporal utility function to take into account the delay in incurring the disutility from being punished (and other costs flowing from engaging in misconduct). People are, as a general matter, impatient: all other things being equal, they prefer to receive rewards earlier and defer costs until future periods. In order to capture this impatience we introduce a discount factor, $\delta < 1$.[36]

A rational offender wants to continue to act in a rational manner in the future, so in period 0, she will act under the assumption that in periods 1 through T she will once again choose the optimal course of action (that which would maximize her intertemporal utility in each of those periods).[37] So if we let α be the optimal course of action in a particular period, given the actor's previous decisions, and her beliefs about her expected future decisions, then we can reduce the actor's intertemporal decision into two parts. In period t, she will choose the optimal action

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[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] The actual payoffs that an offender receives will depend on how accurately she can predict the consequences of her actions, both the positive and negative effects on her future utility. An offender may be uncertain about the pleasure that she will derive from the crime, the magnitude of the tangible payoffs, the way that it will affect her future tastes, the magnitude of the gross sanctions, and the probability of detection. 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. *See* James Q. Wilson & Allan Abrahamse, *Does Crime Pay?*, 9 JUST. Q. 359, 367–68 (1992) (finding that criminals consistently miscalculate the net expected benefits of committing crimes). While rational offenders accurately predict the consequences of their current behavior on their future utility, real-world actors routinely reach incorrect conclusions regarding the relative likelihood of the various possible states of the world, the payoffs associated with those states, or the utility that they will experience under the various scenarios. For example, an offender may mispredict the extent to which engaging in criminal activity will change her tastes and thus her future utility. Nonetheless, this article assumes that actors are fully rational, and thus have perfect foresight regarding each of these factors.

[36] 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 she discounts for a one-period delay in receiving a payoff. For a general discussion of time discounting, see Shane Frederick et al., *Time Discounting and Time Preference A Critical Review*, 40 J. ECON. LITERATURE 351 (2002).

[37] *See* RICHARD BELLMAN, DYNAMIC PROGRAMMING 83 (1957) (describing the principle of optimality).

α—$U_t(\alpha)$—to maximize the sum of her period *t* instantaneous utility u_t and her discounted intertemporal utility beginning in the following period, assuming that she will again choose the optimal course of action α: $U_t(\alpha) = u_t + \delta U_{t+1}(\alpha)$.[38]

For example, suppose that John is deciding whether to commit a crime in period 1, knowing that he will have an opportunity to re-offend in the following two periods. John will commit a crime only if the expected benefits exceed the expected sanctions. Assume that John has a discount factor δ = 0.9, and that the three crimes will yield an immediate benefit of $100 and trigger delayed expected sanctions of $90. Assume further that the first instance in which John can be punished is after he has committed the last crime. From the long-term perspective of period 0, John decides to engage in misconduct in all three periods. This is because his intertemporal utility function in period 0^{39} is $U_0 = [(\$100 \times 0.90) + (\$100 \times 0.81) + (\$100 \times 0.729)] - [(\$90 + \$90 + \$90) \times 0.656)] = \$243.9 - \$177.12 = \$66.78$.[40]

B. The "Golden Handcuffs": Habit Formation and Criminal Misconduct

This section develops the positive claim that criminal misconduct is habit-forming: the greater the number of times that an offender has violated the law in the past, the greater his immediate utility from committing a crime in the current period. Engaging in the same activity repeatedly can lead individuals to form a

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[38] In the following period, the actor will choose $U_{t+1}(\alpha) = u_{t+1} + \delta U_{t+2}(\alpha)$, and so on, until the last period.

[39] This article adopts the standard assumption that offenders discount the future using an exponential function. This means that in period 0, a rational offender will choose the course of action that will maximize her intertemporal utility function U_0. This requires her to maximize the sum of the instantaneous utility in period 0 and the discounted expected utility in periods 1 though T, given her belief of how she will act in the future: $U_0 = [u_0 + (\delta u_1 + \delta^2 u_2 + \delta^3 u_3 + \delta^4 u_4 + \ldots + \delta^T u_T)]$.

[40] In period 1, John will follow through, and engage in misconduct, given that $U_1 = [\$100 + (\$100 \times 0.9) + (\$100 \times 0.81)] - [(\$90 + \$90 + \$90) \times 0.729)] = \$271 - \$196.83 = \$74.17$. We can see that the difference in the net returns from the perspectives of periods 0 and 1 is δ = 0.9. That is $74 × 0.9 = $66 (rounding off). Using similar reasoning, John will also follow through with his planned misconduct in periods 2 and 3. More generally, exponential discounting guarantees that individuals always discounts between any two periods by the same amount, δ, regardless of when they carry out their cost-benefit analysis. *See* Ted O'Donoghue & Matthew Rabin, *Doing It Now or Later*, 89 AM. ECON. REV. 103, 106 (1999) (stating that under exponential discounting, "[a] person's relative preference for well-being at an earlier date over a later date is the same no matter when she is asked"). It follows, that barring new information that would lead her to change her mind, an offender who has chosen the optimal course of action in period 0, will follow through with that original plan. *See* Frederick et al., *supra* note 36, at 358 (stating that "[c]onstant discounting implies that a person's intertemporal preferences are time-consistent, which means that later preferences 'confirm' earlier preferences").

habit. More precisely an activity is habit-forming if the more a person has engaged in that activity in the past, the greater the immediate utility of engaging in it in the current period. Similarly, a product is habit-forming if the greater its past consumption the more that a person wants to consume it again in the current period. For example, Gary Becker has included among habit-forming activities: "smoking, using heroin, eating ice cream or Kellogg's Corn Flakes, jogging, attending church, telling lies, and often intimacy with a lover."[41] People can also form habits or addictions to telling lies, committing violence,[42] to a particular standard of living, and being around particular individuals.[43] Since we are concerned with criminal behavior, our focus will be on activities, although one can easily conceptualize an offender's actions as a type of consumption, in which committing a crime at time t, produces an immediate return and triggers delayed expected sanctions.

We will compare the decision faced by an offender committing her first crime and one on his n^{th} crime. Mary is a potential first-time offender, and John is the repeat offender. What would change if Mary commits a crime? What would happen after her second, third, and fourth crimes? How is someone like John, a habitual or career criminal, different? We will focus on six general ways in which an offender's incentive to commit a crime in the current period, depends on how often he has engaged in misconduct in the past.

First, once Mary has taken all the requisite steps to trigger criminal liability, she cannot undo the crime.[44] For example, if after robbing a bank, Mary changes her mind, and returns the cash a minute later, she is still subject to liability. An offender who regrets having committed a crime may try to mitigate—she may turn herself in, enter into a plea bargain, offer an excuse, provide restitution, or apologize to the victims—but she is still subject to prosecution. More generally, committing a crime casts a lasting shadow over the offender's future welfare, which will affect subsequent decisions to re-offend. Suppose that a manager has made materially false statements in a securities filing, and that at the time of the next filing, she has to choose either to correct the previous misstatement, and

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[41] Becker, *supra* note 1, at 328.

[42] *See id.* at 330–31.

[43] *Id.* at 331–32.

