

THE OPTIMISM BIAS OF THE BEHAVIORAL ANALYSIS OF CRIME CONTROL

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This Article presents a critical review of the behavioral analysis of crime control. It shows that although behavioral studies have offered many insights as to the way humans behave, they do not offer clear predictions as to the way criminals are expected to behave. The indeterminacy of behavioral analysis stems from three distinct factors. First, the cognitive biases upon which behavioral analysis is built are often ill-defined. Second, for many cognitive biases, there exist “counter biases” that function in an opposing manner. Finally, social forces, such as norms and culture, interact in an unpredictable fashion with cognitive biases. In light of these problems, the Article suggests a new research agenda for scholars who wish to develop an accurate model of criminal behavior.

I. INTRODUCTION

Under the traditional model of crime control, life was simple. Criminals were assumed to be utility maximizers who chose to engage in criminal activity only after comparing the benefits they expected to gain from crime and the costs levied by the legal system on those who committed crimes. Thus, the rational choice model could be used in order to predict the behavior of criminals and evaluate the efficiency of different crime-control policies.¹ In this simple world, the market for crimes, such as rape, could be treated more or less like the market for tomatoes. As the price of rape (e.g., the expected sanction) dropped, the amount of rape was expected to rise. Similarly, as substitutes for rape (e.g., prostitution)

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1. For an early contribution to this line of literature, see Gary S. Becker, *Crime and Punishment: An Economic Approach*, 76 J. POL. ECON. 169 (1968). For an updated review, see A. Mitchell Polinsky & Steven Shavell, *The Theory of Public Enforcement of Law*, in 1 HANDBOOK OF LAW AND ECONOMICS 403 (A. Mitchell Polinsky & Steven Shavell eds., 2007).

became more available, the amount of rape was expected to diminish.² This is not to say that some nudging questions did not remain unresolved.³ Nonetheless, the rules of the game and the boundaries of the debate were clear to all of the participants.

Since the 1980s, however, this tranquil state of affairs gradually became unstable. Following the seminal work of Daniel Kahneman and Amos Tversky, a growing body of studies demonstrated that individuals systematically diverge from the predictions of the rational choice model, both with respect to their cognitive abilities and with respect to their ultimate goals.⁴ To mention but a few of the cognitive limitations discovered by psychologists and economists, individuals were shown to be affected by the framing of their payoffs as gains or losses,⁵ by irrelevant options that were added to the menu of possible choices,⁶ and by meaningless anchoring points.⁷ Furthermore, contrary to the prediction of the rational choice model, participants in numerous studies exhibited a tendency to behave altruistically. For example, they were willing to forgo their own welfare in order to punish those who wronged them (and even those who wronged *others*).⁸ Based on these studies, social scientists have argued that the concept of rationality should be substituted by the concept of bounded rationality. That is, while actors tend to behave in accordance with the predictions of rational choice theory, they also “take short cuts in making decisions that frequently result in choices that fail to satisfy the utility-maximization prediction.”⁹

The concept of bounded rationality was used by legal scholars in order to challenge some of the basic premises of the economic analysis of law. The initial targets were the paradigmatic concepts underlying the

2. See Neal Kumar Katyal, *Deterrence's Difficulty*, 95 MICH. L. REV. 2385, 2393–94 (1997) (analyzing the potential substitutes for rape and their implications on penal policies).

3. For example, striking the proper balance between the probability of detection and the size of the penalty remained a highly contested issue within rational choice analysis. See *infra* notes 60–63 and accompanying text.

4. See Daniel Kahneman & Amos Tversky, *Prospect Theory: An Analysis of Decision Under Risk*, 47 ECONOMETRICA 263, 274–84 (1979) (introducing the basic framework of prospect theory). For a later review of the main contributions in the area, see Russell B. Korobkin & Thomas S. Ulen, *Law and Behavioral Science: Removing the Rationality Assumption from Law and Economics*, 88 CALIF. L. REV. 1051, 1075–1143 (2000).

5. Kahneman & Tversky, *supra* note 4, at 277–80.

6. See, e.g., Eldar Shafir et al., *Reason-Based Choice*, 49 COGNITION 11, 21–26 (1993).

7. See, e.g., Nicholas Epley & Thomas Gilovich, *Putting Adjustment Back in the Anchoring and Adjustment Heuristic: Differential Processing of Self-Generated and Experimenter-Provided Anchors*, 12 PSYCHOL. SCI. 391, 391 (2001); Fritz Strack & Thomas Mussweiler, *Explaining the Enigmatic Anchoring Effect: Mechanisms of Selective Accessibility*, 73 J. PERSONALITY & SOC. PSYCHOL. 437, 437–38 (1997).

8. See, e.g., Werner Güth, *On Ultimatum Bargaining Experiments—A Personal Review*, 27 J. ECON. BEHAV. & ORG. 329, 331 (1995) (reviewing findings from ultimatum game experiments that demonstrate a willingness to forgo utility in order to reciprocate and punish unfair behavior); Daniel Kahneman et al., *Fairness and the Assumptions of Economics*, 59 J. BUS. S285, S290–92 (1986) (presenting the results of an experiment in which participants demonstrated a willingness to sacrifice their personal utility in order to punish those who treated others unfairly).

