

Does Criminal Law Deter? A Behavioural Science Investigation

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Abstract—Having a criminal justice system that imposes sanctions no doubt does deter criminal conduct. But available social science research suggests that manipulating criminal law rules within that system to achieve heightened deterrence effects generally will be ineffective. Potential offenders often do not know of the legal rules. Even if they do, they frequently are unable to bring this knowledge to bear in guiding their conduct, due to a variety of situational, social, or chemical factors. Even if they can, a rational analysis commonly puts the perceived benefits of crime greater than its perceived costs, due to a variety of criminal justice realities such as low punishment rates. These conclusions are reinforced by studies of crime rates following rule changes. Many show no change in deterrent effect. Those that purport to show a deterrent effect commonly have persuasive non-deterrence explanations, such as a change in incapacitative effect. The few studies that segregate deterrent and incapacitative effects tend to reinforce the conclusion that rule formulation has a deterrent effect only in those unusual situations in which the preconditions to deterrence exist. Even there, the deterrent effects are quite minor and unpredictable, hence inadequate grounds to influence criminal law rule making.

Does criminal law deter? Given available behavioural science data, the short answer is: generally, no. Having a criminal justice system that imposes liability and punishment for violations deters.¹ Allocation of police resources or the use of enforcement methods that dramatically increase the capture rate can deter. But *criminal law*—the substantive rules governing the distribution of criminal liability and punishment—does not materially effect deterrence, we will argue, contrary to what law and policy-makers have assumed for decades. Our claim is not that criminal law formulation can never influence behaviour but rather that the conditions under which it can do so are not typical. By contrast, criminal law makers and adjudicators formulate and apply criminal law rules on the assumption that they nearly always influence conduct. And it is that working assumption that we find so disturbing and so dangerous.

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¹ See, e.g. Andrew von Hirsch, Anthony Bottoms, Elizabeth Burney and P-O Wikstrom, *Criminal Deterrence and Sentence Severity: An analysis of Recent Research* (The University of Cambridge Institute of Criminology 1, 1999); A. Blumstein, J. Cohen and D. Nagin (eds), *Deterrence and Incapacitation* 47 (National Academy of Sciences Panel, 1978).

Our scepticism of criminal law's deterrent effect is derived in large part from a behavioural science research critique of the alleged path of influence from doctrine to behavioural response. That critique finds that the transmission of influence faces so many hurdles and is so unlikely to clear them all that it will be the unusual instance in which the doctrine can ultimately influence conduct. Yet this is a startling conclusion because it contradicts the common wisdom and standard practice of law makers and scholars. If, as appears to be the case, doctrinal formulation does not affect conduct, then most of the criminal law analysis of the past 40 years has been misguided. Where doctrine has been formulated to maximize deterrence, overriding other goals, such as doing justice, such deterrence analysis has frustrated those other goals for no apparent benefit.

Let us briefly sketch our line of argument: the behavioural sciences increasingly call into question the assumption of criminal law's *ex ante* influence on conduct. Potential offenders commonly do not know the legal rules, either directly or indirectly, even those rules that have been explicitly formulated to produce a behavioural effect. Even if they know the rules, the cost-benefit analysis potential offenders perceive—which is the only cost-benefit analysis that matters—commonly leads to a conclusion suggesting violation rather than compliance, either because the perceived likelihood of punishment is so small, or because it is so distant as to be highly discounted, or for a variety of other or a combination of reasons. And, even if they know the legal rules and perceive a cost-benefit analysis that urges compliance, potential offenders commonly cannot or will not bring such knowledge to bear to guide their conduct in their own best interests, such failure stemming from a variety of social, situational, or chemical influences. Even if no one of these three hurdles is fatal to law's behavioural influence, their cumulative effect typically is. Section 1 reviews the behavioural science evidence.

But some might argue that, although a behavioural science analysis of criminal law's action path says doctrinal formulation can rarely influence conduct, it might in fact do so in some mysterious way presently beyond the understanding of human knowledge. We can test this argument by looking at the effect of specific doctrinal formulations on the crime rates they are intended to lower.

The available studies of what one might call 'aggregated effects'—that is, studies that do not concern themselves with how a deterrent effect might come about but look strictly to whether an effect of doctrine on crime rate can be found—seem consistent with our conclusion above. A majority of these studies find no discernible deterrent effect of doctrinal formulation, which does not surprise us. But others claim to find such an effect and we must explain these results. Even if the mechanism of transmission from doctrinal formulation to behavioural influence is unknown, the finding of such a connection may be inconsistent with some of our claims and must be dealt with, especially since many deterrence advocates will speculate that the causal mechanism in the 'black box' is deterrence.

We find that some of the aggregated-effect studies are simply poorly done and cannot reliably support a conclusion that doctrine affects crime rates. Others

seem undeniably to have found an effect on crime rate, but we suspect that much, if not most, of this is the result of incapacitative rather than deterrent effects. Increasing prison terms, for example, could be taken as providing a greater deterrent threat, but a resulting reduction in crime may be the result of the isolating effect of longer incarcerations rather than their deterrent effect. But even if one concludes that some of these studies show a deterrent effect from doctrinal formulation, which we do, the specific circumstances of those studies serve generally to affirm our points about the prerequisites of deterrence. That is, these studies involve rules and target audiences that do what is rarely done: they satisfy the prerequisites to deterrence. The circumstances of these studies only serve to illustrate that the existence of such prerequisites are not typical. Section 2 reviews these aggregated effect studies.

1. *The Prerequisites to Deterrence*

Can doctrinal formulation influence conduct? For criminal law to have an effect on a potential offender's conduct choices, the following three questions must all be answered in the affirmative:

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

A. *The Legal Knowledge Hurdle*

Does the potential offender know, directly or indirectly, and understand the implications for him, of the law that is meant to influence him? A study done by the present authors tested the knowledge of residents in five different states with regard to four legal rules: rules concerning their duty to assist a stranger in danger, the use of deadly defensive force in situations where the victim can safely retreat, their duty to report a known felony, and the use of deadly force in protection of property.² All of these rules involve situations in which an ordinary person may find herself and in which the law is written with the expectation that

² John M. Darley, Kevin M. Carlsmith and Paul H. Robinson 'The Ex Ante Function of the Criminal Law', 35 *Law & Soc Rev* 165 (2001).

it will guide the person's conduct. States take different positions as to each of these rules, and each state in the study took a minority view as to at least one of the rules. Yet, the study found that the residents of states adopting a minority position on a rule and the residents of states adopting a majority position on the same rule had essentially identical beliefs as to the law's rule. The actual legal rule apparently had no effect on their belief. Interestingly, their belief in the law's commands did not always match the majority view; rather, it closely matched their own judgments of what the law *should* be, suggesting that they were using their own moral intuitions to predict the legal rule, rather than any real knowledge of the legal code's rules.³

It might be argued that knowledge of criminal law by the general population provides unclear evidence of the knowledge among that subset of the population likely to commit crimes, that the deterrence's 'target population' of potential offenders may have more accurate knowledge of criminal law rules. A recent study measured actual criminals' knowledge of the penalties assigned by criminal codes, and found them imprecise. Anderson tested males who had been imprisoned for a felony, persons who, given their time in prison and their interest in the question, one would assume had both the motivation and the opportunity to learn the comparative magnitudes of sentences.⁴ He reports only 22 per cent of criminals thought that they knew 'exactly what the punishment would be' for the crime they committed, while 18 per cent reported that they had no idea of the penalty, or 'thought I knew but was wrong', and another 35 per cent of criminals reported that, as to the punishment for the offence they committed, 'I didn't even think about it'.⁵

To sum up, people rarely know the criminal law rules, even when those rules are formulated under the express assumption that they will influence conduct. Further, people seem not to have a good knowledge of the magnitude of the penalties that the criminal justice system assigns to various crimes. It appears that people commonly assume the law to be as they think it should be, so they assume the existence of criminal law rules that correspond to their own intuitions of

³ In another study the responses by New Jersey citizens to how the state punishes attempt similarly suggests a pattern of using their own moral intuitions to predict the magnitude of punishment rather than having any real knowledge of state law. For example, regardless of the number of years they lived there, they believed that there were only minor sentences or no punishment for attempt, whereas New Jersey, following the Model Penal Code, punishes attempt at the same grade as the completed offence so long as a 'substantial step' toward the commission of the crime has been taken. N.J. Stat. Ann. § 2c:5-1(a)(3). This is a particularly bad error to make, from a deterrence perspective, because it means that people seriously underestimate the penalty that would be assigned for a crime, and thus are less likely to be deterred from committing it. John M. Darley, Catherine Sanderson and Peter LaMantia 'Community Standards for Defining Attempt: Inconsistencies With the Model Penal Code American Penal Code', 39 *Amer Behav Sci* 405 (1996) (hereafter referred to as Community Standards).

⁴ David Anderson 'The Deterrence Hypothesis and Picking Pockets at the Pickpocket's Hanging', 4 *Amer L & Econ Rev* 295 (2002). See also Andrew Hochstetler, *In With a Bad Crowd: An Analysis of Criminal Decision-making in Small Groups* at 23-29 (Ph.D. dissertation submitted to the Department of Sociology, University of Tennessee, Knoxville, December, 1999, UMI Microform 9962267).

⁵ The fact that they thought they knew exactly what the punishment was for the crime they committed does not mean that they actually did so. In a previously noted study, many of the citizens of New Jersey were both confident they knew the penalty for attempt offences and were wrong in their confidence because they were inaccurate about the penalties assigned by the code. Community Standards.

justice. Thus, when the legal rule deviates from the community's shared intuitions of justice, there is a greater burden to make the law known, and a failure to make a special effort to announce the counter-intuitive rule will increase the likelihood that potential offenders will not know of the rule. As we noted, potential offenders have a greater incentive than others to know the details of the law's rules and policies, but in fact their knowledge also is relatively poor.

We do not mean this as an all-encompassing generalization. It is likely that some legal rules are widely known. For example, it is probably well known that dramatically greater penalties for all offences are imposed once a juvenile reaches the age of majority and thereby comes under the jurisdiction of the adult criminal justice system rather than the more rehabilitation-based juvenile justice system. And, thus, it should be no surprise to see that crime rates by juveniles drop off when they reach that age, albeit temporarily.⁶ But such well known rules are the rare exception.

Of course, a potential offender need not 'know the law' in an intellectual sense to be influenced by it. Even rats can be deterred by a perceived threat. They react to the conditions that they experience, such as electric shocks when they pull the lever that previously had given food. In the same way, a potential offender may know nothing about the law *per se*, yet may through his experience and that of others of which he hears, indirectly come to understand, perhaps even subconsciously, the conditions of criminal liability or punishment that the criminal law sets out.

This may frequently be the case with regard to policing practices. When the potential offender sees three times as many police cruisers pass by as before, he may perceive a greater risk of capture for purse snatching. But will this same method of education effectively communicate the substantive criminal law rules that lawmakers have justified on deterrence grounds? We think it unlikely. The application of most criminal law rules is not a common or contemporaneous event, at least in comparison to the rate at which police cruisers drive by.⁷

Perhaps more importantly, the application of the criminal law rules is difficult, if not impossible, for a potential offender to separate out from the large number of other variables at work in determining a given case disposition. Variations in investigative resources, in police efficiency, in prosecutorial policies and exercise of discretion, in witness availability, in the exercise of judicial sentencing discretion, and in an almost infinite variety and combination of other factors will influence every case disposition. When the rat gets electrically shocked upon pulling the food bar, it is not hard for it to sort out the cause and effect. But given the low capture and prosecution rates (see section 1, C, (i) below), it

⁶ Steven Levitt 'Juvenile Crime and Punishment', 106 *J Pol Econ* 1156 (abstract) (1998) ('Juvenile offenders are at least as responsive to criminal sanctions as adults. Sharp drops in crime at the age of majority suggest that deterrence (and not merely incapacitation) plays an important role').

⁷ We have illustrated elsewhere the wide range of criminal law rules that have been justified upon a deterrent analysis. See Paul H. Robinson and 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 (2004) at 957-8 (hereafter referred to as *At Its Worst*).

seems highly unrealistic to think that the potential criminal can do an intuitive multiple-regression analysis to divine the applicable liability rule and its meaning for him.