[44] *Cf.* WAYNE R. LAFAVE, CRIMINAL LAW § 11.1(d), at 575–67 (discussing that once criminal liability for solicitation is triggered, the offender is typically unable to undo this liability by simply renouncing the crime).

subject herself to civil and criminal liability, or to cover-up the first violation by making a second false statement. The more often that the manager repeats the fraud, the greater the disutility of obeying the law and coming clean. Even if repeated misconduct leads to large aggregate welfare losses over time—negative internalities—the marginal immediate utility in any one period can increase with each violation (under certain conditions, as we will see below).

Second, committing a crime not only produces immediate returns, but also requires the offender to incur tangible and intangible "transaction" costs. The latter are higher for a first-time offender, and will depreciate the more often an offender has engaged in misconduct. For example, Mary may hold certain views about her moral worth and integrity that will act as an entry barrier. The first crime will lead to an immediate depreciation of these moral constraints and certain ex post rationalizations;[45] subsequent ones will cause further erosion, and at some point, the constraints will disappear altogether. John, our repeat offender, may in fact develop a distorted moral ethics that values disobedience, violence, or using crime to "rectify" personal setbacks or broader societal injustices.[46]

Third, the more often that an offender has engaged in misconduct, the more likely that he will form relationships with other offenders who will not want him to exit the life. Suppose that John has joined a gang, criminal organization, or conspiracy as part of committing crime 1. At the time of crime 2, John can either choose to exit the group or re-offend. His immediate disutility from choosing to obey the law is greater than when before crime 1. And after crime 10, these

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[45] *See* Darley, *supra* note 16 (describing white collar offenders who make an unnoticed transition into crime); Donald C. Langevoort, *The Epistemology of Corporate-Securities Lawyering Beliefs, Biases and Organizational Behavior*, 63 BROOK. L. REV. 629, 647–48 (1997) (explaining cognitive dissonance); Lisa G. Lerman, *The Slippery Slope from Ambition to Greed to Dishonesty Lawyers, Money, and Professional Integrity*, 30 HOFSTRA L. REV. 879, 909 (2002) (citing lawyer greed as the principal catalyst for beginning to slide down the "slippery slope" to misconduct); David Luban, *Integrity Its Causes and Cures*, 72 FORDHAM L. REV. 279, 281–82 (2003) (discussing role of deception and cognitive dissonance in self-perception).

[46] Some criminals get immediate pleasure from violating the law, from retaliating against perceives social unfairness or from the esteem received from fellow criminals. *See, e.g.*, JACK KATZ, SEDUCTIONS OF CRIME: MORAL AND SENSUAL ATTRACTIONS IN DOING EVIL 312 (1988) (arguing that criminals take "delight in deviance" and "take pride in a defiant reputation as 'bad'"); 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, 1219 (1982) (finding that revenge is one of the major motivators of employee theft).

immediate costs of exit will even be higher, given that the other group members have more at stake if John were not only to exit, but inform on them to the authorities. More generally, the immediate costs of choosing to exit will increase with the number of crimes, the number of associates with whom he has engaged in misconduct, and the amount of incriminating evidence about his co-conspirators that he has acquired through repeated joint misconduct.[47] Assume that the 10 crimes are identical and provide John with the same exact return. Given that with each offense the immediate disutility of obeying the law in the following period increases, it follows that John's marginal instantaneous utility from re-offending increases with the number of offenses. It is this sort of dynamics that can lead to habit formation.

Fourth, criminologists and lawmakers have given a large amount of attention to "career criminals,"[48] the serious repeat offenders that have chosen a life of crime over other ways of making a living. While the term is often used loosely, it does capture an important part of being a repeat offender: each decision to offend or obey involves a second-order decision of what type of human capital to acquire: crime-specific or obedience-specific human capital.[49] More generally, a decision to invest in human capital requires an actor to incur an immediate disutility, in effort and opportunity costs. Given these constraints, rational actors will have to make tradeoffs between different types of human capital, choosing to invest in those that will maximize their aggregate lifetime utility. Obedience-specific human capital

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[47] *See* Neal Kumar Katyal, *Conspiracy Theory*, 112 YALE L.J. 1307, 1319–21 (2003) (describing social science work on group dynamics showing that, once individuals are part of a group, they often act against their own self-interest, including subverting it in favor of the group's interest).

[48] *See* Matt DeLisi & Alex R. Piquero, *New Frontiers in Criminal Careers Research, 2000–2011 A State-of-the-Art Review*, 39 J. CRIM. JUSTICE 289 (2011) (providing a detailed overview of the criminology literature on repeat offenders). Statutes often make reference to both "career" and "habitual" offenders, although the use of the latter term is used to distinguish between vanilla repeat offenders and those who have chosen to make a career out of crime. *See, e.g.*, FLA. STAT. § 775.084 (drawing distinction between the "habitual felony offender," the "habitual violent felony offender," the "three-time violent felony offender," and fourth-time around "violent career criminal," where the different categories capture both a difference as to the underlying offense, and the number of times that an offender has been previously convicted). *See also* Ewing v. California, 538 U.S. 11, 24 (2003) (explaining three-strike laws as a "deliberate policy choice that individuals who have repeatedly engaged in serious or violent criminal behavior and whose conduct has not been deterred by more conventional approaches to punishment, must be isolated from society in order to protect the public safety").

[49] *See* Gary S. Becker, *Investment in Human Capital A Theoretical Analysis*, 70 J. POL. ECON. 9, 25–27 (1962) (discussing role of schooling in the acquisition of human capital) [hereinafter Becker, *Human Capital*].

includes any type of knowledge, skills, and relationships that increases an individual's returns from engaging in non-criminal activities, including work and play outside the criminal sphere, and bonds that will help with either—such as those forged among family members, schoolmates, friends, and business associates. Crime-specific human capital includes the knowledge and skills needed to execute crimes efficiently. As with other types of "workers," repeat offenders learn by doing. Part of what they learn is how to maximize their returns, with a minimum amount of effort.

One would expect, therefore, that over time, repeat offenders gain expertise in particular types of crimes and are able to better choose between available criminal opportunities, including identifying good victims. A victim, for example, may be an easy mark or one that is unlikely to report the crime. Repeat offenders will also become more efficient at covering-up their crimes and avoiding detection; as with executing a crime, a rational offender wants to minimize the costs of covering them up, including the intangible disutility from the fear of being caught. Repeat offenders will also learn about police behavior, prosecutorial practices, and sentencing proclivities among judges in their jurisdiction. At the same time, repeat offenders and recidivists are more likely to attract attention from the police and prosecutors and elicit negative reactions from judges. They are in short more likely to incur negative internalities, a subject to which we return in the next section.