9. Korobkin & Ulen, *supra* note 4, at 1075.

economic analysis of private law. The existence of the “endowment effect,” for instance, was used to challenge the validity of the Coase theorem.¹⁰ Yet soon after came the challenge to the rational criminal model as well. Legal scholars claimed that criminals do not act as utility maximizers and are inherently irrational.¹¹ As a result, so the argument goes, the traditional model’s predictions are inaccurate and its normative suggestions should be either completely dismissed or at least altered substantially.¹²

In a recent review of the behavioral literature dealing with crime control, Professors Richard McAdams and Thomas Ulen described this body of scholarship and presented its implications for legal analysis.¹³ With respect to the complete dismissal line of thought, McAdams and Ulen convincingly demonstrate why deterrence theory should not be abandoned even in the face of different deviations from rationality. With respect to the substantial alteration line of thought, however, they argue that behavioral findings require “some revision of the positive description and normative recommendations economics makes for criminal law.”¹⁴ In this brief Article, I focus only on the latter proposition and argue that the behavioral literature dealing with crime control has made a rather modest contribution and that revising policies based on its insights might be premature.

This Article is organized as follows: Part II offers a critical review of the behavioral literature dealing with crime control. It shows that although behavioral studies have offered many insights as to the way humans behave, they do not offer clear predictions as to the way criminals are expected to behave. Part III explores what the future holds for the behavioral analysis of crime control. It suggests that behavioral research should move out of the lab and into the field, highlighting the path behavioral researchers should take in order to develop constructive policy recommendations. Finally, Part IV, the conclusion, offers some brief remarks.

10. See Mark Kelman, *Consumption Theory, Production Theory, and Ideology in the Coase Theorem*, 52 S. CAL. L. REV. 669, 678–95 (1979).

11. See generally Paul H. Robinson & John M. Darley, *Does Criminal Law Deter? A Behavioural Science Investigation*, 24 OXFORD J. LEGAL STUD. 173 (2004) (reviewing evidence that suggests that criminals do not behave rationally).

12. See, e.g., Paul H. Robinson & John M. Darley, *The Role of Deterrence in the Formulation of Criminal Law Rules: At Its Worst When Doing Its Best*, 91 GEO. L.J. 949, 955–56 (2003) (arguing that sanctions should be distributed along the lines of just desert rather than deterrence theory).

13. Richard H. McAdams & Thomas S. Ulen, *Behavioral Criminal Law and Economics*, in 3 CRIMINAL LAW AND ECONOMICS: ENCYCLOPEDIA OF LAW AND ECONOMICS 403, 413–26 (Nuno Garoupa ed., 2009). For other recent reviews, see Nuno Garoupa, *Behavioral Economic Analysis of Crime: A Critical Review*, 15 EUR. J.L. & ECON. 5, 8, 12–13 (2003); Christine Jolls, *On Law Enforcement with Boundedly Rational Actors*, in THE LAW AND ECONOMICS OF IRRATIONAL BEHAVIOR 268, 272–81 (Francesco Parisi & Vernon L. Smith eds., 2005).

14. McAdams & Ulen, *supra* note 13, at 432.

II. BEHAVIORAL ANALYSIS OF CRIME CONTROL: SOME NUDGING PROBLEMS

This Part highlights three systematic problems associated with the behavioral analysis of crime control. First, it demonstrates that cognitive biases are often ill-defined. Second, it shows that for many biases, there exists “counter biases” that function in an opposing manner. Finally, it suggests that social forces such as norms and culture affect the way in which biases operate, and that currently little knowledge exists on how these forces interact. In light of these problems, I argue that behavioral analysis is inherently indeterminate and could potentially lead legal analysis astray.

A. *Indeterminate Biases*

The first set of problems associated with behavioral analysis of crime control stems from the current murkiness of behavioral theories. Such theories often include terms which require precise meanings in order to produce accurate predictions. These terms, however, are in many cases undertheorized. As a result, behavioral analysis might lead to inaccurate or inconclusive conclusions that are of little value to policy makers.

An example of the indeterminacy of behavioral theories can be found in the context of prospect theory—arguably the most influential behavioral theory within legal analysis.¹⁵ Prospect theory deals with decision making under uncertainty.¹⁶ The theory is rich and complex, yet one of its core insights is that people evaluate probabilistic options depending on whether those options are framed as a “gain” or as a “loss.”¹⁷ Whereas people are risk averse in the domain of gains, they are risk seeking in the domain of losses. Thus, for example, people will usually prefer a certain payoff of \$100 over a lottery ticket that offers a 50% chance of winning \$200, but would rather assume a 50% risk of losing \$200 than agree to a sure loss of \$100.

In the above example the framing of gains and losses was simple and clear, yet other scenarios may be more difficult to decipher. For instance, how will a tenant treat his or her security deposit—does its forfeit reflect a loss or does its return reflect a gain? While the predictions of prospect theory are clear once a reference point has been established (though, as we shall see, not as clear as one would hope), it is far less

15. For two articles arguing that prospect theory offers explanations for an array of legal doctrines across varying areas of law, see Chris Guthrie, *Prospect Theory, Risk Preference, and the Law*, 97 NW. U. L. REV. 1115, 1120–55 (2003); Eyal Zamir, *Loss Aversion and Law's Formation* 14–37 (2010) (unpublished manuscript), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1638527.

16. See generally Kahneman & Tversky, *supra* note 4 (introducing the theory and presenting empirical data supporting it).