Indeed, the 'indirect communication' of experience and gossip often generates inaccurate information about criminal law rules. The insanity defence, for example, is commonly thought to be offered in a large number of cases and is commonly successful. One study found that people thought that 38 per cent of all defendants charged with crime pled not guilty by reason of insanity.⁸ In reality, an insanity plea is exceedingly rare, raised in a fraction of a per cent of even felony cases.⁹ In addition, the public perception is that it is commonly granted,¹⁰ but the reality is that, even in the rare cases in which the insanity defence is sought, the defence is usually not granted.¹¹ The point is, if citizens have this level of ignorance about the operation of a well-publicized criminal law rule, it seems unrealistic to think that they could accurately divine through 'indirect' means the difference between one criminal law formulation and another for the host of rules at work in each case.¹²

B. *The Rational Choice Hurdle*

Assume the potential offender understands the law's implications for him. Can he and will he bring such understanding to bear on his conduct choices? Behavioural scientists who study the decision-making patterns of people now realize that being able to demonstrate that a person has some knowledge of various facts that could be relevant to a decision does not mean that those facts are recalled, and mobilized appropriately, by the decision-maker. Much depends on the momentary context in which the need for the decision arises or on the particular interpretations that the decision-maker puts on the facts as they are relevant to

⁸ See Valerie P. Hans 'An Analysis of Public Attitudes Toward the Insanity Defense', 24 *Criminology* 393, 406 (1986); see also Eric Silver et al. 'Demythologizing Inaccurate Perceptions of the Insanity Defense', 18 *Law & Hum Behav* 63, 67-68 (1994).

⁹ See Lisa A. Callahan et al. 'The Volume and Characteristics of Insanity Defense Pleas: An Eight-State Study', 19 *Bull Am Acad Psychiatry & L* 331, 334 (1991). Note that this is less than 1 per cent of all felony cases, while the lay subjects estimated insanity pleas for 38 per cent of all persons charged with any crime. See also Richard A. Pasewark and Hugh McGinley 'Insanity Plea: National Survey of Frequency and Success', 13 *J Psychiatry & L* 101 (1985) (reporting median rate of one plea per 873 reported crimes).

¹⁰ See, e.g. Hans, above n 8 at 406 (reporting study indicating that public believes over 36 per cent of all NGRI claims, constituting perceived 14 per cent of all criminal cases, result in NGRI verdict); Mary Frayed 'Professor Says Insanity Defense Seldom Works', *Telegram & Gazette* (Worcester, MA), 19 January 1996, at B1 (quoting chair of psychiatry at the University of Massachusetts Medical Center as saying that general public believes the insanity defence is used in 20 to 50 per cent of all criminal cases); Michael L. Perlin 'The Borderline Which Separated You From Me': The Insanity Defense, The Authoritarian Spirit, The Fear of Faking, and the Culture of Punishment', 82 *Iowa L Rev* 1375, 1375 and nn 5-6 (citing polls suggesting that 'ninety percent [of Americans] believe that the insanity plea is overused').

¹¹ One study reports that the average acquittal rate for an insanity plea is 26 per cent. See Callahan et al., above n 9 at 334. Pasewark and McGinley report a success rate of 15 per cent of pleas. See Pasewark and McGinley, above n 9 at 106.

¹² Further, the evidence suggests that persons asked to decide cases under different insanity formulations commonly give the same disposition for all formulations. That is, the difference in the formulations has little practical effect. It seems difficult to see how potential offenders can 'indirectly perceive' the details of criminal law doctrines when those details have no effect. See Norman J. Finkel, *Commonsense Justice* (1995) at 264-70.

himself.¹³ Effects due to the particular personalities of the crime-prone actor, and the circumstances in which the decisions arise, make rational decision-making about crime-doing difficult.

Available evidence suggests that potential offenders as a group are people who are less inclined to think at all about the consequences of their conduct or to guide their conduct accordingly.¹⁴ They often are risk-seekers, rather than risk-avoiders,¹⁵ and as a group are more impulsive than the average.¹⁶ Further, conduct decisions commonly are altered by alcohol and drug intake. In Anderson's sample, an astounding 66 per cent of those interviewed reported that 'recent drug use' contributed to the commission of the crime.¹⁷

There are a number of other temporary states of mind that are likely to drive out rational considerations of punishment, such as desires for revenge or retaliation, and suddenly-induced rages or angers, the duration of which can extend from minutes to days.¹⁸ Other states of mind can be in place for longer durations and also can induce flawed reasoning. For instance, paranoia—feelings that others are immediate and overwhelming threats—is known to cycle over the course of months. When it is acute, it is likely that the degree of threat felt will override considerations of the deterrent weight of possible punishments.¹⁹ The grandiose component of manic-depression, which occurs when the manic-depressive cycles into the manic phase, can give the person experiencing it a feeling of incredible brilliance that is likely to cause him to underestimate the likelihood of the not-so-brilliant forces of law ever catching and convicting him.²⁰

These examples are of actors with diagnosable mental difficulties, but a good many personality differences exist that do not cause us to regard a person as 'mentally ill' yet have implications for the degree to which the person will process deterrence considerations at the moment of contemplating a crime. To the degree that these characteristics are permanent and continuously displayed, they will constantly affect the behaviour of the individual. Some persons, for instance, are

¹³ Lee Ross and Richard Nisbett, *The Person and the Situation: Perspectives Of Social Psychology* (1991).

¹⁴ Anderson, above n 4 at abstract.

¹⁵ M. Junger, R. West and R. Timman 'Crime and Risky Behavior in Traffic: An Example of Cross-Situational Consistency', 38 *J Res in Crime & Delinq* 439 (2001). A second way of being a high risk taker is by perceiving various risks as lower risk than they actually are. The following studies find that criminals are also prone to this error. See O. Dahlbaeck 'Criminality and Risk-taking', 11 *Personality and Individual Differences* 265 (1990); E. Gullone, J. Paul and S. M. Moore 'A Validation Study of the Adolescent Risk-taking Questionnaire', 17 *Behavior Change* 143 (2000); D. Thornton 'Rate of Offending, Risk-evaluation and Risk-preference', 6 *Personality and Individual Differences* 127 (1985) (all three studies concluding that criminals perceive risks as lower, rather than just being willing to accept higher risks).

¹⁶ David P. Farrington, 'Human Development and Criminal Careers', in *Oxford Handbook of Criminology* (2nd edn, 1997) 361 at 384.

¹⁷ Anderson, above n 4 at Table 2. In the National Crime Victimization Survey, victims of violence were asked to describe whether they perceived the offender to have been drinking or using drugs. About 28 per cent of the victims of violence perceived the offender as under the influence of drugs, alone or in combination with alcohol. (Another 42 per cent of the victims reported that they could not tell if the offender was using alcohol or drugs at the time of the crime.) Bureau of Justice Statistics, US Dep't of Justice, Drug Use and Crime, at <http://www.ojp.usdoj.gov/bjs/dcf/duc.htm> (last modified 9 May 2002).

¹⁸ Ronald Comer, *Abnormal Psychology* (3rd edn, 1988).

¹⁹ Timothy Fjordbak 'Clinical Correlates of High Lie Scale Elevations Among Forensic Patients', 49 *J Person Assess* 252 (1985).

²⁰ For a general characterization of the manic state, see Ronald Comer, above n 18 at 262–65.

characterized by a relatively low ability to delay gratification, and they are disproportionately likely to give in to temptation in the present.²¹ In fact, a prominent theory about the personality characteristics of criminals, set forth by Gottfredson and Hirschi, makes the lack of self control central to their theory.²²

Even absent mental abnormalities that distort reasoning, both the ability and the motivation to make the calculations required for deterrence can be influenced by a variety of contextual effects, some of which we have touched on above. Perhaps the most important of these stems from the fact that crimes are often committed by groups. When offenders commit crimes in street gangs, for instance, several effects can temporarily reduce the possible impact of a threatened future prison term on current law-breaking activities: an 'arousal effect' leads to sprees and reduced sensitivity to risk,²³ and an increase in the immediate rewards can arise from an increase in esteem in which the group holds the member who boldly breaks the law.

Of exacerbating effect is the fact of differential association. As Gottfredson and Hirschi point out, those predisposed toward crime 'end up in the company of each other... The individuals in such groups will therefore tend to be delinquent, as will the group itself'.²⁴ This means that the crime-prone individual, already disposed to downplay the long-term punishment consequences, has those around him expressing the same neglect of those consequences, thus reinforcing the decision to commit the crime. Interviews with criminals consistently show that the individual feels 'led to' the commission of the crime by the confidence that other gang members give them that 'they will not get caught'.²⁵ Many report that they 'got involved primarily because of partners'.²⁶ Behavioural scientists will recognize this as an instance of the well-known 'risky shift' phenomenon, in which a group that comes to a collective decision after discussion comes to a decision that is often more risky than the average of the decisions that individuals held prior to the discussion.²⁷ This means that the group tends to badly underestimate the risk of being caught.

²¹ Janet Metcalfe and Walter Mischel 'A Hot/Cool System Analysis of Delay of Gratification: Dynamics of Willpower', 106 *Psych Rev* 3 (1999).

²² Michael R. Gottfredson and Travis Hirschi, *A General Theory of Crime* (1990). They point out that the typical criminal is characterized by many non-criminal signs of this absence of self-control, and commits 'a wide variety of criminal acts, with no strong inclination to pursue a specific criminal act or a pattern of criminal acts to the exclusion of others.' Ibid at 91. They conclude that 'people who lack self-control will tend to be impulsive, insensitive, physical (as opposed to mental), risk taking, short sighted, and they will tend therefore to engage in criminal and analogous acts.' Ibid at 90. See also D.J. West and D.P. Farrington, *Who Becomes Delinquent?* (1973) at 78. The image here is of the individual who careens through life, committing break-in burglaries, barroom assaults, and other impulsive criminal actions. The core suggestion of their theory is that impulsiveness and lack of self control is a major determinant of many criminal acts, which of course suggests that the deterrence effects of uncertain and long-delayed punishment are likely to be minimal.

²³ Paul F. Cromwell, James N. Olson and D'Aunn Wester Avary 'Breaking and Entering: An Ethnographic Analysis of Burglary', 8 *St in Crime, Law & Just* 69-70 (1991).

²⁴ Gottfredson and Hirschi, above n 22 at 158.

²⁵ Cromwell, Olson and Avary, above n 23.

²⁶ Floyd Feeny, 'Robbers as Decision-Makers' in David Cornish and Ronald Clarke (eds), *The Reasoning Criminal: Rational Choice Perspectives on Offending* (1986) at 58.

²⁷ David Myers and H. Lamm 'The Group Polarization Phenomenon', 83 *Psych Bull* 602 (1976).

Yet another process likely to lead groups toward crime commission is the phenomenon called 'deindividuation' in which the individual 'is lost in a crowd'; he perceives a loss of accountability for his individual actions when those actions are taken in a crowd or mob and thus engages in many more anti-social acts.²⁸ The effect is illustrated most dramatically by gangs of teenagers or soccer crowds who sweep through neighbourhoods, breaking windows, assaulting those unlucky enough to be in their paths, but is at work in most groups of potential offenders.

Available data suggests that a significant proportion of offences are committed by offenders in groups.²⁹ Except in cases of murders and rapes without theft, which are crimes in which offenders usually know their victim, 'the majority of offenders commit their offences with accomplices'.³⁰

To sum up, individuals who commit crimes are likely to have certain individual patterns of thought characterized by impulsivity and risk-seeking behaviour, and to be under the influence of alcohol or drugs at the time they decide to commit crimes. Their individual pathologies are likely to be extended and amplified by the fact that the decision to commit a crime is often a group rather than an individual decision, and the group processes shift its members toward taking more risky actions, and deindividuates them, facilitating the commission of destructive behaviours. It is difficult to fit this to the image of a person who is affected by complex rational deterrence considerations.