Fifth, the deeper into a life of crime the offender finds himself, the more time and effort that he will expend in sharpening crime-specific human capital as opposed to acquiring the type of skills and knowledge that are useful for making a living as a law-abiding citizen.[50] In other words, one would expect that the more one learns about a particular skill the greater the expected returns of acquiring an additional unit of the same type of human capital, as opposed to learning a whole new skill. It is of course possible to "retool," but doing so involves a large immediate investment in learning a new set of skills. A rational actor would make the investment only if the expected benefits are greater than those of continuing with what he already knows. This is true for a lawyer, a doctor, or a worker on an assembly line; it is also true for repeat offenders. Moreover, in the latter case, the

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[50] *See* Becker, *Human Capital*, *supra* note 49, at 15 (stating that "foregone earnings are an important, although neglected cost, of human capital, and should be treated on the same footing as direct outlays").

retooling costs are even greater after an offender has a criminal record, which will make it more difficult to get a job (outside of crime) and get a formal education.[51]

Sixth, committing crimes as part of a group will lead to division of labor and specialization which would be lost if the offender chooses to leave the group. This type of group-specific criminal capital is important because, all other things being equal, the group will be able to commit more crimes the greater their joint human capital. When combined with the increasing costs of exit described above, John's decision to join a criminal group will lead to a higher likelihood that he will re-offend, both because his colleagues will insist and because joint misconduct is relatively less expensive. Moreover, one would expect that the value of this aggregate criminal capital will increase with the number of crimes that the group has engaged in, for the same reason that, all other things being equal, a sports team comprising the same players and coach is more likely to succeed. In the case of a criminal group, past behavior improves not only coordination and efficiency, but also the level of trust among its members.

In summary, once an individual begins to commit crimes, he will acquire a set of golden handcuffs that will make it increasingly attractive to continue down the path of repeated misconduct. The difference between Mary and John, between a first-time and an nth-time offender, is that a decision by John to abstain from criminal misconduct will impose a greater disutility than what Mary would experience if she were to decide to obey the law.

C. Negative Internalities from Repeated Criminal Misconduct

The standard law and economics account of criminal misconduct focuses on the external harm created by an offender and the task of choosing the optimal sanctions to cause her to internalize these costs. The latter is another way of saying that sanctions are set to assure that an offender will obey the law when it is socially beneficial and violate the law in all other cases; that is, whenever the benefits from misconduct exceed the harm caused by the offender. But a rational offender will commit a crime only if the benefits exceed the total costs, which includes: (1) the expected sanctions and transaction costs from pursuing the current crime; and (2) any additional costs, in the future, from having chosen to violate the law in the current period. These additional costs are the negative internalities from forming a criminal habit. Repeat offenders incur myriad types of negative internalities. We

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[51] *See* Ted Chiricos et al., *The Labeling of Convicted Felons and Its Consequences for Recidivism*, 45 CRIMINOLOGY 547 (2007) (stating that in many states convicted felons are not eligible for student loans or employment with state-licensed occupations or entities).

will not go into all of them, given that they are often crime-specific and because our general conclusions still hold even when repeated misconduct yield positive internalities.

Repeat offenders are also more likely to have an opportunity to be the subject of violence (either in prison or while engaging in misconduct) and to die early.[52] Choosing a life of crime will also have long-term effects on the foregone utility from having forged stable family relationships.[53] At the same time, one would expect that repeat offenders are likely to attract more attention from the police and prosecutors. A police force intent on maximizing the returns from its enforcement efforts will focus on identifying previously undetected repeat offenders, given that with one arrest they can solve *n* crimes, as opposed to having to make *n* individual arrests; the same is true with prosecutors, which have limited resources and broad discretion in charging offenders and reaching plea bargains. Additionally, certain types of repeat offenders have a higher risk of encountering sting operations and undercover police. In the case of a recidivist, the police is more likely to know about their existence and whereabouts. All other things being equal, a recidivist is more likely to be wrongfully convicted of a future crime. This is due in part to a framing effect (of the cognitive sort): the authorities are more likely to start an investigation if they see that the crime bears the stylistic signature of a known offender, and may cut short their search for the perpetrator if they are able to find such a match. Prosecutors and judges presented with a recidivist may approach the case as one in which the likelihood of a wrongful conviction is lower. One would also expect that a rational judge who wants to reduce her docket will, all other things being equal, punish recidivists more severely, given that the very act of being a recidivist provides the judge with two important pieces of information: that the offender is one with a propensity to commit crimes and that he is not very good at avoiding detection.

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[52] *See* Jarmo Paanila, Panu Hakola & Jari Tiihonen, *Mortality Among Habitually Violent Offenders*, 100 FORENSIC SCI. INT'L 197 (1999) (finding that repeat violent offenders' relative risk of dying vis-à-vis general population was 4.9-fold); Ingrid A. Binswanger et al., *Release from Prison A High Risk of Death of Former Inmates*, 356 NEW ENG. J. MED. 157 (2007) (study finding high risk of death among released inmates due to drug overdoses, cardiovascular disease, homicide, and suicide).

[53] *See* R. Jay Wallace, *Reason and Responsibility*, *in* NORMATIVITY AND THE WILL: SELECTED PAPERS ON MORAL PSYCHOLOGY AND PRACTICAL REASON 123, 123–24 (2006) (describing expectations of behavior in moral communities as reactive sentiments and judgments).

D. Rational Addictions to Criminal Misconduct

This section develops a model of rational criminal addictions. We will assume that offenders are rational intertemporal decision-makers who choose to engage in misconduct in the current period only if doing so will maximize their intertemporal returns. They will therefore choose the course of action that will maximize the sum of: their immediate instantaneous utility; and the discounted aggregate expected utility given how they expect to act in the future. The latter will depend on their beliefs about how their current behavior will affect the number of criminal opportunities that they will have in the future, their temptation to re-offend (given habit formation), the magnitude of the expected sanctions, and negative internalities (given the number of crimes they expect to commit).

Under the standard law and economics account, an offender will commit a crime ("offend") at time t, whenever the benefits of offending are at least as great as the expected sanctions.[54] When this condition holds, the offender receives a net gain, which we will refer to as $x \geq 0$.[55] When the expected sanctions exceed the benefits, $x < 0$, a rational offender will abstain from crime ("obey"). We will refer to x as an offender's "addiction-independent returns." Under the standard account an offender will always obey the law when $x < 0$, but under the criminal addiction theory and offender with a positive addiction level may offend when $x < 0$ and obey when $x \geq 0$.

More specifically, our principal claim is that an offender's immediate utility from re-offending vis-à-vis obeying the law is higher the more often he has offended in the past. This is because an offender's immediate utility from committing a crime in the current period depends on his addiction-independent returns and his "addiction premium." The addiction premium captures the immediate disutility of obeying the law when an offender has formed a habit for misconduct. And since an offender reinforces his habit with each offense, the addiction premium increases with the number of prior crimes. A rational offender, under the criminal addiction theory, will violate the law whenever the benefits from the crime plus his addiction premium is at least as great as the discounted expected

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[54] Assuming that offenders commit crimes when they are indifferent. So if an offender with a discount factor $\delta = 0.9$ has the opportunity to commit a crime that will yield an immediate benefit, v, and trigger delayed expected sanctions, s, the offender's cost-benefit analysis would involve: x = v − δs.