17. See Guthrie, *supra* note 15, at 1117–19 (reviewing the main aspects of the theory).

clear what constitutes a reference point. This is not to say that the concept of reference points is meaningless, as cognitive psychologists have certainly made progress in defining this term.¹⁸ Nonetheless, a comprehensive theory of the topic has yet to emerge.¹⁹ As Tversky and Kahneman note, while the reference point usually corresponds to the status quo, “it can also be influenced by aspirations, expectations, norms, and social comparisons.”²⁰ For example, where a salary raise reflects a gain in comparison to the status quo, it might be viewed by the decision maker as a loss if it is lower than the raise received by others.²¹ Thus, predicting behavior might turn out to be a thorny task, because without a reference point, it is not clear whether people are in the domain of gains or the domain of losses.

An illustration of the problems that can be caused by theorizing about reference points can be found in James Cox’s analysis of white-collar crime.²² Cox examines the decision of a manager to collude with other managers of competing firms. The analysis is based on a simple numeric example according to which colluding entails a probabilistic penalty coupled with a gain in the shape of a bonus due to increased profits. Not colluding, on the other hand, entails a penalty in the shape of diminished wages. Cox demonstrates that while according to the standard rational choice model the manager is expected to be deterred, prospect theory suggests the manager will not be deterred. This conclusion is based on Cox’s assumption that the reference point for the manager is the manager’s state of affairs *with the bonus* associated with collusion. Building on this assumption, he argues that “[t]he manager acting according to prospect theory . . . will likely choose the risk-preferring choice to collude since it has the only outcome that satisfies her target point regardless of its potential accompanying sanctions.”²³

While this analysis is internally valid, it is unclear why Cox assumes that a hypothetical wealth level ought to serve as the baseline for analysis. This is not to say that Cox’s analysis is necessarily wrong. Rather, it is to say that the concept of reference points lacks the specificity required in order to make the shift from the laboratory to policy recommendations. Does, for example, a drug dealer view the potential profits from an illicit transaction as a gain or as an entitlement to lose? Is this percep-

18. See, e.g., *id.* at 1159–60 (reviewing the potential meaning of reference points); Zamir, *supra* note 15, at 7–8 nn.20–24 (same).

19. Amos Tversky & Daniel Kahneman, *Advances in Prospect Theory: Cumulative Representation of Uncertainty*, 5 J. RISK & UNCERTAINTY 297, 299 (1992) (“[N]o formal theory of framing is available . . .”).

20. See Amos Tversky & Daniel Kahneman, *Loss Aversion in Riskless Choice: A Reference-Dependent Model*, 106 Q.J. ECON. 1039, 1046–47 (1991).

21. See Daniel Kahneman & Amos Tversky, *Choices, Values, and Frames*, 39 AM. PSYCHOLOGIST 341, 349 (1984).

22. James D. Cox, *Private Litigation and the Deterrence of Corporate Misconduct*, L. & CONTEMP. PROBS., Autumn 1997, at 1, 5–8.

23. *Id.* at 6.

tion uniform across all drug dealers or might it change depending on social norms, past experience, etc.? There is much more to study before we can properly utilize prospect theory to model the decisions of criminals.

To be sure, I do not claim that murkiness of reference points renders prospect theory useless in predicting the behavior of potential criminals. In the context of tax evasion, for example, taxpayers' status quo at the time of filing seems like a logical reference point to evaluate their decisions.²⁴ Under this assumption, there is a clear difference between those who expect a refund and those who expect to owe taxes. While the former function in the domain of gains when filing, the latter function in the domain of losses. Thus, taxpayers who owe the tax authority money are expected to be willing to take greater risks when filing their returns in order to minimize their losses.²⁵ This hypothesis has been corroborated by data from actual tax return filings.²⁶

A second example of undertheorized behavioral concepts also comes from the world of prospect theory. As noted above, one of the key findings of this theory is that individuals tend to be risk seeking with respect to losses.²⁷ This finding, however, does not reflect a complete description of the theory's account of peoples' attitude towards probabilistic losses. An additional aspect of the theory is that the size of the probability of the loss will affect peoples' attitude towards uncertainty.²⁸ More specifically, the preference for risk with respect to losses is exhibited in the domain of relatively high probabilities. In the domain of low probabilities, on the other hand, people tend to exhibit risk aversion (as the existence of the insurance industry demonstrates).

Whereas a large body of behavioral literature has demonstrated the potential nuances among different levels of uncertainty,²⁹ it has yet to offer a comprehensive account of the borderline between the domain of loss aversion and the domain of loss seeking. As a result, legal scholars are left to conjecture about the behavior of potential transgressors when they face a risk of criminal liability.

A concrete example of the described problem can be found in an influential article by Alon Harel and Uzi Segal, which explores why criminal sanctions are usually clear and predictable, while the probability of

24. See Guthrie, *supra* note 15, at 1142–45.

25. *Id.*

26. See Henry S.J. Robben et al., *Decision Frame and Opportunity As Determinants of Tax Cheating: An International Experimental Study*, 11 J. ECON. PSYCHOL. 341, 345–46 (1990) (reporting on data from 1982 tax return filings).

27. See *supra* notes 15–17 and accompanying text.

28. See Tversky & Kahneman, *supra* note 19, at 316 (summarizing the expected way people behave in different domains of probabilities).