A further gap between the reality and the assumption of legal-rule influence on conduct is the unrealistic extent to which lawmakers think they can micro-manage conduct. Consider, for example, the situation where one perceives that one is under immediate attack, and is considering various options for using force in self defence. It strikes us as near silly to think that such a person—even a criminal law professor who has been teaching criminal codes for 25 years—would be able to look to the detailed legal rules of codes set out to guide her conduct. Is it realistic, for example, to think that, when under attack, a person would or could apply the terms of two-page Model Penal Code section 3.04, the most common self-defence formulation? Even if one had instant familiarity with these detailed rules, their application depends on the actor's resolution of factual issues that may be difficult, if not impossible, in the split second the actor has to make a decision on the use of defensive force. Is retreat possible, or has the attacker crossed a threshold that no longer requires retreat? What exactly is the level of threat or force conveyed by the hand of the attacker moving menacingly

²⁸ Phillip Zimbardo, 'The Human Choice: Individuation, Reasons and Order Versus Deindividuation, Impulse, and Chaos' in W. Arnold and D. Levine (eds), *17 Nebraska Symposium on Motivation* (1969) 237; L. Mann, J.W. Newton and J.M. Innes 'A Test Between Deindividuation and Emergent Norm Theories of Crowd Aggression', 42 *J Person & Soc Psych* 260 (1982).

²⁹ Estimated per cent distribution of violent victimizations by lone offenders (1999), Table 3.29, Sourcebook of Criminal Justice Statistics 2001, at <http://www.albany.edu/sourcebook/1995/pdf/t329.pdf> and Estimated per cent distribution of violent victimizations by multiple offenders, Table 3.31, above, at <http://www.albany.edu/sourcebook/1995/pdf/t331.pdf> (last visited 16 May 2003) (approximately 20 per cent of 1999 violent crimes were committed by offenders in a group).

³⁰ Hochstetler, above n 4 at 3.

toward a pocket? Despite this implausibility of a defender being able to apply the law's detailed rules, the lawmakers debate and formulate such rules as if the formulations really will be guiding conduct.³¹

C. *The Perceived Net Cost Hurdle*

Assume the potential offender, at the time of the offence, understands the law's implications for him and is able to be influenced by the facts known to him. Do the perceived costs of non-compliance outweigh its perceived benefits? The requirement has two components, which we shall examine separately: the perceived 'cost'—the threatened punishment and the weight the potential offender gives to it—and the perceived 'benefit'—what he expects to gain from the offence.

(i) *The perceived cost: probability, amount and delay*

Famously, Bentham suggested three aspects of the penalty that need to be taken into account in calculating the resulting weight of the penalty. These are, in a modern terminology, the probability of incurring the penalty, the total amount of the punishment, and, although this is often omitted from deterrence calculations, the delay with which the penalty will or might follow the crime.³²

For Bentham, the importance of these various aspects of the punishment were intuitively obvious, and we will suggest that his intuitions were correct. That is, we present evidence about how variations in each of these aspects of punishment affect the weight given to the punishment in serving as a deterrent. However, as will become clear, our current understanding of these issues has outstripped the standard deterrence thinking. Available empirical studies suggest that, first, these issues are more complex than standard deterrence analysis assumes and, second, that the dynamics at work often conflict with the principles that traditional deterrence analysis has used in setting today's liability and punishment schemes.

For reasons that can be easily realized, researchers have been ethically hesitant to impose punishments of the magnitudes associated with prison sentences on human beings participating in research studies. (However, with the consent of human research participants, punishments of moderate intensity have been inflicted on those participants and we will review those studies.) But there is a vast experimental literature in which higher magnitudes of punishments have been inflicted on animals, characteristically rats, pigeons, or dogs. Part of our analysis draws upon this literature and deserves a special preliminary note. Obviously, one wants to generalize to humans the patterns discovered using infrahuman subjects with considerable caution. However, one reviewer of the animal behaviour data asks, 'Are the effects of intense punishment on humans

³¹ See Model Penal Code § 3.04 comment (1985).

³² J. Bentham, *The Rationale of Punishment* (R. Heward, 1830) at ch VI.

the same as those observed on animals?' His reply: 'For obvious reasons, the data on this point are limited, but what evidence we do have suggests a number of similarities'.³³

Probability. The conditioning literature gives reason to be concerned about the effectiveness of a deterrent threat under our current criminal justice system. Research has been done that varies the likelihood of punishment from its being certain—that is, punishment following every transgression—to a likelihood of only a probability of 0.1 per cent. For subjects at a 50 per cent punishment rate, the punishment considerably decreased the subsequent response rate, by approximately 30 per cent, from the no-punishment rate. But at a 10 per cent punishment rate, almost no suppression was observed.³⁴ This suggests that the response rate will be fairly sensitive to a drop off in the punishment rate. Of course, for comparisons to the criminal justice process, we would be less interested in these fixed-rate studies and more interested in variable-rate studies, in which the punishment occurs on the *average of*, say, one punishment in every 10 actions but has a random one-in-ten chance of occurring in response to any of those 10 actions. Surprisingly, there are relatively few such studies in the behavioural literature but what there are supports similar conclusions. In a review of them, Lande concludes that as the rates move toward lower probabilities of punishments, they become less effective in suppressing responses.³⁵ A shock intensity that is an effective suppressant when delivered with certainty after a response, declines in suppression effectiveness as it becomes less probable. When the probability of the shock declines to rates that approximate the arrest rates for various crimes,³⁶ their behaviour suppressive effects are quite low.

In Lande's own study, an interesting additional effect is shown that has rather ominous implications for behaviour control via punishments. If the punishments are given on a variable-rate schedule such that the animal is producing a reduced but still present rate of response, the animal shows what are called 'response bursts' immediately after receiving a punishment. That is, it is as if the animal is reasoning that it is highly improbable that a second punishment will follow immediately on the first, and it thus produces a high rate of response during the period immediately following punishment. One can imagine a criminal, just released from prison, reasoning that it is highly improbable that he would be caught for the very first crime he next commits.³⁷ The point here is that the dynamics of deterrence are in fact quite complex, more so than present deterrence analysis acknowledges.

³³ David Lieberman, *Learning, Behavior, and Cognition* (2nd edn, 1993) at 257.

³⁴ Nathan Azran, W. Holz, and D. Hake 'Fixed Ratio Punishment', 6 *J Exper Anal Behav* 141 (1963).

³⁵ Stephen Lande 'An Interresponse Time Analysis of Variable-Ratio Punishment', 35 *J Exper Anal Behav* 55 (1981).

³⁶ See Estimated number of arrests (2000), Table 4.1, Sourcebook of Criminal Justice Statistics 2001, at <http://www.albany.edu/sourebook/1995/pdf/t41.pdf> (listing total number of arrests by offence charged for most major crimes).

³⁷ Consider the case of Dwight Jackson: 'Thirty minutes after being released from prison, to which he had been sent on conviction of two bank robberies, Dwight Jackson robbed another bank'. *United States v Jackson*, 835 F.2d 1195, 1196 (7th Cir. 1987).

Consider this picture of the effect of reduced probability of punishment in light of the known rates of arrest and conviction for various crimes. The overall average of conviction for criminal offences committed is 1.3 per cent³⁸—with the chance of getting a prison sentence being 100-to-1 for most offences.³⁹ Even the most serious offences, other than homicide, have conviction rates of single digits. Although no very precise comparisons can be made to the animal research on schedules of punishment, it can be expected that these low rates of conviction and punishment will have a seriously damaging effect on deterrent effect of the threatened punishment.

We suspect that most citizens would be shocked at how low the punishment rates are, which suggests that the perception of detection rates tends to be higher than the rates actually are. Luckily for deterrence, people tend to overestimate the occurrence of rare events.⁴⁰ This error is useful because it is the perceived rate of punishment rather than the actual rate that counts for deterrent effect. Probably the best summary is that the average person's perception of punishment rates is low, but at least higher than the reality.⁴¹

But, and again, the group of persons who are the most likely offenders—those who have already committed an offence will account for the majority of future crimes⁴²—have a greater incentive than other people to learn the actual punishment rates. Thus, the career criminals—just the persons at whom we would wish to aim our deterrent threat of punishment—are the persons most likely to realize how low the punishment rates really are and, therefore, to perceive a lower chance of punishment than non-crime prone people.⁴³

³⁸ Compare US Department of Justice, Bureau of Justice Statistics, *Criminal Victimization in the United States, 2000 Statistical Tables*, Table 91, at <http://www.ojp.usdoj.gov/bjs/pub/pdf/cvus00.pdf>, with *Disposition of cases terminated in US District Courts (2000)*, Table 5.17, *Sourcebook of Criminal Justice Statistics 2001*, at <http://www.albany.edu/sourcebook/1995/pdf/t517.pdf> (listing federal convictions by offence), and *Felony convictions in State courts (1998)*, Table 5.42, *Sourcebook of Criminal Justice Statistics 2001*, at <http://www.albany.edu/sourcebook/1995/pdf/t542.pdf> (listing state convictions by offence). See generally Table 1 at <http://www.law.upenn.edu/fac/phrobins/OxfordDeterrenceAppendix.pdf> (providing a comparison of commissions, reports, arrests, convictions and sentences for various crimes, and including the average length of sentence imposed and served in both the federal and state systems).

³⁹ Compare US Department of Justice, Bureau of Justice Statistics, *Criminal Victimization in the United States, 2000 Statistical Tables*, n 37 above, with *Defendants sentenced in US District Courts (2001)*, Table 5.25, *Sourcebook of Criminal Justice Statistics 2001*, at <http://www.albany.edu/sourcebook/1995/pdf/t525.pdf> (listing number of defendants sentenced, by offence, in federal courts) and *Felony sentences imposed by State courts (1998)*, Table 5.43, at <http://www.albany.edu/sourcebook/1995/pdf/t545.pdf> (providing percentages of defendants sentenced, by offence, in state courts). See generally Table 1 at <http://www.law.upenn.edu/fac/phrobins/OxfordDeterrenceAppendix.pdf>, above n 38.

⁴⁰ R. J. Zeckhauser and W. K. Viscusi, 'Risk Within Reason' in T. Connolly, H. R. Arkes and K. R. Hammond (eds), *Judgment and Decision Making: An Interdisciplinary Reader* (2nd edn, 2000) 465.

⁴¹ Lance Lochner, *A Theoretical and Empirical Study of Individual Perceptions of the Criminal Justice System*, Rochester Ctr. for Econ. Research Working Paper No. 483 (June 2001), Figure 5: Average Perceived Probability of Arrest and Official Arrest Rate Over Time.

⁴² Mortimer Zuckerman 'War on Crime, By the Numbers', 116 *U.S. News & World Rpt* 68 (17 January, 1994) (reporting that 7 per cent of criminals commit 2/3 of all violent crimes); 'Note: Selective Incapacitation: Reducing Crime Through Predictions of Recidivism', 96 *Harv L Rev* 511 (1982) ('career criminals' are responsible for a vastly disproportionate number of crimes committed each year').

⁴³ Jule Horney and Ineke Haen Marshall 'Risk Perceptions Among Serious Offenders: The Role of Crime and Punishment', 30 *Criminology* 575, 587 (1992) (noting that 'Numerous studies have found that individuals with experience in committing an offence have lower estimates of the risk of punishment than those with no such experience' and demonstrating that 'the inverse relationship between participation in an offence and the perceived risk of

There is also some evidence that many offenders tend to overestimate their own ability to avoid the mistakes that have led to others like them being caught. This is likely to be an exaggerated form of a tendency that most people show—a perception that they are smarter or more capable than they in fact are. Recent research shows that this is particularly true of persons who are low on the characteristic being rated. For instance, in one study, subjects in the bottom quartile of a test on logic grossly overestimated their logical skills, estimating them on the average as at the 62nd percentile when they were in fact at the 12th percentile!⁴⁴

The net effect is that most criminals do not think they will be caught and punished. In the Anderson study noted above, for example, when asked about the risk of being caught, it was found that ‘76 percent of active criminals and 89 percent of the most violent criminals either perceive no risk of apprehension or have no thought about the likely punishments for their crimes’.⁴⁵

One final point. The instances in which deterrence analysis in the formulation of criminal law does real work is where it generates results that are different from those that would result from a distribution based upon the community’s shared principles of justice.⁴⁶ To the extent that the threat of official punishment stems from a legal rule that people perceive as unjust—which is by definition the case where deterrence-based rules deviate from perceived desert—the offender may discount the threat of punishment in the belief that, no matter what the law on the books says, the lawyers and judges and jurors in the system would not in fact be so unjust as to actually enforce the rule as written.⁴⁷ They may assume that the system will ‘slip’ to some extent, and thus the formal threat must be accordingly discounted.