[55] The only difference from the standard account is that we sometimes allow for the net benefits ($x_t > 0$) of loss ($x_t < 0$) from committing a crime to vary over time, which explains the time subscript attached to x. While this is not critical for our account, it helps to capture the potential that exogenous factors can lead to an increase in the incentive to start down a path of misconduct. *See infra* Part III.

sanctions and delayed costs from addiction—the negative internalities and increased incentive to re-offend due to the higher addiction premium.

An offender's addiction premium depends on his addiction level. The concept of habit or addiction that we are concerned with has little to do with physiological changes that increase an offender's immediate disutility from not following through on a criminal opportunity. While such changes may in fact occur, particularly with young offenders who are still maturing, none of our claims depend on the sort of "craving" usually associated with addictions. Instead, the "golden handcuffs" argument developed above is more general; it holds that the deeper an offender goes down the path of misconduct, choosing to obey the law can become relatively more costly either because third parties make it more costly to exit the life of crime, or the offender's own actions, such as his investment in crime-specific human capital, have made it relatively more attractive to re-offend. One can, of course, imagine scenarios in which an offender's past actions have put him in a position in which obeying the law would produce immediate disutility. For example, peer pressure can make it relatively more attractive to offend instead of obey and having accepted a large number of stock options can increase a manager's disutility from obeying Federal securities laws. This sort of exogenous factors can be incorporated into our model by including them under the addiction-independent returns from crime, x.

We will model the golden-handcuffs effect, by introducing a parameter, $o > 0$ that captures an offender's addiction-related disutility from obeying the law, and another, $r > 0$, that represents the offender's addiction-related negative internalities. Both o and r increase with an offender's level or stock of addiction, k. The latter will increase with each prior offense. Habits, however, become less binding the more one abstains from the conduct in question. As a result, one would expect that an offender's addiction level will depreciate by some amount, each time that he chooses to obey when faced with a criminal opportunity.

Assume therefore that in each period, an offender has the ability to engage in misconduct and will choose either to offend or obey. Each time that he offends his addiction level, k, increases by 1,[56] while obeying allows depreciation to do its work. We assume that a first-time offender has an addiction level $k = 0$. Let $d < 1$ be an offender's depreciation rate. If it is close to 1, the offender with a positive

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[56] *See* O'Donoghue & Rabin, *supra* note 4. Their model builds on the basic premise of Becker and Murphy's rational addiction model, which allows for continuous changes in the addiction stock. *See* Becker & Murphy, *Rational Addiction*, *supra* note 5.

addiction stock will have to obey the law a greater number of times before he exhausts it; on the other hand, if $d = 0$, one act of obedience will completely eliminate his addiction.[57]

An offender facing a criminal opportunity can either offend or obey. If he chooses to offend he receives the addiction independent return, x, and incurs a negative internality based on his addiction level. An offender's immediate utility from violating the law is therefore:

(1) $x - (r \times k)$.

Since the addiction stock increases with the number of prior offenses, a repeat offender's utility in the current period will be lower due to the negative internalities produced by his prior offenses.

When an offender chooses to obey the law, he gives up the addiction-independent return, but still incurs the negative internalities, as well as the addiction-related disutility from obeying the law. The immediate utility from obeying the law is:

(2) $0 - (r \times k) - (o \times k)$.

The difference between these two gives us the gain in immediate utility from a decision to violate the law, or an offender's *temptation to offend*:

(3) $[x - (r \times k)] - [0 - (r \times k) - (o \times k)] = x + (o \times k)$.

When $k = 0$, the offender is unaddicted and thus receives an immediate utility equal to the addiction-independent return, x. When the offender has a positive addiction level, his returns from misconduct also include the *addiction premium*, $(o \times k) > 0$. It follows that the more the offender has violated the law in the past, the greater his addiction premium, and thus the greater his current incentive to re-offend.

A rational offender will choose to offend in period t, only if his temptation to offend is greater than the discounted delayed costs from offending. These costs include both the incremental increase in negative internalities not just in the following period, but also in future ones, given that with each offense, the temptation to re-offend becomes even greater.

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[57] The depreciation parameter d will vary across offenders and the nature of their past offenses. Someone who has joined a gang or an organized crime family will find that it will take longer to reduce these negative internalities than would a repeat burglar who works alone.

For example, suppose that an offender has negative internalities of $r = 10$, an addiction-related disutility from obedience, $o = 30$, and that his addiction independent returns from crime C remain constant at $x = 30$. Suppose further that in period t, his addiction stock is at 5 and he has a depreciation rate to $d = 0.9$. This means that in period t, the offender has negative internalities of 50. Since these are the spillover costs from his previous offenses, his period t utility is decreased by 50, whether he chooses to re-offend or obey. The offender's temptation to offend in period t is: $[30 + (30 \times 5)] = 180$.

If he were to offend, his addiction stock increases by: $[(0.9 \times 5) + 1] = 5.5$.[58] If on the other hand he obeys, his addiction stock decreases by: $(0.9 \times 5) = 4.5$. Suppose first that the offender engaged in misconduct. In period $t + 1$, his negative internalities and addiction premium would be 55 and $(30 \times 5.5) = 165$, respectively. If he obeyed the law in the previous period, then his negative internalities and addiction premium would be 45 and 135, respectively. The offender has two delayed costs from offending in period t. First, he incurs added loss in negative internalities of $45 - 55 = -10$. Second, his addiction premium is larger: $165 - 135 = 30$. This greater addiction premium will increase the offender's temptation to re-offend.

Suppose now that he choose to re-offend. His addiction stock will increase to $[(0.9 \times 5.5) + 1] = 5.95$. Had he decided to obey in period $t + 1$, his addiction stock would have depreciated to $(0.9 \times 5.5) = 4.95$. Once again offending leads to higher negative internalities and addiction premium.

In summary, an offender with a positive addiction level will have an addiction premium that may lead him to re-offend notwithstanding the fact that doing so reduces his future utility due to negative internalities. The following chart captures this reinforcement effect and its long-term cost to a repeat offender. Suppose that in period 1, John has an addiction level of 1, and that, with each offense, it increases by a total of 1 (after depreciation). Therefore, his addiction level in periods 1 through 6 is $k = \{1, 2, 3, 4, 5, 6\}$. John also incurs negative internalities, $r = 1$ and an addiction-related disutility from obedience, $o = 1$. His addiction-independent benefit from committing the crime is $x = 0$.

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[58] That is the addiction stock increases to: $k_{t+1} = (d \times k_t) + 1$. One would expect that there is a maximum level of the criminal addiction that an offender can acquire; that is, after some point committing an additional crime will not lead to any increase in k. However, the fact that there is such an upper bound, does not affect our results, given that the general argument that an offender who has committed a sufficient number of crimes in the past will want to continue down the path of misconduct, even when doing so creates a large aggregate loss, over the long run.