29. See Matthew Rabin & Richard H. Thaler, *Anomalies: Risk Aversion*, 15 J. ECON. PERSP. 219, 228 (analyzing the different ways in which people treat various types of risks).

punishment is usually vague and uncertain.³⁰ The observations of Harel and Segal are rich and complex and rely on several insights.³¹ Yet their most general argument with respect to the way the law treats punishments rests on the assumption that potential criminals are risk seeking with respect to punishments because punishments are framed as losses.³² Given that assumption, Harel and Segal argue that criminals prefer a sentencing lottery over a clear and uniform sentencing regime.³³ Thus, in order to enhance deterrence (at no extra cost) the law should aim to minimize the uncertainty associated with sanctions.³⁴

The analysis Harel and Segal present is certainly plausible, yet it is not conclusive. While it might be the case that criminals are risk seeking in order to avoid the loss reflected by punishments, it might also be the case that they are risk averse. Without presenting a theory regarding the border between the domain of probabilities in which people are risk seeking and the domain of probabilities in which people are risk averse, scholars are free to pick and choose between the two options. As a result, behavioral analysis will continue to lead to indeterminate (or wrong) conclusions.³⁵

Furthermore, the practicalities of the criminal justice system suggest that there is no way to reach a general conclusion as to the domain of probabilities in which criminals are situated. Crime data shows that the probability of punishment varies dramatically between offenses. Whereas criminals who engage in assault, burglary, larceny, and motor vehicle theft face a punishment probability of approximately 1%, those who engage in rape and homicide face probabilities of 12% and 44.7%, respectively.³⁶ Thus, in order to predict the way in which changes in uncertainty

30. See Alon Harel & Uzi Segal, *Criminal Law and Behavioral Law and Economics: Observations on the Neglected Role of Uncertainty in Deterring Crime*, 1 AM. L. & ECON. REV. 276, 291–309 (1999).

31. A significant part of the analysis presented by Harel and Segal rests on purely rational grounding and demonstrates why incarceration is expected to create risk-seeking behavior. See *id.* at 294–97.

32. *Id.* at 298–99.

33. *Id.*

34. *Id.*

35. The analysis in the text above merely points out the difficulty of reaching conclusive predictions based on prospect theory. As noted, the claim of Harel and Segal that criminals are risk seeking is plausible according to prospect theory. That said, there are two reasons to assume that this claim does not describe criminals' attitudes toward risk adequately. First, the standard account of prospect theory suggests that people are risk seeking with respect to high probability losses and risk averse with respect to low probability losses. In this regard, criminal sanctions seem much closer to the latter, as they generally involve a low probability of detection coupled with a high sanction if detected. See LOUIS KAPLOW & STEVEN SHAVELL, *FAIRNESS VERSUS WELFARE* 373 n.164 (2002) (presenting data on the probability of detection with respect to different crimes). Second, regulators routinely prohibit the sale of insurance coverage for criminal liability. See *Nw. Nat'l Cas. Co. v. McNulty*, 307 F.2d 432, 440 (5th Cir. 1962) (“It is not disputed that insurance against criminal fines or penalties would be void as violative of public policy.”). Such regulation implies the existence of a demand for criminal liability insurance, which suggests that people are risk averse with respect to this prospect.

36. See Paul H. Robinson & John M. Darley, *The Utility of Desert*, 91 NW. U. L. REV. 453, 459–61 (1997).

will affect behavior, researchers need to present a far more nuanced analysis.

Note that the problem of murky domains of probabilities is not one that can be dealt with by some fine tuning of the predictions of the model. Rather, a mischaracterization of the domain of probabilities requires turning the predictions of the analysis on their head. If, for instance, criminals are actually risk averse, this would imply that uncertainty could enhance deterrence and that policy makers should adopt precisely the opposite policies as those suggested by Harel and Segal.³⁷

In conclusion, behavioral analysis based on prospect theory hinges on pinpointing precise points in which peoples' risk preferences are transformed. These points, however, are illusive and difficult to identify. This indeterminacy is troubling as Cass Sunstein put it (with respect to the gain-loss dichotomy), "simply through inventive terminology, it is possible to manipulate the frame so as to make a change appear to be a loss rather than a gain, or vice versa."³⁸ In the world of legal debates, the potential meaning of this situation is that desired conclusions will drive the way in which debates are framed.

B. *Offsetting Biases*

The previous Section demonstrated that, in many instances, the building blocks of behavioral analysis—the different cognitive biases—are not sufficiently defined, at least as they relate to criminal behavior. This Section will assume, for the sake of argument, that each cognitive bias is internally well defined. As the analysis will demonstrate, however, this internal clarity is not sufficient to produce policy recommendations because, in many cases, different biases might operate in conflicting ways. In such cases, behavioral theories will yet again lead to indeterminate conclusions.

Take, for example, the availability bias and its relation to other biases. A large body of studies have demonstrated that when individuals need to make estimates regarding uncertain events, they tend to base those estimates on the ease with which similar events can come to mind.³⁹ Thus, people tend to systematically overestimate the probability that salient and vivid events will occur. For instance, they might exaggerate the estimate of the possibility of an airplane crash simply because such events are easily remembered—that is, they are "available."

37. In a later piece Harel in fact refined his claims and presented experimental data suggesting that participants exhibited risk aversion with respect to sanctions. See Tom Baker et al., *The Virtues of Uncertainty in Law: An Experimental Approach*, 89 IOWA L. REV. 443, 463 (2004).

38. Cass R. Sunstein, *What's Available? Social Influences and Behavioral Economics*, 97 NW. U. L. REV. 1295, 1312 (2003).