Punishment Amount. An effective deterrent system must be able to impose punishments that will be perceived as having punitive ‘bite.’ That in itself is not difficult. A term of imprisonment will be perceived as a punishment. But an effective deterrent system would not impose imprisonment, and certainly not the same the term of imprisonment, for every rule violation it wished to deter. First, such would not be cost effective. The societal harm of only some offences can justify the high costs of this punishment. More importantly, an effective deterrent system must modulate its punishment to achieve its program. For

arrest for that offence, which has been shown in numerous studies of students and general adult populations, can be generalized to a sample of serious offenders committing major felonies’); *Lochner*, above n 41 at Figure 5 (‘Consistent with the model, perceived arrest probabilities among those engaged in crime are lower than those of non-criminals’).

⁴⁴ Justin Kruger and David Dunning ‘Unskilled and Unaware of It: How Difficulties in Recognizing One’s Own Incompetence Lead to Inflated Self-Assessments’, 77 *J Pers & Soc Psych* 1121 (1999).

⁴⁵ Anderson, above n 4 at 1 (abstract); see *ibid* at Table 1. This helps explain research results suggesting that increasing sentencing severity has limited effect in increasing deterrent effect. See, e.g., von Hirsch et al., above n 1 at 47.

⁴⁶ See *At Its Worst*, above n 7.

⁴⁷ Irwin A. Horowitz ‘Jury Nullification: The Impact of Judicial Instructions, Arguments, and Challenges on Jury Decision Making’, 12 *Law & Hum Behav.* 439 (1988) (finding that juries that are informed of the possibility of nullification are more likely to acquit a sympathetic defendant); Michael Kades ‘Exercising Discretion: A Case Study of Prosecutorial Discretion in the Wisconsin Department of Justice’, 25 *Am J Crim L* 115 (1997); Robert A. Weninger ‘Factors Affecting the Prosecution of Rape: A Case Study of Travis County, Texas’, 64 *Va L Rev* 357 (1978); Donna M. Bishop and Charles E. Frazier ‘Transfer of Juveniles to Criminal Court: A Case Study and Analysis of Prosecutorial Waiver’, 5 *Notre Dame J Ethics & Pub Pol’y* 281 (1991).

example, it may want to tie punishment amount to the degree of offence seriousness so as to provide a continuing disincentive for offenders to commit a more serious offence. That is, if rape automatically triggered the most serious penalty, every rapist would have nothing to lose and something to gain—eliminating the primary witness—by killing his victim. Further, there are a range of other factors—from difficulty of detection, to level of publicity—that an efficient deterrence system would want to take into account in setting the optimum level of punishment. In other words, the challenge for an effective deterrent system is not just to threaten punishment with a perceived bite but to modulate the amount of punishment it threatens with sufficient accuracy and in sufficiently discrete units so as to carry out its deterrent program. As with the probability studies, the studies relating to punishment amount suggest both greater complexity than current deterrence analysis seems to comprehend and dynamics inconsistent with modern deterrence practices.

The first finding of the relevant animal studies is unremarkable: the degree to which the administration of punishment suppresses later actions that the animal had previously been reinforced for taking, depends heavily on the amount of the punishment. In one study in which the punishment consisted of electric shocks delivered immediately after the animal pressed a bar (an action that had previously led to reward), the punishment hardly suppressed later bar pressings at all if the shocks were mild in intensity, but achieved a great deal of behaviour suppression, close to complete suppression, if they were very high in intensity.⁴⁸ (It is important to remember that the punishment is delivered immediately and after each and every 'transgressive' response, a set of conditions that is not likely to be achieved in instances of human criminal transgressions.)

The second findings of these studies is more remarkable: There is an interesting 'adaptation to intensity' effect. In one study a pigeon was shocked for pecking a key that had previously delivered and continued to deliver a reward.⁴⁹ A shock level of 80 volts produced total response suppression when administered as punishment for the animal's first response. When the shock level was slightly below that, at 60 volts, it had little behaviour suppression effect. However, if the shock level started at the undetering 60 volts, then gradually increased, the pigeons continued with the punished response, even up to 300 volts, far beyond the 80 volt 'complete deterrence' level!

The application of this to punishments within the criminal justice system is unsettling, since it is often the case that the punishment for first offences is rather low, frequently consisting of short sentences, probation, or suspended sentences. What this suggests is that we may inadvertently be creating offenders who, like the pigeon, learn to tolerate punishment levels that, if administered earlier, would have deterred the punished action.

⁴⁸ E. Boe and Russell Church 'Permanent Effects of Punishment During Extinction', 63 *J Comp & Physiol Psych* 486 (1967).

⁴⁹ Azran, Holz and Hake, above n 34.

The data regarding sentences for first offenders, and particularly young offenders, suggests that the problem may be a real one. 45 per cent of *all felony* offenders without a prior conviction are not given an incarcerative sentence.⁵⁰ 66 per cent of *all felony* offenders under the age of 20 receive a probation sentence.⁵¹ One occasionally sees newspaper articles about a youthful offender who has committed some horribly violent offence and who does receive a prison sentence, but the news coverage is probably a testimony to how rare it is to sentence young offenders to prison.

From several perspectives, this is an acceptable, even good, outcome: judges often do not send youthful offenders to prison because the experience may increase their future likelihood of committing criminal offences.⁵² They also may experience appalling treatment by older convicts.⁵³ However, from the deterrence perspective, it may bring about the 'hardening to punishment' effect observed in animals, in which an escalating series of punishments, if it begins at a level that is ineffective in controlling the initial transgression, simply conditions the person to tolerate the increasing punishments, without reducing the rate of transgressions.

Another finding of recent empirical work may be even more unsettling. Deterrence analysis classically uses variation of prison terms as the metric by which punishment severity is adjusted. This is not strictly true, of course: for more minor offences, probation or community service might be assigned, and for some offences, the death penalty is available. However, for a wide variety of crimes, with wide ranges of severity, duration of prison term is the way in which we fit the punishment to the crime.

The simplest assumption to use in equating length of prison term to offence severity is to assume that severity of punishment is linear with the duration of the sentence. So, for instance, a ten year sentence produces twice the punishment bite as does a five year sentence. Assuming a constant intensity of 1, which continues at the same level for, say, 100 days, the total amount of punishment—the total punitive 'bite'—is 100 punishment units.

In a famous paper, Brickman and Campbell introduced the idea of the 'hedonic treadmill'.⁵⁴ The essence of the notion is that over time, people who move from a neutral affective state to a set of circumstances that initially produce a higher affective state come to adapt to that new set of circumstances,

⁵⁰ Bureau of Justice Statistics, US Dep't of Justice, *Felony Defendants in Large Urban Counties—1998*, Table 35 (2001).

⁵¹ Bureau of Justice Statistics, US Dep't of Justice, *State Court Sentencing of Convicted Felons—1998*, Table 3.11 (2001).

⁵² Dennis Stevens 'The Depth of Imprisonment and Prisonization: Levels of Security and Prisoners' Anticipation of Future Violence', 33 *How J Crim Just* 137–57 (1994); Dennis Stevens 'The Impact of Time-Served and Regime on Prisoners' Anticipation of Crime: Female Prisonization Effects', 37 *How J Crim Just* 188–205 (1998).

⁵³ Zvi Eisikovits and Michael Baizerman "'Doin' Time": Violent Youth in a Juvenile Facility and in an Adult Prison', 6 *J of Off Counsel Serv & Rehab* 5 (1982).

⁵⁴ P. Brickman and D. Campbell, 'Hedonic Relativism and Planning the Good Society' in M.H. Appley (ed.), *Adaptation-level Theory: A Symposium* (1971) at 287–302. This review draws on the chapter by Shane Frederick and George Loewenstein, 'Hedonic Adaptation' in Daniel Kahneman, Ed Deiner and Norbert Schwarz, (eds), *Well-Being: The Foundations of Hedonic Psychology* (1999) at 302–29.

and experience it as lapsing back to affective neutrality. The examples here are of a person who wins the lottery or moves from some place with dreadful weather to California, and initially is euphoric, but over time reverts to his or her previous neutral level of affect. The same adaptive effect has been found to work in both directions; both those suffering accidents making them paraplegics and those winning the lottery tend to adjust similarly to their new circumstances, treating them as their new neutral state of affect.⁵⁵

Applying this to our present argument, we see that the duration of the sentence might not be having the deterrent effect that one might attribute to it. Two kinds of adaptation to the prison environment may take place. First, the prisoner, who initially found his seven foot cell horribly cramped, comes to regard it as the evaluatively neutral condition. His adaptation level shifts, and one consequence of this is that there are now prison experiences that would previously be experienced as nearly as negative as his seven foot cell that now become above adaptation level experiences and therefore positive—an hour in the exercise yard, or a move to a nine foot cell for instance. On this account, the prisoner who has adapted to prison, experiences it as affectively neutral on the average, and is likely to have some positive and some negative experiences during the duration of his sentence, not greatly unlike the experiences of a person who is not confined to prison. Whatever systematic negativity the prison experience has for the prisoner is caused by the initial time in prison during which the adaptation takes place. Supporting this view, a study finds that 50 per cent of the suicides that occur in prison occur during the first 24 hours of imprisonment.⁵⁶

A second kind of adaptation is a general desensitization to the unpleasant experiences that prison can deliver to the prisoner. The prisoner becomes 'hardened' to the prison experience and not only regards it as affectively neutral but does not experience much negativity when the prison experience temporarily gets worse. To understand this concept, assume that there is a natural fluctuation in the hedonic intensity of the stimuli experienced in prison. Some days are affectively worse, others neutral, others better. The key notion here is that the prisoner's sensitivity to change decreases over time. This 'hardening' or becoming 'jaded' means that the change in felt effect is damped from the changes in objective circumstances. Thus, when the objective situation gets much worse, it is experienced as only a little worse, and much better is experienced as a little better.⁵⁷ Applying this notion and the more general concept of hedonic adaptation to the context of prison incarceration Fredrick and Loewenstein recently concluded that 'although incarceration is designed to be unpleasant, most of the research on adjustment to prison life points to considerable adaptation' over

⁵⁵ Shelly Taylor 'Adjustment to Threatening Life Events: A Theory of Cognitive Adaptation', 38 *Amer Psych* 1161 (1983); Ronnie Janoff-Bulman and Camille Wortman 'Attributions of Blame and Coping in the "Real World": Severe Accident Victims React to Their Lot', 35 *J Person & Soc Psych* 351 (1977).

⁵⁶ L.M. Hayes "'And Darkness Closed In": A National Study of Jail Suicides', 10 *Criminal Justice and Behavior* 461-84 (1983).

⁵⁷ Fredrick and Loewenstein, above n 54 at 304-05.

time, citing studies that show improvements in 'deviance, attitude and personality measures,' and decreases in dysphoria, stress related problems and boredom among inmates, including those in solitary confinement.⁵⁸

To sum, several empirically supported conclusions in behavioural science bring us to the uncomfortable thought that our society's major means of modulating the punitive bite of the punishment felt by a convicted individual, which is by manipulating the duration of the prison sentence, is not going to be as effective as what we might call the 'naive calculation system' assumes. This aspect of adaptation to punishment also is problematic because it means that imprisonment becomes increasingly less cost-efficient as punishment increases. Each additional unit of prison time will have a near constant cost, but the punitive bite of each unit will become increasingly less.

Still, it is important to see that what remains common to both of these representations of punishment effect is that the *duration* of the negative experience is a strong determinant of the negative quality of the experience that is retained in memory by the punished individual. More specifically, the duration of the punishment interacts multiplicatively with its intensity to produce the total punishment amount of the prison experience. This general assumption of the approximate multiplicative effect of the duration of punishment is the conventional wisdom.

However, recent psychological research presents a radical challenge to the role of duration in the experience of punishment. This recent work separates the total remembered pain (or pleasure) of an experience, from the moment-by-moment intensity of the experience throughout the duration of the experience. The results are startling; they suggest that duration does not play anything like the major role that intuition gives it in determining punishment amount.⁵⁹ Instead, in these experiments the amount contributed by duration to the remembered experience of pain was small.⁶⁰

We can take this startling finding about 'duration neglect' further. In other experiments, participants were led to experience a shorter period of intense pain, or a longer period that began with an intense pain of the exact duration of the one in the shorter period, and then, without the subjects becoming aware of it, added a period of less-intense pain.⁶¹ (Thus whether the subjects had experienced the shorter or longer sequence, they perceived both as being a single experience.)