Relative Disutility Between Offending and Obeying
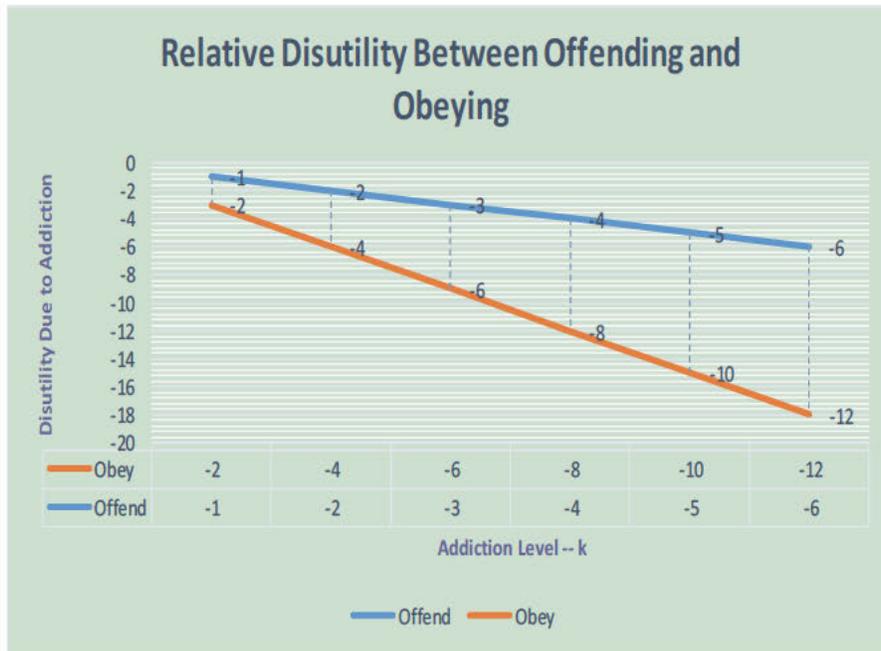
As the addiction level increases, so do the negative internalities. This is captured by the negative slope of the "offend" and "obey" lines. But a decision to obey the law also produces a disutility due to habit-formation, which also increases with the level of addiction. It is this growing gap between the relative disutility from offending and obeying that leads to the trap of addiction: the more often that an offender violates the law, the greater the incentive to continue to offend in the future and also the greater the negative internalities from being a repeat offender. But a rational offender will go down such a path of repeated misconduct if his temptation to offend is sufficiently high to overcome the delayed costs from repeated misconduct.

III. IMPLICATIONS OF THE RATIONAL CRIMINAL ADDICTION THEORY

This Part develops some of the theoretical and legal implications of the rational criminal addiction theory. We will assume the best possible scenario under the standard account and show that even then the criminal addiction theory leads to different predictions. The first section sets forth this best possible scenario. The second section shows that even under this ideal scenario, offenders with a positive addiction stock can, under certain circumstances, repeatedly violate the law even though the expected sanctions exceed the benefits received by the offenders. The next four sections use the criminal addiction model to explain: why even when the harm produced by a crime remains unchanged, lawmakers routinely ratchet up

expected sanctions to rectify what they perceive as systematic underdeterrence; why repeat offenders get punished with more severely; why society imprisons offenders who are not wealth constrained and can be properly deterred with fines; why society spends more on enforcement than predicted by the standard model; and why in some areas individuals are overdeterred—they fail to violate the law even though the benefits from doing so greatly exceed the expected sanctions. The last section extends to the criminal addiction theory to group misconduct and shows why certain rules under the law of conspiracy help exacerbate criminal addictions.

A. The Standard Law and Economics Account: Best Possible Scenario

Suppose that when an offender engages in crime C he causes a harm of 100[59] with a probability of 1. A lawmaker sets the expected sanctions at 100 (as a fine, up to the point that an offender can pay, and with a prison sentence, for the residual). In order to economize on enforcement, the lawmaker sets the probability of detection at 0.01. As a result, the gross sanctions for crime C are 10,000. The probability of detection remains the same throughout; that is, even when offenders are apprehended the police do not learn anything about them, so that if they re-offend they still bear a probability of detection of 0.01. The harm remains constant over time, which means that the gross sanctions will also remain the same.

John is a risk neutral potential offender. He knows with complete certainty the harm that he would cause, the probability of detection, the gross sanctions, and thus the expected sanctions. John is perfectly rational and forward-looking, and will choose and execute the course of action that will maximize his intertemporal utility. For the sake of simplicity, assume that John does not discount the future: he has a discount factor $\delta = 1$. John knows everything there is to know about being a good criminal; in other words, he does not learn anything new about avoiding detection or committing crimes more efficiently through the act of offending or being apprehended. We will assume for the moment that he has infinite wealth such that he is able to pay the gross sanctions if he is detected and convicted. John will have n opportunities to commit the crime, once in each of n periods.

The above scenario is an ideal one under the standard account, and leads to easy predictions. We will examine two types of cases in which habit-formation leads to different predictions. In the "inefficient-crime" case an offender's

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[59] We will work with "utils" which are translatable to monetary amount using some metric. This allows us to capture tangible and intangible utility and disutility.

addiction utility leads him to offend even though the addiction-independent returns from crime are negative. In the "efficient-crime" case, a concern for future addiction leads him to forego crimes with a positive return. In both cases, we assume a fully rational offender, as the ones modeled under the standard approach.

B.   Repeated Misconduct and Inefficient Crimes

Suppose that John is 18 years old and that engaging in repeated misconduct requires him to expend resources, time, and effort that he would otherwise use to acquire human capital that would be valuable in making a living outside of crime. This of course is not the only type of "golden handcuffs" side-effects from engaging in repeated misconduct,[60] but we want to for now abstract from those that are more directly tied to being a criminal, such as learning-by-doing, through which a repeat offender becomes increasingly efficient in executing and covering-up crimes. The point is that at each juncture, John chooses either to commit a crime or to invest in obedience-specific human capital, and the deeper that he goes into a life of crime the more costly it becomes to pass up a criminal opportunity and start retooling for a life in the legal sector. This means that with each offense, the addiction-related disutility of choosing obedience, and thus the addiction premium, goes up.

Violating the law exposes John to the potential of violence; for example he has to interact with dangerous individuals, who may harm him, even after the crime is completed. Moreover, the more often that John engages in misconduct the greater the number of these dangerous actors that he will come across. This is just one type of negative internality that John can experience when he chooses to offend.

Assume that John, a first-time offender, will have 5 opportunities to offend. The earliest that John can be punished is in period 6. This rules out that John is, at any point, a recidivist, or that he learns from being apprehended and convicted.[61] The addiction-independent return from violating the law in period 1 is 175 and in each the other periods it is -20.[62] That is, except for the first one, all of the crimes

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[60] *See supra* Part II.B. (setting forth a more detailed account of the habit-forming aspects of repeated criminal misconduct).

[61] This delay has no other effect on our results, since we are assuming that John has a discount factor of $\delta = 1$.

[62] Recall that the crimes in question always create a harm of 100 and the expected sanctions are set, optimally, at 100. This means that the first crime gives John a gross benefits (before the expected sanctions) of 275, while the other crimes yield only 80.

are inefficient ones. Under the standard account, John will offend in period 1 and obey in all subsequent periods. This would give him, and society, a welfare gain of 100.

A rational offender will work backwards from the last period. John will first determine whether he will obey or offend in the last period, given what has occurred before. If a rational John obeys the law in every period, he foregoes the 175 gain in period 1 but does not lose anything in the next 4 periods. John therefore will try to determine whether he can do better by offending in period 1 and obeying the law from then on.