39. See Amos Tversky & Daniel Kahneman, *Judgment Under Uncertainty: Heuristics and Biases*, in *JUDGMENT AND DECISION MAKING: AN INTERDISCIPLINARY READER* 38, 46–49 (Hal R. Arkes & Kenneth R. Hammond eds., 1986).

Legal scholars have incorporated the availability bias into the design of crime-control policies. With respect to enforcement, Christine Jolls, Cass Sunstein, and Richard Thaler argue that authorities should make their enforcement efforts highly visible in order to bolster offenders' perception of the probability of detection and raise deterrence.⁴⁰ For example, they suggest that authorities use large, brightly colored parking tickets rather than small unnoticeable ones.⁴¹ This analysis, however, overlooks other cognitive biases that might suggest that enforcement efforts remain subtle.

One such "counter bias" that Jolls and her colleagues overlook is ambiguity aversion. A well-documented body of literature has demonstrated that while people are averse toward risky situations, they are even more averse towards ambiguous situations, which are defined as situations in which people are not informed of the underlying probabilities.⁴² For example, people systematically prefer to participate in a lottery that has a 50% success rate than in a lottery that has a success rate that is between 0% and 100% with equal probability. This finding suggests that authorities should attempt to minimize the amount of information potential criminals hold regarding the probability of apprehension. As Harel and Segal argue, "An optimal legal system is . . . a system that disguises as much as possible the probability of sentencing."⁴³ Since salient enforcement efforts are expected to increase the amount of information potential criminals hold regarding the possibility of punishment,⁴⁴ adopting such policies might undermine deterrence.

Another relevant body of behavioral studies to the analysis of enforcement policies deals with the effect of compliance of others on the way individuals choose to behave. These studies suggest that, in many cases, people behave according to a simple rule: if everyone else does it, so will I. In their seminal study on student behavior, Daniel Katz and Floyd Allport demonstrate that students who believe that their fellow students cheat on exams are far more likely to cheat on exams themselves.⁴⁵ More recently, Bruno Frey and Benno Torgler show that the perceived level of tax evasion affects the willingness of people to comply with the tax code.⁴⁶ These findings again suggest that making incidents of

40. See Christine Jolls, Cass R. Sunstein & Richard Thaler, *A Behavioral Approach to Law and Economics*, 50 STAN. L. REV. 1471, 1538 (1998).

41. *Id.*

42. See generally Daniel Ellsberg, *Risk, Ambiguity, and the Savage Axioms*, 75 Q.J. ECON. 643 (1961) (presenting experimental findings on ambiguity aversion).

43. Harel & Segal, *supra* note 30, at 304.

44. Richard A. Posner, *Rational Choice, Behavioral Economics, and the Law*, 50 STAN. L. REV. 1551, 1553 (1998) (suggesting the scheme proposed by Jolls and her colleagues will offer potential violators more information regarding the probability of punishment).

45. DANIEL KATZ & FLOYD HENRY ALLPORT, *STUDENTS' ATTITUDES: A REPORT OF THE SYRACUSE UNIVERSITY REACTION STUDY 205-35* (1931).

46. Bruno S. Frey & Benno Torgler, *Tax Morale and Conditional Cooperation*, 35 J. COMP. ECON. 136, 145-53 (2007).

noncompliance more visible might be undesirable since it could create a norm of noncompliance.⁴⁷

In sum, even if we enhance our understanding of behavioral biases such that their content becomes crisp and clear, we are still left with the problem of countervailing biases. Ignoring such biases, as is done at times by behavioral scholars, could lead to wrong conclusions. Incorporating all potential biases into the analysis could lead us back to the indeterminacy problem.

C. *The Sociology of Biases*

A final problem of behavioral analysis of crime control stems from the individualistic nature of both behavioral economics and cognitive psychology. These disciplines focus on the decision-making process in which each person engages before making a choice. The decision-making process, however, is not an atomized endeavor. Rather, it is entangled with social forces that lie beyond the individual. This entanglement further complicates behavioral analysis, as it suggests that the meaning of the different biases might diverge across different societies. As a result, the task of generating predictions based on such theories might be even more complex.

The policy conclusions legal scholars infer from the availability bias can serve as an illustrative example for this point as well. As noted above, scholars have argued that enforcement efforts should be made salient so that criminals can easily recall cases in which the authorities detected violations.⁴⁸ This line of thought has been extended to the area of punishment methods. In this context, legal scholars have argued that vividly unique penalties might generate additional deterrence. For instance, Cass Sunstein and Adrian Vermeule contend that because “executions are highly salient and cognitively available,” potential criminals might overestimate their occurrence.⁴⁹

As was the case with respect to other policy prescriptions resting on behavioral insights, these suggestions seem plausible. Nonetheless, given our current knowledge of the way in which the availability bias functions, they cannot be seen as more than tentative suggestions. The critical unresolved issue in this regard is the conditions that generate saliency and trigger the bias. Behavioral scholars have alluded to a long list of potential forces that will affect availability (e.g., group dynamics, individual

47. To be sure, the causal mechanisms driving the described behavior are complex. See Robert Cooter et al., *The Misperception of Norms: The Psychology of Bias and the Economics of Equilibrium*, 4 REV. L. & ECON. 889, 890 (2008) (outlining the psychological literature). One could assume, for example, that people who choose to violate a norm rationalize this act by assuming that the norm is constantly violated. While such an option is certainly plausible, it does not rule out that at least some of the results are driven by a causal chain originating from perceptions.