⁵⁸ Ibid at 302–29.

⁵⁹ Daniel Kahneman, 'Objective Happiness' in Daniel Kahneman, Ed Deiner and Norbert Schwartz (eds), *Well-Being: The Foundations of Hedonic Psychology* (1999) at 4.

⁶⁰ D. Redelmeier and Daniel Kahneman 'Patients' Memories of Painful Medical Treatments: Real Time and Retrospective Evaluations of Two Minimally Invasive Procedures', 116 *Pain* 3 (1996). The effect of increasing the duration of, for instance, a painful medical procedure, on the later reported aversiveness of that event, Kahneman summarizes as follows: 'A consistent finding of these experiments was that duration always combined additively with other determinants of global evaluation and participants appeared to use it as a minor extra feature (used to evaluate the painfulness) of each trial, as if they were telling themselves "this episode is painful and is also rather long," or "this episode is painful but it is short"'. Daniel Kahneman, 'Evaluation by Moments, Past and Future' in Daniel Kahneman and Amos Tversky (eds), *Choices, Values and Frames* (2000) 693 at 698.

⁶¹ Ibid at 701.

They were then led to believe that they would need to repeat one but not both of the previous experiences of pain and chose which they would suffer for the second time. A strong majority of respondents chose to repeat the longer experience! If duration were given the weight that conventional wisdom assumes, the subjects would have chosen to repeat the shorter pain experience. But they did not.

Kahneman suggests that people retain a 'snapshot' of the negative experience that pools by averaging two aspects of the painful episode: the affective value of the most extreme pain experienced during the episode and the affective value of the pain experienced near its end. This rule accounted for over 90 per cent of the variance in pain judgments in the experiments mentioned above. Duration of the experience, again, added only a slight upward boost in pain that is remembered.

What does this mean for our standard duration-linked means of regulating the amount of punishment? Consider again the most plausible version of punishment noted above, which includes the duration of the punishment as a multiplicative determinant of its total pain. Compare this to the remembered punishment amount registered under a 'duration neglect' calculation of perceived punishment bite, which is the average of the sum of the maximum intensity and the end intensity.

Now compare this to a much shorter sentence, which is likely to have a greater chance of being as aversive at its end as at its beginning. The startling realization is that this short sentence will be experienced as more aversive than a much longer sentence that is equally aversive at the beginning but less so at the end! There are two reasons for this. The first is that, under the duration neglect account, the much longer duration of the long sentence contributes little or nothing to the reconstructed negativity of the remembered sentence. The second reason is that the 'end-point intensity' of the short sentence comes before it has had an opportunity to decay, while the end point intensity of the longer sentence is reduced at the end. The point here is that lengthening sentences may actually reduce their recalled negative character if the end experiences are relatively less aversive!⁶²

All of this is bad news for the standard deterrence practice, which relies on sentence duration to adjust the magnitude of the punishment imposed by a prison term. Realistically, the most unpleasant peak experience of pain of the imprisonment is likely to occur relatively early in the prison experience. As the duration of the sentence is extended, it may not be having an increase in the remembered negativity. Indeed, if the final days of the term are markedly less aversive, as one would expect, the increase in duration is having a subtractive effect on the remembered negativity of the prison experience!⁶³ It is, of course,

⁶² See generally Table 2 at <http://www.law.upenn.edu/fac/phrobins/OxfordDeterrenceAppendix.pdf> (contrasting the aversive affects of longer and shorter prison terms).

⁶³ Similarly, extending the duration under the simplest assumption of relatively constant pain does not increase the pain of the end experience over a shorter duration sentence.

possible to conceive of a punishment that can be inflicted in a period of short duration, that is of high intensity, and that is most intense at the end of the punishment period. These are the sorts of punishments that are usually referred to as 'torture'.⁶⁴

The possibility that lengthening a prison term may reduce its remembered punitive bite is a quite startling assertion, and future research will be required to confirm or disconfirm it. Suppose for a moment that it is confirmed. Is there any way that a person advocating a deterrence stance can limit the implications of this finding? Yes. By pointing out that this discovery applies only to a subset of people: those who have had a prior prison experience. Recall that this discussion has been about the degree of pain experienced by a person who actually offends against the law and receives a prison sentence for doing so. Thus, even if we grant its complete truth, the duration neglect finding is only relevant to the case of special deterrence of those who have already experienced prison—they are the only group who has 'caught on' that prison is not as negative as conventional wisdom holds that it is. For the rest of us, who have not experienced prison, it still looms in our minds as the dreadful deterrent that conventional wisdom suggests that it is. General deterrence, it is argued, remains largely untouched by the duration-neglect problem.

But there are several problems with this dismissal of the duration-neglect problem. First, recall that our primary point is to question the standard practice of using deterrence analysis in the formulation of criminal law rules. That practice is one that relies upon both general and special deterrence arguments.⁶⁵ Thus, the evidence here of the unreliability of prison terms as a means to modulating punishment amount supports our point of the impropriety of much of the standard practice.

Second, as a good many statistical analyses have demonstrated, a large component of the pool of those who commit criminal actions consists of those who have already offended.⁶⁶ Putting this another way, a great many current offenders are recidivating prior offenders. Our standard view of them is that the prison sentence they received for their prior offence was not long enough to deter them from future offences, and thus a longer sentence is required. But what we offer here is an alternative account of why the prior prison term did not work: remembered after the fact, it has taught these people that prison 'isn't so bad after all' and risking it is not an important consideration in one's thinking in deciding whether to offend. Given that so many offenders are recidivists, it is hard to discount the significance of special deterrence and to assume that general deterrence is the central mechanism of deterrent effect.

⁶⁴ In other societies, or in our society when detention was not practical as a punishment, short-duration punishments of presumed high intensity have been used. Flogging in the British navy during the Napoleonic wars had this character. See John Lockwood, *An Essay on Flogging in the Navy; Containing Strictures Upon Existing Naval Laws, and Suggesting Substitutes for the Discipline of the Lash* (1849).

⁶⁵ See Robinson and Darley, *At Its Worse* at 955.

⁶⁶ See above n 50.

Third, the conventional wisdom that the publicized existence of long duration prison sentence serves as a deterrent to crime among those who have never experienced a prison term, ignores what might be called the 'leakage of the truth' that prison is 'not so bad' into the communities of people who are at risk of committing crimes but have not yet experienced a prison term. The reality is that that group is being socialized by the communities within which they grow up and currently exist. To mention a socially repugnant fact, it is unlikely that an African-American male child in a poor neighbourhood, growing up among a community of elders of whom a large number have served prison time, is unaware of their view that prison is 'not so bad.' Any criminological theory of differential association emphasizes the transmission of criminal behaviour and criminal thinking within the groups within which the person exists, and transmission of knowledge about the relative 'bite' of 'jail time' is likely to be a large component transmitted. The evidence suggests that new criminals disproportionately emerge from groups in which other criminals are prominent.⁶⁷

Let us also put this issue in the larger context of our general point, which is to challenge the effectiveness of criminal law rule formulation (and, here, sentencing practices) to deter. Even if one were unpersuaded by all of counterpoints immediately above and continued to believe that the problems of duration neglect and adaptation-to-intensity have effect primarily in undercutting special deterrence, that hardly undercuts our general point. The previous sections have already pointed to a variety of other problems to the efficacy of general deterrence and coming sections will offer more. The startling problems of duration neglect and adaptation-to-intensity are simply one piece of a larger mosaic of general deterrence difficulties.

Before closing our discussion of amount-of-punishment problems, let us note a few other ways in which the perceived threat of prison is likely to be degraded and complicated, at least with regard to persons likely to offend. Potential offenders may come from social groups in which the threat of stigma for being convicted as a felon may not be as high as it is for other persons. In fact, for many offenders, conviction and imprisonment may lead to very little if any loss of status and respect in the communities within which they function.⁶⁸ Similarly, it is likely that potential offenders as a group live a more deprived existence than the average person,⁶⁹ and thus the threat of prison, with its provision for meals and shelter, is not so worse an alternative to their current existence as it would

⁶⁷ Edward Sutherland, *Principles of Criminology* (4th edn, 1947).

⁶⁸ D. S. Nagin, 'Deterrence and Incapacitation' in M. H. Tonry (ed.), *The Handbook of Crime and Punishment* (1998) at 345; D. S. Nagin and R. Paternoster 'Enduring Individual Differences and Rational Choice Theories of Crime', 27 *Law & Soc Rev* 467 (1993); R.D. Schwartz and S. Orleans 'On Legal Sanctions', 34 *U Chi L Rev* 274 (1967); S. A. Venkatesh, 'The Gang in the Community' in C. R. Huff (ed.), *Gangs in America* (2nd edn, 1996) at 241. But a corollary to this is that, for those people who care a good deal about social approval of persons with traditional values, even very low probability of criminal conviction may produce a deterrent effect because its cost is viewed as so high. S. Klepper and D. Nagin 'Tax Compliance and Perceptions of the Risks of Detection and Criminal Prosecution', 23 *Law & Soc Rev* 209 (1989).

⁶⁹ Bureau of Justice Statistics, US Dep't of Justice, Profile of Jail Inmates 1996, at www.ojp.usdoj.gov/bjs/pub/pdf/pij96.pdf (last visited 24 July 2002) (of jail inmates in 1996: 36 per cent were unemployed at time of last arrest;

be for the more well-to-do person. Indeed, county jails often serve as places of refuge for vagrants during the winter months in cities in cold climates.⁷⁰

Our ultimate conclusion, which we think the evidence strongly supports, is that the threat of punishment amount under current practices is at best unpredictable and at worst unreliable in modulating the threatened amount of punishment, an incapacity that in itself will frustrate a general deterrence scheme, a fact that in turn damages the effectiveness of a criminal punishment system that seeks to achieve behaviour control by distributing liability and punishment upon a deterrence analysis.

Delay. The psychological research literature is similarly unsupportive of our current deterrence practice with regard to the matter of delay of punishment. It is a classic finding that the effects of punishment in deterring behaviour drop off rapidly as the delay increases between the transgressive response and the administration of punishment for that response. The rapidity of the drop-off is quite striking. In one study hungry dogs were given a 10 minute opportunity to eat from a dish of highly preferred or unpreferred food.⁷¹ Then, they were punished by a conspicuously present experimenter (a) after 15 seconds or (b) after 5 seconds or (c) immediately, for eating from the preferred food dish, and not punished for eating from the unpreferred dish.⁷² All dogs learned to avoid eating from the preferred dish. Next, they were repeatedly returned to the test room, with the experimenter now conspicuously absent. The dogs from (a) the 15 second delay group returned to eating the preferred food in about three minutes of the first day, (b) the five second delay dogs resisted for 8 days and (c) the immediately punished dogs resisted for about two weeks!⁷³

These are remarkable differences to be produced by variations between 0 and 15 seconds of punishment delivery. In criminal cases, the delay that intervenes between the completion of the offence and the beginning of the punishment may be significant. Available data regarding state courts suggest that the average time from arrest to sentencing for felony cases ranges from 7.2 months for a guilty plea to 12.6 months for a jury trial.⁷⁴

46 per cent had less than a high school education; 46 per cent had monthly income less than \$600; 60 per cent did not live with both parents while growing up; 22 per cent belonged to a family that received welfare while growing up; 46 per cent had a family member incarcerated while growing up; 47 per cent of female inmates were physically or sexually abused prior to most recent incarceration; 36 per cent had a physical or mental disability).

⁷⁰ Sean Gardiner and Melanie Lefkowitz, 'Taken From Street: Freezing Weather Prompts City Effort to Remove Homeless', *Newsday* A03 (27 December 2000); Jennifer Stenhauer, 'A Jail Becomes a Shelter, and Maybe a Mayor's Albatross', *N.Y. Times* B1 (13 August 2002). The authors of one study report that 'the threat of legal sanctions is reduced by constraints of poverty, drug use, criminal peers, lack of normative constraints'. Stephen Baron and Leslie Kennedy 'Deterrence and Homeless Male Street Youths', 40 *Canadian J Crim* 27 (1998). They conclude, perhaps in an understated way, 'that traditional models of deterrence must be reexamined when dealing with extremely "at risk" groups'. In other words, perceptions of the harshness of punishment differ among different groups and may be least harsh among those most driven to crime by need.