Assume that John's negative internalities are $r = 10$ and that the addiction-related disutility from obeying the law is $o = 30$. John's addiction depreciation rate is $d = 0.9$. As a first-time offender, John enters period 1 with an addiction level, $k_1 = 0$. If he violates the law in period 1, his addiction level increases to 1.[63] If John were to obey the law after the first period, as predicted by the standard account, then his addiction level in periods 3 through 5 would be 0.9, 0.81, and 0.73.[64] Working backwards from period 5, John concludes that if he has obeyed in periods 2 through 4, his addiction level would have depreciated from 1 to 0.73. However he would still have an addiction premium of 21.9 which is greater than the loss of – 20 from violating the law. He therefore concludes that if he were to offend in period 1 and obey in the next three periods he will still choose to offend in the last period. As the table below illustrates, working backwards, John will conclude that if he enters into period 2 with an addiction level of 1, he will re-offend in the next four periods, even though these subsequent crimes are inefficient ones.

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[63] That is he starts with an addiction level of 0, and when he offends his addiction increases by $d \times 0 + 1 = 1$.

[64] If he obeys in period 1, his addiction level depreciates by: $0.9 \times 1 = 0.9$. If he obeys the next two periods it depreciates again to $(0.9 \times 0.9) = 0.81$, and $(0.9 \times 0.81) = 0.729$, which we round off to 0.73.

	Addiction Level	Addiction-Related Disutility of Obedience	Addiction Premium	Addiction Independent Return from Crime	Net Utility Gain from Offending
Period 5	0.73	30	21.9	− 20	1.9
Period 4	0.81	30	24.3	− 20	4.3
Period 3	0.9	30	27	− 20	7
Period 2	1	30	30	− 20	10

Next John will determine whether the aggregate negative internalities produced by violating the law in periods 2 through 5 exceed the net gain from offending in period 1. If John were to offend in every period, his addiction level would evolve in the following manner: {0, 1, 1.9, 2.7, 3.4}. This would produce negative internalities in periods 1 through 5 of 0, 10, 19, 27, and 34, respectively. As a result the aggregate negative internalities $= − 90$. Taken together with the addiction-independent losses of $− 20 \times 4 = − 80$, the total losses from repeated misconduct are $− 170$, which is less than the period 1 gain of 175. John will therefore choose to offend in period 1, even though he knows that this will lead him to form a habit for criminal misconduct. He becomes rationally addicted to crime because the he still receives a net gain of 5.

In summary, the standard law and economics theory predicts that John will engage in misconduct in period 1 only and will receive a net utility gain of 175. On the other hand the criminal addiction theory reaches a very different conclusion: John will commit both the efficient and inefficient crimes and will receive a net gain of only 5. It follows that once one takes into account the potential for rational criminal addiction, offenders may choose to behave in a manner that will whittle away the social welfare gains from their actions. Finally, while we have been assuming that John does not discount the future, once one allows for discounting, his incentive to become addicted will increase, given that he will discount the future costs of addiction.[65]

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[65] *See* Becker & Murphy, *Rational Addiction*, *supra* note 5, at 683–84 (stating that myopic actor is more likely to become addicted given that myopia leads her to discount the future consequences of addiction, but rejecting possibility of extreme myopia, where the actor completely discounts the future and

C.   Ratcheting-Up of Sanctions Puzzle

As we saw in the last section, habit-formation can lead to systematic underdeterrence—i.e., where offenders intersperse big-return crimes with negative return ones, and are willing to become addicted to crime, even though this means that they will often have an incentive to commit inefficient crimes. More generally, whenever the conditions for criminal-addiction are met, the addicted offender will be underdeterred by the sanctions that are optimal for a non-addicted offender. This follows from the fact that a non-addicted offender will only commit efficient crimes while the rationally addicted offender will commit both efficient and inefficient crimes: the non-addicted offender will violate the law whenever the addicted offender does so, but she will obey the law in some scenarios in which the addicted offender engages in misconduct.

As a result, if a lawmaker assumes that it is dealing with a population of offenders who are not affected by habit-formation, it will adopt expected sanctions that are lower than the ones needed to properly deter addicted offenders. Given the dynamic nature of addictions, one would expect that over time the expected sanctions needed to deter addicted offenders will have to be increased. Therefore, once one allows for the potential of criminally addicted repeat offenders, one is able to explain why lawmakers routinely ratchet-up criminal sanctions even though the harm created by each act of misconduct has not changed. In other words, while the harm created by a crime C is likely to remain unchanged for relatively long periods of time, the population of criminally addicted repeat offenders and the frequency of their crimes will vary over time.

D.   The Repeat Offenders' Punishment Premium Puzzle

Under the ideal deterrence scenario discussed so far, it is difficult to explain why repeat offenders get punished more severely.[66] We have assumed that the

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becomes addicted if her previous consumption has increased the marginal utility of current consumption by a sufficient amount).

[66] Repeat offenders, who commit a series of crimes before they are caught, face sanctions that are greater than the aggregate expected harm created by repeatedly engaging in prohibited activity or delaying compliance with legally-imposed duties. *See, e.g.*, United States v. Liebman, 40 F.3d 544, 549–51 (2d Cir. 1994) (agreeing that a sentence can be enhanced for "ongoing and repetitive discharge" of a hazardous substance); Water Quality Act of 1987, 33 U.S.C. § 1319(c)(2)(B) (2004) (stating that each one-day delay in complying with the Water Quality Act is an act of misconduct, triggering daily fines between $5,000 and $50,000, regardless of the connection between the ongoing delay and the harm caused by the violation being remedied). Under the Clean Water Act, the maximum penalty after a first conviction is doubled that for a first conviction. Clean Water Act, 33 U.S.C. § 1319(c)(1), (2) (2004) (knowing violators face maximum of $50,000 per day and *three-year jail sentence* for first conviction

sanctions are set optimally, that the level of harm stays constant, and that the offender is risk neutral, is not wealth constrained, and has perfect knowledge of the probability of detection and the magnitude of the gross sanctions. We have also assumed that what is leading the offender to develop a habit for crime is not that he acquires crime-specific human capital (although that is no doubt one possible explanation), but that the offender foregoes investing in the non-crime human capital and enters into criminal relationships that can lead to violence and that increase the costs of exiting a life of crime. Under this ideal scenario, punishing repeat offenders more severely will lead to systematic overdeterrence.[67] However, once one allows for the habit-formation aspects of repeated misconduct, the use of escalating sanctions can be rationalized. The general intuition is straightforward: since an offender's level of addiction increases with each offense, increasing the expected sanctions with each offense can, if properly calibrated, eliminate an offender's incentive to become rationally addicted to crime.