48. See *supra* notes 40–41 and accompanying text.

49. See Cass R. Sunstein & Adrian Vermeule, *Is Capital Punishment Morally Required? Acts, Omissions, and Life-Life Tradeoffs*, 58 STAN. L. REV. 703, 714 (2005).

predispositions, media, social norms)⁵⁰ but have not presented a clear theory that will allow policy makers to predict how potential policies alter behavior. If the theory we have at the end of the day is that “different cultural orientations play a large role in determining what turns out to be available,”⁵¹ then this theory has rather limited predictive power. As a result, crime-control policies based on the existence of this bias cannot be viewed as more than educated speculations.

Both examples mentioned above demonstrate this point. Holding everything else equal, shifting to brightly colored parking tickets might raise the saliency of enforcement. Yet what will be the effect of a comprehensive saliency assault that will bombard the public with additional information on the prevalence of enforcement with respect to an array of crimes? Assuming that the public will not simply screen all of this new information as annoying background noise,⁵² behavioral theories do not offer a prediction as to what precisely its effect will be. As a result, we do not know which enforcement effort will become a focal point for public attention and which will go unnoticed. Furthermore, such a policy might have unforeseen consequences if only certain enforcement efforts become salient and cause a shift of criminal activity to other crimes. Thus, utilizing the availability bias to design a broad crime-control plan that aims to deal with an array of criminal activities might prove to be an impossible task.

Similarly, the occasional execution might serve as a vivid reminder for potential criminals of the grave consequences of crime. Nonetheless, when dealing with crime control, the occasional policy can quickly turn into the casual policy. That is, over time the public might grow accustomed to a certain type of punishment, which will lose its allure. This is not to say that policy makers will not be able to add interesting twists to the penal regime in order to sustain the “vividness” of punishment (say, by shifting from boiling thieves in oil to feeding them to hungry piranhas). Yet again, we are left with more questions than answers regarding the implications of different policies.

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In conclusion, this Part demonstrated that there are many gaps of knowledge to fill before the behavioral framework can be used in a comprehensive fashion with respect to crime control. Cognitive biases are not yet properly defined in a way that one can predict their effect on behavior in concrete settings. In addition, the borders between the differ-

50. See Sunstein, *supra* note 38, at 1305–11.

51. *Id.* at 1311; see also Dan M. Kahan, *Two Conceptions of Emotion in Risk Regulation*, 156 U. PA. L. REV. 741, 755–56 (2008) (“The impact of vivid information on risk perceptions is conditional on individuals’ cultural worldviews.”).

52. This can be seen as a situation involving an overload of information. See generally Martin J. Eppler & Jeanne Mengis, *The Concept of Information Overload: A Review of Literature from Organization Science, Accounting, Marketing, MIS, and Related Disciplines*, 20 INFO. SOC’Y 325 (2004).

ent biases have yet to be mapped in a way that will allow us to foresee the potential relations between them. Finally, the way in which cognitive biases interact with other social forces that drive behavior remains a puzzle. With this rather gloomy picture regarding the present state of behavioral analysis of crime control in hand, I turn now to explore its potential future.

III. WHAT NEXT FOR THE BEHAVIORAL ANALYSIS OF CRIME CONTROL?

In 1998 Ulen posed the question, “What [n]ext for [b]ehavioral [l]aw and [e]conomics?”⁵³ He then listed an ambitious research agenda for scholars in the field. The first action item on this list was the need for behavioral analysis to present “much more nuance in its findings.”⁵⁴ For example, he noted that “we need to know if in some circumstances cognitive limitations affect all actors, and if in others they only affect certain people.”⁵⁵ Regrettably, it seems like over a decade later we are still in search of more specificity in this line of research as it relates to crime control. This lack of specificity stands in the way of meaningful contributions to the analysis of concrete policies.

Take for example the rise of sentencing guideline systems in U.S. jurisdictions, arguably one of the most significant changes in crime-control policy in recent history. Interestingly, despite mountains of law review articles on the topic and the fact that sentencing guidelines affect the uncertainty associated with punishment, a topic behavioral theories allude to routinely, there is only scarce reference to the topic within the behavioral literature.⁵⁶ This odd state of affairs might stem from the fact that one could easily raise a series of conflicting arguments regarding the desirability of guidelines from a behavioral perspective (that is, the desirability of reducing the variance of sanctions while holding the size of the expected sanction constant) and would find it difficult to end an article with any clear policy prescriptions.

On the one hand, several behavioral biases suggest that guidelines might enhance deterrence. Since guidelines reduce the variance of punishments, they are expected to prevent outlier cases in which judges employ a lenient sentence. If such sentences are salient, say because the media enjoys focusing on them, then potential criminals might overesti-

53. Thomas S. Ulen, *The Growing Pains of Behavioral Law and Economics*, 51 VAND. L. REV. 1747, 1757 (1998).

54. *Id.*

55. *Id.*; see also Korobkin & Ulen, *supra* note 4, at 1058 (“[Behavioral] scholars will have to conduct more empirical and experimental work of their own to test whether [their] hypotheses are in fact true in the particularized settings they study.”).