⁷¹ R. L. Solomon, L. H. Turner and M. S. Lessac 'Some Effects of Delay of Punishment on Resistance to Temptation in Dogs', 8 *J Person & Soc Psych* 233 (1968).

⁷² Unlike the standard experiment, which uses electric shock as punishment, this experiment punished by swatting the dog on the snout with a rolled up newspaper.

⁷³ *Ibid* at 235-38.

⁷⁴ Mean and median number of days between arrest and sentencing for felony cases disposed by state courts (1998), Table 5.48, *Sourcebook of Criminal Justice 2001*, at <http://www.albany.edu/sourcebook/1995/pdf/t548.pdf>

The deterrent effect of a threat of punishment sometime in the future also is hurt by the findings of recent experimental work showing that humans place less weight on events in the future as compared to events in the present. The research paradigm developed by researchers on human judgment is simple in form. A person is given a choice of, for instance, \$100 delivered immediately or \$X dollars delivered in, say, one month, and the person is asked to set X such that he is indifferent between the \$100 dollars today and the \$X dollars one month in the future. He thus is willing to let the experimenter toss a coin to determine which outcome happens. The general finding is that X is set at a startlingly high amount. In one study, subjects were indifferent between receiving \$10 immediately and \$21 in one year, and also indifferent between receiving \$100 immediately and \$157 in a year.⁷⁵ As a comparison of the two pairs suggests, the discounting rate for higher sums was lower, but was still extremely high as compared to the sorts of interest rates that are on offer from banks. (We know of no banks that are offering 110% or 57% interest per year on no-risk investments.) It appears that the same discounting effect appears for future losses as compared to immediate losses, specifically in this study subjects were indifferent between losing \$100 right now, and \$133 in one year's time.⁷⁶ That suggests that consequences in the future are given less weight than are consequences in the present and this remains true when those consequences are negative, such as prison sentences.

This discount of future consequences is exacerbated by drugs or alcohol use, which we saw earlier was common among criminal offenders.⁷⁷ Recent experimental work has examined the decision-making processes of persons who are under the influence of alcohol, and summarizes the results as 'alcohol myopia'.⁷⁸ While under the influence of what were only moderate levels of alcohol, the study respondents showed a general tendency to reduce the weight they gave to more distant consequences. In some of the research, the decision in question was whether to engage in sexual intercourse, and the distant consequences that received less weight were the possibilities of contracting a sexually-transmitted disease or causing pregnancy. These findings are consistent with the view that alcohol intoxication restricts attentional capacity so that people are highly influenced by the most salient cues in their environment. For a crime-prone individual under the influence of alcohol, the salient environmental cues are likely to be the emotionally arousing temptations to rob or burglarize, rather than the not

(last visited 16 May 2003). Available data regarding federal district courts suggest that the median time from filing to disposition is 6 months, ranging from 2.3 months for a bench trial, 4.7 months for dismissal, 6 months for a guilty plea, to 11.1 months for a jury trial. Median amount of time from filing to disposition of criminal defendants in US District courts (2001), Table 5.41, above, at <http://www.albany.edu/sourcebook/1995/pdf/t541.pdf>.

⁷⁵ A review of the temporal discounting literature can be found in George Loewenstein 'Out of Control: Visceral Influences on Behavior', 65 *Org Behav & Human Dec Proc* 272-79 (1996).

⁷⁶ *Ibid* at 277.

⁷⁷ See text accompanying n 17 above.

⁷⁸ Tara K. MacDonald, Geoff MacDonald, Mark P. Zanna and Geoffrey T. Fong 'Alcohol, Sexual Arousal, and Intentions to Use Condoms in Young Men: Applying Alcohol Myopia Theory to Risky Sexual Behavior', 19 *Health Psych* 290 (2000).

present reminders of the possibility of distant imprisonment. Under alcohol or drug-induced myopia, it is reasonable to conclude that the threat of arrest and conviction, and eventually, of prison, is not given much weight in the decisional process.

(ii) *The perceived benefit*

The same kinds of factors relevant to assessing the perceived threat of punishment are relevant in determining the perceived benefit of a crime: the probability of attaining the benefit, its value, and its immediacy all play a role. But while the 'cost' analysis showed many factors tending to degrade the perceived cost, the benefit analysis suggests little such degradation in valuing the perceived benefit.

Typically, the perceived benefit of the contemplated offence is immediate or at least quite near: with regard to theft, for example, it is the immediate possession of money or property and the choices and possibilities they immediately bring; with regard to assault, the immediate satisfaction of the revenge, anger, or whatever motivation drives the offender. Even if the motivating benefit is delayed—the stolen property must be traded for drugs, to feed an addiction—the offender's expectation that he will not be caught⁷⁹ means that he expects satisfaction to come without interruption before too long. There will be some offences for which the benefit is delayed, of course, as in elaborate fraud schemes, and in these cases the weight of the future benefit may be discounted just as future punishment is. As a whole, however, the criminal justice system reflects a picture of a threat of delayed punishment pitted against the attraction of immediate benefits of crime.

As to the value of the benefit, that value frequently is seriously exaggerated by the effects of addiction. The National Crime Victimization Survey reports that in 1999, about 11 per cent of violent crimes and 24 per cent of property crimes were committed to raise money to get drugs.⁸⁰ Consider this in light of experiments on addictive effects. Some studies consider addiction in the context of health-risking behaviours such as smoking and drug use, which produce immediate pleasure but serious long-term health consequences such as painful deaths from lung diseases. Several studies have demonstrated that alcoholics,⁸¹ heroin users⁸² and substance abusing gamblers⁸³ have higher discounting rates than do normals, and that is true when money is the gain in the present or the future. But it is even more true when the gain in the present is the alcohol or drug to which they are addicted. What these studies, on normals and addicts, imply is that all persons are prone to take immediate gains even if it costs them future

⁷⁹ See text accompanying nn 52–59 above.

⁸⁰ Bureau of Justice Statistics, *Drug Use and Crime*, above n 17.

⁸¹ Nancy Petry 'Delay Discounting of Money and Alcohol in Actively Using Alcoholics, Currently Abstinent Alcoholics, and Controls', 154 *Psychopharm* 243 (2001).

⁸² Gregory Madden, Warren Bickel, and Eric Jacobs 'Discounting of Delayed Rewards in Opium-Dependent outpatients', 7 *Exper & Clin Psychopharm* 284 (1999).

⁸³ Nancy Petry and Thomas Casarella 'Excessive Discounting of Delayed Rewards in Substance Abusers with Gambling Problems', 56 *Drug & Alcohol Dep* 25 (1999).

consequences, and addicts, even more than normal individuals, are highly driven by the pleasures on offer in the moment, and less affected by what might be risked in the future for taking the pleasures of the moment.

D. *Tripping Over Any Hurdle for Any Reason as Fatal to Law's Influence*

Notice that the ways in which the deterrence function works is that setting any one of the variables to zero means that there is no deterrent effect whatever. If the potential offender is unaware of the legal rule that is set to influence his conduct, or is aware of the rule but sees no meaningful chance of punishment, or perceives a meaningful chance of punishment but does not see the overall costs as outweighing the overall benefits (because of the high discount of the future punishment, or because the present benefit overwhelms because of his addiction), or perceives an overall net cost but is unable or unwilling to bring this information to bear on his conduct choices, then the punishment threat will not deter the person from committing the crime. The point here is that tripping over any one of the prerequisite hurdles is fatal to a deterrent effect.

Different groups of potential offenders can thus fail to be deterred by the possibility of punishment for any one of a number of reasons. Some of the potential offenders may be too intoxicated or mentally disturbed, or angered or afraid, to contemplate the future consequences of their deeds. A different group may be ignorant of the particular rule adopted under a deterrence rationale to influence their conduct. And so on. The cumulative effect may be that large groups of potential offenders may be unaffected by the deterrent threat for one reason or another.

E. *The Cumulative Dissipation Problem*

Assume, for the sake of argument, that there will be some potential offenders contemplating some offences who might at least potentially be influenced in their conduct by the deterrence-based rule or policy. That is, assume that not every potential offender is eliminated from a deterrent effect by tripping over one of the prerequisite hurdles. Is the resulting deterrent effect such that it justifies relying upon deterrence analysis in criminal law rule-making?

Even if we assume that the potential offender perceives some modest chance of being punished, that he is not so intoxicated that he has lost his ability to calculate costs and benefits, that he has some vague sense of what the rule or policy might be, it is still the case that any weakness in any prerequisite condition can combine with weaknesses in any other to reduce the ultimate deterrent effect to something trivial. This is so because the theoretical character of the function linking the prerequisite conditions into an overall deterrent effect is one of jointly necessary conditions, that combine approximately multiplicatively to give the total deterrent effect. Thus, when several of these conditions drop to low

values, the resultant weight of deterrence is likely to be negligibly low. To give an example drawing on considerations we have raised before, analyse the case of a set of young males who, because they are jobless, have free time that they spend aimlessly 'hanging out'. They probably are jobless because of poor skills and impulse control. As they gather, they are likely to engage in alcohol consumption, which induces alcohol myopia, and their joint egging each other to 'be bold' is likely to cause them to lose sight of the possibilities of being detected. The weight of deterrence rests very lightly on these young males. And the fine debates over which formulation of a criminal law rule will best deter has little meaning for this population and the many others for whom the prerequisites of deterrence are nonexistent or highly dissipated.

2. *The Aggregated-Effect Studies*

Let us restate our position. We do not deny that having a criminal justice system that administers punishment can have a deterrent effect. It is even possible that changes in police procedures or allocation of resources can have an effect on crime rates. But we are profoundly sceptical that *the formulation of criminal law rules* or even sentencing policies or practices can have the deterrent effect that common wisdom assumes it has. Section 1 has shown how unusual it is that all of the prerequisites for such a deterrent effect to exist. But some might argue that, although this analysis of criminal law's action path says doctrinal formulation can rarely influence conduct, it might in fact do so in some mysterious way presently beyond the understanding of human knowledge. We can test this argument by looking at the effect of specific doctrinal formulations on the crime rates they are intended to lower.

The available studies are of what one might call 'aggregated effects'—that is, studies that do not concern themselves with how a deterrent effect might come about but look strictly to whether an effect of doctrine on crime rate can be found. In the standard form, some change in the criminal law in a jurisdiction creates the opportunity for examining the resulting change in the rates of crime. Other aggregated effect studies examine changes of behaviour due to an existing law that by its terms changes over time in its effects on a group, as with an immaturity defence that minimizes punishment amount as long as an offender is below a certain age. Still others examine demographically similar jurisdictions that have different criminal law rules.

What aggregation studies share is a reliance on the discovery of differences in crime rates presumably caused by differences in criminal law rules. Given that they aggregate their findings over large data sets, these studies provide powerful possibilities of discovering code-produced deterrent effects. And we must acknowledge that, if aggregated effect studies show increased deterrence from doctrinal formulation, our arguments against relying on deterrence analysis are accordingly reduced.

But our review of the existing studies suggests these conclusions:

1. Some well-designed studies show no resulting crime reduction even from doctrinal formulations designed toward that end, and we cite these because they support our general argument.
2. Some studies purport to reliably show a crime reduction effect from doctrinal formulation, but the observed effect is due (or could as easily be due) to causes other than deterrent effects, such as the increased incapacitative effect that one would expect from increasing prison terms, removing from society those who would repeat offend.
3. The remaining studies really do show a deterrent effect, but the small number of instances in which this occurs only illustrates and buttresses our point in Part I that a deterrent effect from doctrinal formulation requires the existence of special conditions that in fact are the exception rather than the rule.

A. Studies that Find No Deterrent Effect from Doctrinal Formulation

The studies that show no deterrent effect include ones that test the effect of a criminal code altering the grade of an offence, or a code's setting different grades for an offence according to variations in a specific offence characteristic, such as punishing 'kiting' of checks of greater amounts more severely. In other no-effect studies, conduct was criminalized, or decriminalized, with no resulting change in the subsequent frequency of the commission of the offence.