E. The Over-Incapacitation Puzzle

An offender who is addicted to crime can become unhooked. If the offender obeys the law for a sufficient number of periods, his addiction premium will reach a point in which the immediate benefits from violating the law will no longer exceed the delayed loss of re-offending. This helps explain why offenders routinely get punished with prison sentences, even when they are not wealth-constrained and are able to be deterred with fines.[68] Incapacitation is one way of helping a criminally-addicted offender to go cold-turkey. Putting an offender in prison can lead to a depreciation in valuable non-criminal human capital;[69] however, it can

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and $100,000 per day and 6 years in jail for a second one); Clean Air Act, 42 U.S.C. § 7413(c)(1) (2004) (maximum sanctions for second offense are double). Moreover, the Federal Sentencing Guidelines Manual provides for heightened sanctions for repeat and career offenders. *See* U.S. Sentencing Guidelines Manual § 4A1.1 (2006) (allowing for the addition of points to criminal history dependent upon the type and length of prior sentence); *id.* at § 4B1.1 (2006) (adjusting the offense level for career offenders).

[67] *See* A. Mitchell Polinsky & Steven Shavell, *On Offense History and the Theory of Deterrence*, 18 INT'L REV. L. & ECON. 305, 307 (1998) (admitting that escalating sanctions may overly deter some criminal behavior). A similar argument holds for the use of punitive damages in tort. *See Punitive Damages*, *in* 3 THE NEW PALGRAVE DICTIONARY OF ECONOMICS AND THE LAW 192–93 (Peter Newman ed., 1998) ("[I]f damages are less than harm, levels of activity will tend to be socially excessive, and if damages exceed harm, levels of activity will tend to be low.").

[68] *See supra* Part I.B.

[69] *See* POSNER, *supra* note 6, at 223 (arguing that imprisonment can lead to a depreciation in the offender's human capital, and thus of some of the knowledge and expertise that would make her socially valuable after her release).

also lead to a depreciation of his criminal addiction capital. Having said that, an offender who is incarcerated with expert criminals may acquire crime-specific human capital; this can increase the likelihood that the offender will be addicted to crime after her release.

F.   The Over-Enforcement Puzzle

Society can provide repeat offenders with an incentive to become unaddicted by increasing the immediate costs of engaging in criminal misconduct (or decreasing the immediate benefits), or by increasing the delayed sanctions. Both approaches will provide repeat offenders with a short-term and long-term incentive. Any increase in the cost, or decline in the benefit, of misconduct will, from a short-term perspective, reduce an offender's incentive to violate the law. But each period that he abstains, his addiction capital will decline, which means that over the long-run these changes in the price of misconduct can help him become un-addicted. Society can increase the immediate costs of misconduct by spending more on enforcement. As the level of law enforcement increases so does the need for offenders to plan their crimes more carefully and to take added precaution to avoid being detected during the commission of the crime. The criminal addiction model thus helps explain why society spends more on enforcement that what the standard model predicts.

G.   The Over-Obedience Puzzle

Suppose that John will have three opportunities to commit a crime that in all three instances would give him an addiction-independent return, $x = 20$. He starts with an addiction level of 1 and has a depreciation rate of 0.9. So that if he offends in the first period his addiction level increases to 1.9 and if he re-offends it goes to 2.71. Assume further that John's addiction-related disutility from obedience is $o = 25$. This means that in period 1, John has an addiction premium of 25 and a total temptation to offend of 45. If he offends in period 1 and 2, his addiction premium increases to 47.5 and 67.75, respectively. This would give him period-2 and period-3 temptation to offend of 67.5 and 87.75, respectively. If on the other hand, John obeys in both periods, his addiction depreciates to 0.9 and 0.81, respectively. Moreover, his addiction premium depreciates from its initial amount of 25 to 22.5 and 20.25. As a result, an obedient John's initial temptation to offend of 45, goes down to 42.5 and 40.25. As can be seen with this relatively modest depreciation rate, John's addiction level goes down by small incremental amounts, while his addiction premium increases more sharply with each offense. John's temptation to offend under both scenarios is summarized in the following table.

	Re-Offending	Obedient
Period 1	45	45
Period 2	67.5	42.5
Period 3	87.75	40.25

Assume further that John incurs negative internalities by an amount of $r = 10$. In period 1 the re-offending and obedient versions of John incur the same externality of -10, given that they both enter that period with a positive addiction level of 1. If John offends in all three periods he incurs additional negative externalities in periods 2 through 4 of: -19, -27.1, and -34.44 (given his period-4 addiction level of 3.44). An obedient John sees his negative internalities go down in periods 2 through 4: -9, -8.1, -7.29 (given his ending addiction level of 0.729). The total negative internalities produced by John's positive addiction levels is summarized in the table below:

	Re-Offending	Obedient
Period 1	-10	-10
Period 2	-19	-9
Period 3	-27.1	-8.1
Period 4	-34.44	-7.29
Total Negative Internalities	-90.54	-34.39

In order to isolate the main addiction-related issues, we continue to assume that John does not discount the future—i.e., that he has a discount factor of $\delta = 1$.[70] In deciding whether to offend or obey John will choose the course of action that will maximize his intertemporal utility: the sum of the immediate utility due to his temptation to consume and the delayed costs due to negative internalities. Because we are assuming that John is perfectly rational he will make an accurate cost-benefit analysis, formulate his optimal long-term plan, and execute it.

John will begin by determining how he would act if he reaches period 3 with an addiction level of 2.71 (which would be the level if he offended in the first two periods). In period 3, he would have an addiction premium of 67.75 and, taking into account the crime's addiction-independent return, a total temptation to offend of 87.75. Since this is greater than the next-period negative internalities of -34.44,

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[70] This is a plausible assumption if these four periods are close to each other.

he will choose to re-offend.[71] Knowing this, John next determines that if he reaches period 2 with an addiction level of 1.9, his addiction premium of 47.5 would give him a temptation to offend of 67.5. If he offends, on the other hand, he knows that he will definitely re-offend in the following period, which would give him total negative internalities for those last two periods of 61.54. As a result, he will conclude that if he offends in period 1 he will definitely end up offending in all 3 periods. From the perspective of period 1, he has a temptation to offend of 45, which is less than the aggregate negative internalities in periods 2 through 4 of 80.54.

In summary, a fully rational offender such as John would choose to obey in all three periods, given that he predicts that if he engages in misconduct in period 1 he will become a repeat offender, and that such a course of action would make him worse off in the long run. If one fails to take into account both habit-formation and negative internalities, one would reach a diametrically opposed conclusion: that John will offend in all three periods since each time that he offends he would receive an addiction-independent gain of 20. In fact the standard law and economic account would reach such a conclusion.

H. Conspiracy Liability and Habit Formation

Suppose that crime C requires that three individuals be involved—one to drive the getaway car, the other as a lookout, and the third to actually execute the crime. Each offender is identical and would receive the same exact benefit from the offense: 125. Moreover, they each will cause a harm of 100. However, with each offense, the costs of exiting the conspiracy[72] increases; for example, they are all worried that co-conspirators who exit may not take sufficient care to avoid apprehension and that if captured they will turn on the others.

Assume that Larry, Paul, and Mary agree to carry out crime C as co-conspirators. Under the standard account, this is still an easy case. The three offenders will form a conspiracy and will engage in repeated misconduct. With each offense, each will receive a net gain of 25 and society an aggregate welfare

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[71] Note that if he were to choose to obey the law, his addiction level would go down from 3.44 to 3.02, which would reduce his next period negative internalities by only 4.2. At the same time obeying with an addiction level of 2.71 would lead him to forego the 20 addiction-independent return and incur an obedience-related disutility of − 67.5. As a result, John will choose to re-offend.