56. For an exception, see Baker et al., *supra* note 37, at 479 (exploring the role of uncertainty in penal policy based on behavioral findings and arguing that sentencing guidelines should be rejected or that the range of permissible sanctions within guideline systems should be widened).

mate their probability and thus perceive the expected sanction to be relatively low.⁵⁷ Similarly, if criminals suffer from the optimism bias,⁵⁸ they might erroneously assume they will end up in the lower part of the distribution of punishments, say, because they think their ability to persuade a judge to exert leniency is above average. Again, this would imply that a larger variance in punishment will reduce the perceived expected sanction. Finally, as already explained above,⁵⁹ if criminals are risk seeking with respect to penalties, then lowering the variance of penalties will enhance deterrence.

On the other hand, several behavioral biases suggest that enhancing the variance of punishments might raise deterrence. First, while guidelines might eliminate extraordinarily lenient punishments, they might also eliminate extraordinarily harsh punishments. To the extent the latter are more available to potential criminals, it might be the case that this small subset of cases is generating a large deterrent effect. Thus, excluding them from the distribution of punishments might be detrimental to deterrence. Additionally, potential criminals might view the penalty lottery as an ambiguous bet, because they possess little information on the precise way in which sanctions are distributed at the time they contemplate their acts. Hence, eliminating this ambiguity is desirable from the perspective of criminals and might reduce deterrence. Similarly, if punishments are losses that lie in the domain of risk aversion rather than risk seeking, then eliminating any uncertainty from punishments (even a nonambiguous risk) will fit the preferences of criminals and thus diminish the level of deterrence.

The point of this exercise is not to suggest that behavioral analysis is futile. Traditional economic analysis can be equally indeterminate at times. For instance, the traditional model has yet to produce a clear answer to the age-old question regarding the optimal balance between the size of sanctions and the probability of detection.⁶⁰ Whereas Gary Becker argues that low detection rates coupled with high sanctions are efficient because they minimize the cost of deterring criminals,⁶¹ other scholars point out the problems associated with a high-sanction, low-detection-rate regime. George Stigler, for example, points out that such a regime might undermine marginal deterrence and cause criminals to

57. On the availability bias, see *supra* note 39 and accompanying text.

58. The optimism bias refers to peoples' tendency to overestimate their own capabilities and prospects. The bias was first documented in Neil D. Weinstein, *Unrealistic Optimism About Future Life Events*, 39 J. PERSONALITY & SOC. PSYCHOL. 806 (1980). For later studies of the bias, see Marie Helweg-Larsen & James A. Shepperd, *Do Moderators of the Optimistic Bias Affect Personal or Target Risk Estimates? A Review of the Literature*, 5 PERSONALITY & SOC. PSYCHOL. REV. 74 (2001); Cynthia T.F. Klein & Marie Helweg-Larsen, *Perceived Control and the Optimistic Bias: A Meta-Analytic Review*, 17 PSYCHOL. & HEALTH 437 (2002).

59. See *supra* notes 30–34 and accompanying text.

60. To be sure, neither has behavioral analysis. See McAdams & Ulen, *supra* note 13, at 417–26 (pointing out the indeterminacy of behavioral analysis on this point).

61. See Becker, *supra* note 1, at 183–84.

engage in more crime.⁶² Focusing on the behavior of fact finders, James Andreoni argues that uniform high sanctions will lower the probability of conviction and dilute deterrence.⁶³

The indeterminacy of both traditional economic analysis and behavioral analysis can lead to two lines of thought. The first views indeterminacy as an irreparable failure that justifies forgoing the consequential project. After all, if consequentialists cannot offer accurate predictions as to how different policies will affect behavior, their normative dictates carry little weight.⁶⁴ The second, more constructive way to deal with indeterminacy is to reduce it through additional empirical research. In this regard though, the additional empirical research required represents a paradigmatic shift for the behavioral literature dealing with crime control.

Scholars currently engaging in behavioral analysis of criminal activity often extrapolate their conclusions from empirical findings not obtained through the study of crime. Rather, they identify a bias studied by cognitive psychologists or economists both in the lab and, at times, in the field. They then apply these findings to the area of criminal activity and *theorize* as to how they affect the behavior of criminals. In this regard, this is a purely theoretical genre of scholarship. Just as the traditional legal economist observes that the demand for tomatoes diminishes as their price rises and then applies this empirical finding to the area of crime control, contemporary behavioral jurists observe that people are risk seeking with respect to certain types of bets and then apply this finding to the area of crime control.⁶⁵

What is required at this point is empirical research of *actual criminal behavior* that will corroborate, refute or refine the hypotheses set forth in the behavioral literature. Like behavioral analysis of other legal fields, the behavioral analysis of criminal activity will have to move from the lab to regression analysis of crime data. This line of research will need to utilize policy shifts, jurisdictional arbitrages, and similar opportunities in order to demonstrate whether and how different cognitive biases affect criminal behavior. Such studies will clarify behavioral theories of criminal conduct and will offer policy makers concrete recommendations.

62. See George J. Stigler, *The Optimum Enforcement of Laws*, 78 J. POL. ECON. 526, 527–28 (1970).

63. See James Andreoni, *Reasonable Doubt and the Optimal Magnitude of Fines: Should the Penalty Fit the Crime?*, 22 RAND J. ECON. 385, 385–86 (1991).

64. See, e.g., Robinson & Darley, *supra* note 12, at 976–89 (arguing the punishments should be distributed according to the dictates of justice and not deterrence given the practical hurdles standing in the way of the latter theory).