A brutal and much-publicized instance of rape in Philadelphia on Palm Sunday, 1966, led to an increase in rape penalties. However, Schwartz concludes that neither the excitement leading up to the imposition of stronger penalties nor the actual imposition of such penalties affected the rate of rapes in the following months.⁸⁴

In the 1950s Finland was characterized by a high rate of individuals in prison. And the authorities, concerned about the social consequences of this, decriminalized many offences and assigned some offenders shorter prison sentences or directed still other offenders to community service, suspended sentences, or heavy fines rather than prison terms. Crime rates in the following years were not detectably different from those before the reforms and from those of nearby countries.⁸⁵

Zimring conducted an aggregated effect study using a database from a bank in Nebraska that includes both the number and the dollar amount of bad checks written.⁸⁶ The state's criminal law assigns different sentences to checks drawn for over and under \$35, a distinction that intuition suggests is not well publicized but might be known among those who regularly write bad checks. He

⁸⁴ Barry Schwartz 'The Effect in Philadelphia of PA's Increased Penalties for Rape and Attempted Rape', 59 *J Crim Law, Criminology & Pol Sci* 509 (1968).

⁸⁵ Tapio Lappi-Seppälä 'The Fall of the Prison Population', *Journal of Scandinavian Studies in Criminology and Crime Prevention* 27 (2000).

⁸⁶ Frank Zimring, 'Punishment and Deterrence: Bad Checks in Nebraska: A Study in Complex Threats' in David Greenberg (ed.), *Corrections and Punishment* (1977) at 173.

found little or no differential deterrent effect of the more or less severe sentences for the crime.

Zimring also studied the effects of decriminalizing abortion in Hawaii on estimated rates of the performance of abortions that were illegal in the years just before decriminalization.⁸⁷ Several assumptions are needed to estimate the previous rates of abortion, but he concludes that the prior criminalization of abortion did not deter it to a significant extent.

B. *Studies that Find Mixed or Conflicting Results*

Other studies show very mixed success in attempts to deter through doctrinal formulation. Some attempts are characterized by only short-term effects, for reasons we may be able to extract. For others, including death penalty studies, the evidence is too conflicting to draw any reliable conclusion.

A well-known study by Ross dealt with crime rate changes when Britain passed a road safety act, which allowed for higher penalties for offences such as driving while intoxicated, and was coupled with an extensive publicity campaign that implied that the police presence on roads and highways would substantially increase.⁸⁸ The deterrent effect of this was initially high, probably due to the public's overestimation of the certainty of apprehension. Over time, however, the police either decreased their enforcement efforts or the public was better able to estimate the real frequency of police stops, and the deterrent effect dwindled considerably. In other words, the *criminal law formulation* changes, which created more severe penalties, were not enough in themselves to create a deterrent effect, absent the considerable increase in likelihood of arrest and conviction produced by police enforcement efforts, which is what our previous analysis would predict.

In several other studies, Ross has pursued the effects of campaigns to affect the rates of drunk driving. These campaigns involve not only increased penalties for drunk driving, but considerable publicity about these increased penalties, publicity that is likely to cause citizens to believe that the rate of surveillance for drunk driving is increased. He uses interrupted-time-series analysis, with the law change as the 'interruption,' to see if resulting deterrence effect can be detected. In a study done following the adoption in France in 1978 of a law modelled on the Scandinavian drinking and driving laws, he finds that the law had a notable deterrent effect, but that the effect was temporary.⁸⁹ Again, *criminal law formulation* in itself was ineffective. If there was to be an increased deterrent effect, it had to

⁸⁷ Frank Zimring 'Of Doctors, Deterrence, and the Dark Figure of Crime: A Note on Abortion in Hawaii', 39 *U Chi L Rev* 699 (1972).

⁸⁸ H. Lawrence Ross 'Law, Science, and Accidents', 2 *J Legal Stud* 1 (1973).

⁸⁹ Laurence H. Ross, Richard McCleary and Thomas Epperlein 'Deterrence of Drinking and Driving and France: An Evaluation of the Law of July 12, 1978', 16 *Law & Soc'y Rev* 345 (1982). In his review of a number of similar drinking-and-driving law studies, Ross points out that they provide the possibility of testing the deterrence proposition with data sets that are both large, guaranteeing that any important effects will be detected, and of high quality. His summary of the results of these studies is quite illuminating: 'Efforts directed mainly at increasing potential drunk drivers' perceived certainty of punishment frequently have a deterrent effect in the short run. In the

come through other changes, such as changing police procedures or reallocating resources.⁹⁰

When considering criminal law changes designed to reduce crime, the death penalty quickly comes to mind in the United States, perhaps because the threat of death is the most frightening penalty within the state's arsenal. If a deterrence effect exists at all, it might be argued, it ought to exist for offences in which this maximal penalty is available. Many reviews have examined the case for deterrent effects of the death penalty.⁹¹ Hood comes to a not atypical conclusion in a major recent review: 'In short, the absence of sufficient controls, when taken in conjunction with the other problems already mentioned, should lead any dispassionate analyst to conclude that econometric analyses have not provided evidence from which it would be prudent to infer that capital punishment has any marginally greater deterrent effect than alternative penalties'.⁹² In any event, our examination of the literature on the deterrent effect of the death penalty tells us less than one would hope about even its efficacy. Since our issue is the deterrent effect of the full range of criminal law rules and penalties on crime rates generally, and since the death penalty is the penalty for only a few crimes, we will not pursue the issue of its deterrent effect further.⁹³

C. *Studies that Find a Deterrent Effect from Doctrinal Formulation*

There are a number of studies that have found effects, purportedly from doctrinal formulation, that they label deterrent effects. In some of these studies, it strikes us that the 'deterrent effect' found is merely an incapacitative effect of

long run, however, i.e. over several months or a few years, indexes of drunk driving return to prior levels. This phenomenon may be explained by the very low actual probability of punishment. Efforts directed principally at increasing the perceived severity of punishment have not had the desired deterrent effects, perhaps because of the low levels of certainty that these punishments will be applied. The utility of deterrence-based laws appears to be limited owing to the cost of raising the actual likelihood of punishment to a point that would support a perception of reasonable certainty'. Laurence H. Ross 'Social Control Thought Deterrence: Drinking-and-Driving Laws', 10 *Annual Rev of Sociology* 21 (1984) (abstract).

⁹⁰ Andenaes provides an interesting study that confirms the suggestion that increasing the detection rate of drunken driving can lead to its decrease, even when the severity of the penalties for it are decreased! Johannes Andenaes, 'The Scandinavian Experience' in Michael D. Laurence, John R. Snortum and Franklin E. Zimring (eds), *Social Control of the Drinking Driver* (1988) 43. In Finland, prior to 1977, very severe drunken driving sentences were in effect. Post 1977, probably bothered by the large number of prisoners incarcerated in jails, the penalties for drunken driving were reduced to fines and suspended prison sentences for most offenders. However, many more breath tests were given to motorists. The number of instances of driving under the influence were cut in half.

⁹¹ The studies, whether or not they find evidence supportive or not of the death penalty, require interpretation of empirical and analytic complexities to come to their conclusions. There is evidence that prior beliefs affect the interpretation of evidence in the direction of supporting the prior beliefs. Charles G. Lord, Lee Ross and Mark R. Lepper 'Biased Assimilation and Attitude Polarization: The Effects of Prior Theories on Subsequently Considered Evidence', 37 *Journal of Personality and Social Psychology* 2098 (1979). It has been suggested that this effect is at work here. Edward E. Leamer 'Let's Take the Con Out of Econometrics', 73 *American Economic Review* 31 (1983); Walter S. McManus 'Estimates of the Deterrent Effect of Capital Punishment: The Importance of the Researcher's Prior Beliefs', 93 *Journal of Political Economy* 417 (1985).

⁹² Roger Hood, 'Capital Punishment' in *The Handbook of Crime and Punishment*, above n 68 at 739, 762.

⁹³ There is one other set of studies that measures the effects of a threat of death on a reduction in crime rates. In these studies the possibility of death arises not from a death penalty imposed by some court, a death that may occur in some long-delayed future, but by the immediate threat of death from an intended victim. The victim, who the unlucky criminal accosts, has a concealed weapon, and uses it against his attacker. Twenty-three states have passed

the increased prison terms. That is, it is possible that the alteration of crime rate that follows the doctrinal change is a result of locking away for a longer period those repeat criminals who are responsible for a good deal of the crimes committed. This is a potentially societally-protective effect, but it is from an incapacitative effect rather than a deterrent effect.⁹⁴

Levitt conducted two studies of the effects of deterrence on aggregate crime statistics, both of which attempt to distinguish the effects of deterrence and incapacitation resulting from changing arrest rates. He does an elegant job in dealing with the problem of measurement error in panel data, which has plagued previous studies on the topic. He uses the assumption that if increased arrest rates have their effects through incapacitation, then an increase in arrest rates for one type of crime will reduce all (or at least all related) crime rates, because criminals who commit burglary, for instance, also commit robberies and being locked away for one crime means they also do not commit any other kinds of crimes. But from a deterrence perspective an increase in arrest rates for one crime will lead to a rise in the rates of other crimes as criminals rationally substitute away from committing the now frequently-arrested crime to other crimes that have no increase in the frequency of arrest. In doing so, they are responding rationally, being deterred away from the crime for which arrest is likely to other categories of crime for which it is unlikely.

Using this logic, his results:

suggest that incapacitation predominates (that is, is the largest cause in the relationship between arrest rates and drops in crime frequency) for rape, incapacitation and deterrence are of equal magnitude for robbery, and that deterrence effects outweigh incapacitation for aggravated assault and property crimes.⁹⁵

Later, he notes that for the crime of murder, error rates make it impossible to conclude that arrest rates affect either deterrence or incapacitation considerations of criminals.⁹⁶

such right-to-carry laws and the pre-post-law-change crime rates in those states allow for a test of this quite interesting form of the deterrence hypothesis. One examination of the evidence concluded that passage of these laws leads to a reduction in violent and property crimes, a result that they assert is due to the deterrent effect supplied by the awareness on the part of the potential criminals that their victims might be armed and dangerous. John R. Lott Jr. and David B. Mustard 'Crime, Deterrence, and Right-to-Carry Concealed Handguns', 26 *J Legal Stud* 1 (1997). However, a follow-up study used the same data set and an alternate model for projecting crime rates, which are then compared to the actual crime rates. Hashem Dezhbakhsh and Paul Rubin 'The Effects of Concealed-Handgun Laws on Crime', 88 *American Economic Review* 468 (1998). We quote their conclusions: 'We find that the results of concealed-weapon laws are much smaller than suggested by Lott and Mustard (1997) and by no means negative (e.g. crime-reducing) across all crime categories. For murder, for example, there is at best a small reducing effect. For robbery many states experience increases in crime. For other crimes, results are ambiguous, with some counties showing predicted increases, and some predicted decreases'. *Ibid* at 473.

⁹⁴ Levitt reviews previous studies on the topic, but since they are subject to his criticism of methodological error, we will not review them here. We should say that several of them find evidence that they interpret as supporting a deterrence effect. See Steven D. Levitt 'Why Do Increased Arrest Rates Appear to Reduce Crime: Deterrence, Incapacitation, or Measurement Error?', 36 *Econ Inq* 353 (1998), available at 1998 WL 15260029.

⁹⁵ *Ibid* at WL .pdf version p 3.

⁹⁶ *Ibid* at WL .pdf version p 11.

This undeniably impressive study strikes us as making the best case that we have seen for the operation of deterrence considerations at the aggregate level. Nonetheless, the study offers no challenge to our claim. It demonstrates that increased *arrest rates* through reallocation of police resources can have a deterrent effect;⁹⁷ it provides no showing that *criminal law formulation* has a deterrent effect. As we have suggested, many kinds of changes in conditions or procedures—like the number of patrol cars driving by—may effect the behaviour of potential offenders. It is producing such effect through the formulation of criminal law rules that we find unlikely.⁹⁸

Levitt's second study, one that does concern a substantive criminal law rule rather than a police practice, is equally methodologically and conceptually sophisticated, but is one that we see as supporting our general conclusions.⁹⁹ Briefly, he finds that there are sharp drops in the rate of crimes committed as an individual passes out of the jurisdiction of the juvenile court, with its relatively more lenient punishment practices, to the jurisdiction of the adult court, with its associated arsenal of severe punishments.¹⁰⁰

This is impressive evidence that the transition between court systems has an effect on crime rates, and one obvious interpretation is that the criminal is affected by the differing amount of punishment that he or she anticipates receiving for crimes committed on either side of the jurisdictional divide. There can be several behind-the-scenes social phenomena that contribute to this. First, the differences in punishment amount between juvenile and adult courts is one of those general truths that are well known to all. Unfortunately, there are very few such criminal law rules that are so well known. Second, the means of transmission of this knowledge may often be the juvenile gangs in which young potential wrong-doers travel, so it is a result that may be produced to some extent by the

⁹⁷ It should also be noted that the police attention needed to increase one crime's arrest rate is likely to generate lower police attention on other crimes, with the predicted increases in crime rates postulated by Levitt himself. Thus, the deterrent effect noted here is not, on policy terms, a ringing endorsement of the practice as a crime-fighting measure.