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

gain of 75. The addiction premium, as we have seen, increases the likelihood that Larry, Paul, and Mary will follow through with their planned misconduct. Let us now examine how the law of criminal conspiracy can exacerbate the criminal addiction problem.

By agreeing to act as co-conspirators, the offenders will trigger conspiracy liability. Conspiracy liability attaches when the co-conspirators have agreed to conspire.[73] Conspiracy liability is independent of that for the underlying crime: an offender who commits crime C as part of the conspiracy can be punished both for the underlying crime and conspiracy; if interrupted before the crime is carried out, the offender can still be charged with conspiracy. Finally, if co-conspirators commit *n* crimes as part of the same conspiracy they trigger conspiracy liability only once; they can of course be punished, in addition, for the *n* underlying crimes.

Suppose that the expected sanctions for conspiracy in connection with our crime C is 70 for each offender, and that it attaches in period 0, when Larry, Paul, and Mary agree to conspire. First, assume that they will only have one opportunity to offend. In such a case, they will not form a conspiracy and will obey the law, given that the total expected sanctions of 70 + 100 are greater than the benefit of 125. Assume instead that the offenders have two opportunities to offend, for an aggregate benefit of 250; they will still decide to obey the law, given the expected sanctions of 70 + 100 + 100. If the co-conspirators know that they will have three opportunities to offend, they will form the conspiracy and commit the three crimes. The total expected sanctions per offender are 370 and the total benefits are 375. Suppose that the offenders have five opportunities to offend. One can see that conspiracy liability will assure that offenders will offend at least three times, and if they offend three times they will offend all five. Once one adds the addiction-related disutility from exit discussed in the previous section, the incentive to re-offend is even greater.

This last example, reveals an important tension under the standard account's focus on treating each instance of a crime independently. Because this is an efficient crime, society would be better off if the co-conspirators engaged in misconduct all five times. If one treats each crime independently, conspiracy liability poses a problem for the standard account: the purely myopic offenders focused on each self-standing crime will never form the conspiracy and will obey

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

the law in all five periods. This is because the offenders will find it profitable to conspire only if they can commit at least three crimes. If one looks at the crimes as interconnected, and offenders as forward-looking rational actors, then conspiracy liability once again makes sense under the standard account, given that it acts as a sort of commitment device to assure that the offenders at the very least will offend three times, and once they are over that hurdle they will continue to re-offend, given that with each offense they each gain 25.

But if one can explain conspiracy liability in this manner—as a commitment device—it conflicts with other economic explanations for conspiracy liability. Under that account the crime of conspiracy acts as added deterrence for individuals who commit crimes as a group. The general idea is that co-conspirators need added deterrence because by dividing their labor they are able to offend more efficiently and thus commit more crimes.[74] In fact we have been assuming so far that it is socially optimal for Larry, Paul, and Mary to commit all five crimes: they get benefits that exceed the expected sanctions, which in turn are set to the optimal amount. Conspiracy liability would deter two crimes (if those were the only opportunities) but assure the commission of all five.

Finally, conspiracy law actually creates an addiction-related disutility from exit. Once conspiracy liability is triggered, the offenders cannot undo it except by withdrawing from the conspiracy, something that is difficult to accomplish.[75] It follows that as the costs of withdrawal increase, so does the addiction-related disutility of obeying the law by exiting the conspiracy. It is also the case that the costs of withdrawal increase with each offense. For example, under the Model Penal Code a co-conspirator can withdraw only if he "advises those with whom he has conspired of his abandonment or he informs the law enforcement authorities of the existence of the conspiracy and of his participation."[76] Under the latter approach, the costs of exiting increase with the number of crimes, since the co-conspirator will open himself to liability for those crimes. Informing one's co-conspirators is also likely to increase with the number of crimes, given that even where the withdrawing co-conspirator has no intention to go to the authorities, if he is apprehended prosecutors will try to tempt him to reveal the identity of his co-

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[74] *See* RICHARD A. POSNER, ECONOMIC ANALYSIS OF LAW 230 (7th ed. 2007) (stating that conspiracies are "in being able to commit crimes more efficiently).

[75] *See* WAYNE R. LAFAVE, 2 SUBSTANTIVE CRIMINAL LAW § 12.42(b), at 309–11 (discussing the onerous steps that a co-conspirator needs to follow to withdraw from a conspiracy).

[76] *See* MODEL PENAL CODE § 5.03(7)(c) (2001).

conspirators in exchange for a reduced sentence for the underlying crimes. This means that as the number of crimes increase, so does the bargaining power of prosecutors to cause the apprehended co-conspirators to turn on the others. In summary, conspiracy law leads to habit formation, as we have described in this article. And habit-formation increases the likelihood that an offender will re-offend.

IV. CONCLUSION AND SOME LIMITATIONS

This article extends the standard law and economics account of criminal misconduct by allowing for offenders who become rationally addicted to criminal misconduct, and using this very fact to explain the decision-making process of career and habitual criminals. Of course, not all repeat offenders are addicted to criminal misconduct; in some instances each act of misconduct is independent of the other. The crimes of an episodic repeat offender can be analyzed using the standard approach, given that if we understand one instance, we understand all of them. Even when a series of crimes are interconnected, an offender will become addicted only if committing a crime in the current period increases the marginal benefits from re-offending in the following period. However, one can imagine cases in which past misconduct reduces the marginal utility of re-offending. For example, a youth may engage in a series of crimes and find out, after a while, that that the thrill is gone. Or a repeat offender may decide to stop because, given her past history, offending in the current period will increase the risk of detection, or the aggregate expected sanctions given all her previous crimes. Moreover, an offender may engage in repeated misconduct that produces negative internalities, not because she is addicted but because of systematic, but independent rationality mistakes.

That notwithstanding, some repeat offenders exhibit the standard characteristics of addicts in other areas, and thus it becomes important to understand the underlying dynamics. For one thing, the idealized rational offender of the standard law and economics account behaves very differently than a crime-addict—even a "rationally addicted" one. There is one other caveat to keep in mind. Even if one can show that a sufficiently large subset of the repeat offender comprises crime-addicts, it does not necessarily follow that society has to intervene to rectify the problem. Moreover, in a world populated by episodic and addicted repeat offenders, a lawmaker has to take into account how changes in criminal sanctions or enforcement practices can have a negative spillover effect on the criminal population. However, the theory developed in this article helps explain why repeat offenders get penalized more harshly, something that the standard account cannot explain. It also helps explain the repeated ratcheting-up of criminal sanctions in certain areas to deal with perceived deterrence shortfalls. Under the standard account, a lawmaker should ratchet-up criminal sanctions only if it discovers that the harm caused by the outlawed behavior is greater than originally

believed. Finally, the theory provides new explanations for why society spends so much on enforcement and why it incapacitates offenders who have sufficient wealth to pay optimal criminal fines.