65. In this regard, I depart from several behavioral scholars who describe their project as an empirical one. See, e.g., Guthrie, *supra* note 15, at 1116 (“[P]rospect theory is an empirical theory that describes how people actually make decisions.”); McAdams & Ulen, *supra* note 13, at 404 (“[B]ehavioralism is not a *theoretical* criticism of rational choice theory. Rather, it is a criticism based almost entirely on experimental and other empirical studies that find the predictions of rational choice theory to be inaccurate.”).

My goal in this Part is merely to point towards the desired direction of future research. Thus, I will not outline specific protocols for potential studies. That said, I would like to sketch out a few concrete examples for possible areas of future research. In the area of penalties, we are currently in the dark regarding the precise risk preferences of potential criminals. Researchers could attempt to utilize changes in the penal regime that affect the distribution of punishments in order to assess whether criminals exhibit a preference for certain or uncertain sanctions. Such policy changes could include both the introduction (complete or partial) of guideline systems into a jurisdiction or the elimination (complete or partial) of such a regime. Needless to say, deciphering criminals' risk preferences through the analysis of guideline systems presents several challenges. For example, to the extent the shift to or from guidelines is tied to changes in the level of punishment, researchers will have to distinguish between the effect of the level of sanctions and the effect of their variance. Nonetheless, guidelines represent a significant change with respect to the risk criminals face.

With respect to enforcement, scholars will need to identify instances in which the saliency of enforcement was elevated while its actual frequency remained unchanged. Shifts in the way detection is treated (e.g., the color of parking tickets) is one example of such changes. Additionally, changes in the visibility of enforcement efforts might help assess the topic. For instance, police forces have reportedly changed the design of their uniforms and cars in order to enhance their visibility.⁶⁶ Such changes are arguably not coupled with significant changes in the level of police activity and can therefore serve to measure the effect of saliency on criminal behavior.

While the research agenda described here might seem ambitious, it is not unattainable. To a large degree, the behavioral crime-control literature needs to evolve in the same manner as the traditional law and economics literature. After presenting the basic theoretical framework for the analysis of crime, economists have turned to test this theory in an array of settings.⁶⁷ Economists utilized penalty enhancements,⁶⁸ prison

66. See *Innovation and Creativity*, ISR. POLICE (Hebrew), <http://www.police.gov.il/mehozot/agaf/AME/Pages/hadshanut.aspx> (last visited May 19, 2011) (reporting that the police changed the design of their uniforms in order to enhance visibility and deterrence); Avi Ashkenazi & Nativ Nahmani, *White Patrol Cars Out; Dark Blue Patrol Cars In*, NRG (Hebrew) (Aug. 31, 2009), <http://www.nrg.co.il/online/1/ART1/936/238.html> (noting that the police are considering a new design for patrol cars in order to elevate their visibility and deterrence).

67. For a review of empirical studies of crime control, see Steven D. Levitt & Thomas J. Miles, *Empirical Study of Criminal Punishment*, in 1 HANDBOOK OF LAW AND ECONOMICS, *supra* note 1, at 455.

68. See Joanna M. Shepherd, *Fear of the First Strike: The Full Deterrent Effect of California's Two- and Three-Strikes Legislation*, 31 J. LEGAL STUD. 159, 162-71 (2002) (presenting data on the deterrent effect of California's three-strikes legislation).

conditions,⁶⁹ and even amnesty programs,⁷⁰ in order to evaluate the deterrent effect of penalties. These studies have corroborated the general deterrence hypothesis, but have also documented its limits.⁷¹ It is time for behavioral scholars researching crime control to go down this thorny path and discover how criminals really behave.

IV. CONCLUSION

Behavioral studies have taught us that people tend to be overly optimistic. It would seem the behavioral movement within legal scholarship has suffered from this bias, at least in the area of the analysis of crime-control policies. Scholars engaging in behavioral analysis have built a structure of axioms and assumptions from which they derive a set of predictions and policy prescriptions. They have done this without stopping to examine the internal inconsistencies their claims include and without verifying their predictions in a systematic fashion. To a large degree, behavioral analysis of crime control has turned into its worst nightmare—an intellectually stimulating line of literature that presents fascinating theoretical conjectures.

Whereas the critique presented in this Article focuses on crime control, it raises more general doubts regarding the path down which behavioral analysis has gone. Some opponents of behavioral analysis have argued that this body of scholarship is flawed since it presents “no theory.”⁷² The more serious problem of behavioral analysis, however, is not its lack of theory, but rather its overly theoretical nature and lack of empirical grounding. One would hope that in the decade to come, scholars will take up the glove that Ulen tossed over a decade ago and fill this empirical void.

69. See Lawrence Katz et al., *Prison Conditions, Capital Punishment, and Deterrence*, 5 AM. L. & ECON. REV. 318, 322–38 (2003) (exploring the deterrence value of harsh prison conditions).

70. Francesco Drago et al., *The Deterrent Effects of Prison: Evidence from a Natural Experiment*, 117 J. POL. ECON. 257, 278–79 (2009) (presenting evidence of a deterrent effect based on random variations in the expected sanction offenders faced as result of a unique clemency bill).

71. See Steven D. Levitt, *Why Do Increased Arrest Rates Appear to Reduce Crime: Deterrence, Incapacitation, or Measurement Error?*, 36 ECON. INQUIRY 353, 365–70 (1998) (finding that deterrence and incapacitation differ with respect to distinct crimes).

72. See Posner, *supra* note 44, at 1560.