⁹⁸ Our scepticism on this particular point is shared by others. The United Kingdom Home Office commissioned the Institute of Criminology at Cambridge University to examine studies on deterrence, with a particular focus on whether one can achieve marginal deterrent effects of altering the severity of punishment through changes in sentencing policy. Andrew von Hirsch et al., above n 1. They summarize as follows an influential set of studies conducted by Farrington and his co-authors, with regard to changes in the certainty of punishment—typically requiring changes in police practices—and changes in the severity of punishment—typically achieved through alteration of criminal law rules: 'With respect to certainty, the findings are consistent with Farrington and his co-authors' previous studies, of significant negative correlations between most measures of certainty (of arrest and conviction) and crime rates—although these relationships are somewhat weaker in the American than the English data. For severity, however, the data mostly do not show significant negative correlations'. Ibid at 26.

⁹⁹ Levitt quotes the comments of juvenile criminals interviewed by Glassner and his colleagues that reveal a sharp awareness of the comparison between the relatively easy and shorter time done in a juvenile house of detention as compared to the harder time done in 'jail'. Barry Glassner, Margaret Ksander, Bruce Berg and Bruce Johnson 'A Note of the Deterrent Effect of Juvenile versus Adult Jurisdiction', 31 *Social Problems* 219 (1983).

¹⁰⁰ Levitt reports that: 'States in which juvenile punishments are lenient relative to adult punishments see much greater declines (or smaller increases) in crime as a cohort passes to the adult court. For example, in states in which the juvenile courts are most lenient vis-a-vis the adult courts, violent crimes committed by a cohort fall by 3.8 per cent on average when the age of majority is reached. In contrast, violent crimes rise 23.1 per cent with passage to the adult criminal justice system in those states in which the juvenile courts are relatively harsh compared to the adult court'. Levitt, above n 6 at 1159.

social pressures existing in the gang to take advantage of one's 'window of freedom' to offend. The plausibility of this is increased by reports from those who are knowledgeable about the organization of juvenile gangs, who suggest that some of the more violence-prone gang duties, such as carrying weapons and keeping watch for hostile intrusions on one's turf, are delegated to younger gang members specifically because of their ability to avoid the harsher sanctions of the criminal justice system.¹⁰¹ In other words, the prerequisites to deterrence commonly absent in other instances are present here: first, the legal rule is well known and, second, the potential offender is highly motivated, himself and by others of influence on him, to alter his conduct because of the rule.

One final, remarkably interesting study concerns the crime-reducing effects of the felony-murder rule.¹⁰² The felony-murder rule, as is well known, penalizes the felon for any death that takes place during the commission of a crime as if it were an intentional killing, murder. The study and its results are important to our argument because it is one of the few instances in which we are able to test a doctrine expressly formulated to produce deterrent effects.

The deterrence-based justification for the felony-murder rule is twofold. First, it is said to induce the criminal to take greater care during the commission of a crime, perhaps to plan against dangerous contingencies such as bank guards unleashing a hail of fire in their general direction and killing some civilian. For example, it might cause the offender to not carry a gun to the scene of the crime. Second, it is said to cause the sensible criminal to realize that crime is an inherently chancy, unpredictable, frightening process during which 'anything can happen' and many of these anythings are not under the control of the criminal. The sensible criminal, realizing this, will be less inclined to commit the crime in the first place.

The study results are quite surprising and illustrate the complexity of such deterrent effects. As the author remarks, '[T]he felony-murder rule does not simply lower robberies. It lowers robberies that do not result in death, but increases the number of robberies that do result in death. Overall, it increases the rate of deaths during a robbery'.¹⁰³ As to the effect of the felony-murder rule when the underlying felony is rape, 'the estimates suggest that the rule decreases rapes by 0.21 percent, but increases the average number of deaths per rape by 0.37 percent'. The overall effect is to increase the total deaths due to rape by 0.15–0.16 per cent.¹⁰⁴ One can only speculate about what causes these complex results (that is, the apparent tendency of those who engage in robbery or rape, when a felony-murder statute is in effect, to be slightly more likely to cause the death of their victim).¹⁰⁵

¹⁰¹ Terry M. Williams, *The Cocaine Kids: The Inside Story of a Teenage Drug Ring* (1989) at 19.

¹⁰² Anup Malani, *Does the Felony Murder Rule Deter? Evidence from the FBI Crime Data* (unpublished manuscript).

¹⁰³ *Ibid* at 22.

¹⁰⁴ *Ibid* at 305.

¹⁰⁵ One could speculate that those criminals who know of the felony-murder rule and nonetheless have undertaken the offence are persons who have already judged that the risk of death-causing conduct is worth taking.

Ultimately, the study seems to suggest that the felony-murder rule does have an effect on conduct. On the other hand, changes in conduct that are of fractions of a per cent, as reported in the study, are hardly a ringing case for the overall efficacy of basing criminal law formulation on a deterrence analysis. This is particularly true since some of the influence seems to increase the social damage rather than decrease it as the law-makers intended. The study's results also illustrate another good reason not to rely upon deterrence analysis in the formulation of criminal law rules: the complexity of the dynamics of deterrence and our lack of information about those factors that are needed to accurately predict an effect.¹⁰⁶ If anything, the study seems to argue against formulating the felony-murder rule in order to affect crime rates.

To sum, we do not find that the aggregated effect studies of deterrence demonstrate a capacity to reduce crime rates as would justify the deterrence orientation that dominates criminal law rule-making. Most studies showing a 'deterrent effect' produce it by changes in police practices and attendant publicity that increase the perceived certainty of arrest, not by the formulation of criminal law rules. Where effect on conduct does come from criminal law formulation, it can be both unpredictable in its direction and near trivial in its amount.¹⁰⁷

3. *Summary and Conclusion*

We have argued that the standard practice of formulating criminal law liability and punishment rules to optimize deterrent effect is indefensible given the rarity with which such rule formulation is likely to have the intended effect on crime decisions. Potential offenders commonly do not know the legal rules, either directly or indirectly, even those rules that have been explicitly formulated to produce a behavioural effect. Even if they know the legal rules, potential offenders commonly cannot or will not bring such knowledge to bear to guide their conduct in their own best interests, such failure stemming from a variety of social, situational, or chemical influences.

And even if they know the rules and are able to bring that information to bear on their conduct decision, the cost-benefit analysis potential offenders perceive commonly leads to a conclusion suggesting violation rather than compliance, either because the perceived likelihood of punishment is so small, or because it is so distant as to be highly discounted, or for a variety of other or a combination of reasons. Thus, even if the punishment to be imposed had real bite, it

¹⁰⁶ See *At Its Worst* at 977–8.

¹⁰⁷ Our conclusions are consistent with another recent review of aggregate effect studies authored by Anthony Doob and Cheryl Marie. See Anthony Doob and Cheryl Marie Webster, 'Sentence Severity and Crime: Accepting the Null Hypothesis' in Michael Tonry (ed.), *Press, Crime and Justice: A Review of Research. Volume 30* (2003). As they point out, 'most of these reviews (of the impact of sentence severity on crime levels) have concluded that there is little or no consistent evidence that harsher sanctions reduce crime rates in western populations'. They argue that, based on the weight of the evidence, including recent evidence made available by 'three strikes' laws, we should now accept the conclusion that we will not obtain general deterrence effects by alterations in sentence severity that are 'within the limits that are plausible in western countries'.

nonetheless would have that bite heavily discounted because it would occur so far in the future. Even if the discounted bite were still seen as painful, it would have no deterrent effect if the chance of suffering it is perceived as *de minimis*. (The pickpockets working the crowd at the pickpocket's hanging illustrate the point.¹⁰⁸)

The absence of any one of these prerequisites to deterrence—knowing the legal rule, being willing and able to bring such information to bear on one's conduct decision, and perceiving the threat of punishment to exceed the benefit of the offence—can be fatal to a deterrent effect. A well known rule carrying a credible threat of punishment that exceeds the benefit of the offence nonetheless will be ineffective in deterring a person caught up in rage or the social pressures of the group or drug effects. A rational calculator who fears any form of punishment even if the likelihood of it is slight, nonetheless will not be deterred by a rule of which he does not know. And a rule known by a rational calculator and perceived to carry a meaningful penalty nonetheless will not deter if the chance of getting caught is seen as trivial. Even if no one of these three hurdles is fatal to law's behavioural influence, their cumulative effect commonly is.

Given the rarity of the situations in which the prerequisites of deterrence are present and of non-negligible effect, the standard use of deterrence analysis to formulate criminal law doctrine seems wildly misguided. At the very least, deterrence analysis ought to be considered in criminal law debate only after a showing that the deterrence-prerequisite conditions might actually exist.

¹⁰⁸ See V.A.C. Gatrell, *The Hanging Tree* at 59–60 (1994).

DOES CRIMINAL LAW DETER? A BEHAVIORAL SCIENCE INVESTIGATION

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APPENDIX

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Abstract

Table 1: The Problem of Low Punishment Rates

Table 2: The Problems of Adaptation and Duration Neglect

ABSTRACT

Having a criminal justice system that imposes sanctions no doubt does deter criminal conduct. But available social science research suggests that manipulating criminal law rules within that system to achieve heightened deterrence effects generally will be ineffective. Potential offenders often do not know of the legal rules. Even if they do, they frequently are unable to bring this knowledge to bear in guiding their conduct, due to a variety of situational, social, or chemical factors. Even if they can, a rational analysis commonly puts the perceived benefits of crime greater than its perceived costs, due to a variety of criminal justice realities such as low punishment rates. These conclusions are reinforced by studies of crime rates following rule changes. Many show no change in deterrent effect. Those that purport to show a deterrent effect commonly have persuasive non-deterrence explanations, such as a change in incapacitative effect. The few studies that segregate deterrent and incapacitative effects tend to reinforce the conclusion that rule formulation has a deterrent effect only in those unusual situations in which the preconditions to deterrence exist. Even there, the deterrent effects are quite minor and unpredictable, hence inadequate grounds to influence criminal law rule making.

Below are provided tabular data and graphical representations of material contained in the Article. The first section, "The Problem of Low Punishment Rates," provides data regarding the relatively low rates of capture, conviction, and punishment for a variety of offenses. The second section, "The Problems of Adaptation and Duration Neglect," provides graphical representations of the punishment amount experienced by prisoners, and shows how punishment amount and the length of prison terms have a more complex relationship than is traditionally assumed.

THE PROBLEM OF LOW PUNISHMENT RATES

Table 1

Type of Offense	(a) Number Committed	(b) Number Reported (% of col. a)	(c) Number of Arrests (% of col.. a)	(d) Number Convictions (% of col. a)	(e) Prison Sentence (% of col. a)	(f) Avg. Sentence Imposed (months)	(g) Avg. Time Served (months)
Total	25,505,600	10,264,938 (40.2%)	2,229,674 (8.7%)	330,372 (1.3%)	242,708 (1.0%)	78	40 (51% of col. f)
Murder and Non-Negligent Manslaughter	NA	13,896 ---	13,227 (95.2%)	Fed = 345 State = 9,158 (68.4%)	Fed = 283 State = 8,792 (65.3%)	Fed = 94.2 State = 263.0	Fed = 63.6 State = 136.0
Rape	147,160	76,939 (52.3%)	27,469 (18.7%)	Fed = 347 State = 11,622 (8.1%)	Fed = 311 State = 9,762 (6.8%)	Fed = 84.5 State = 147.0	Fed = 46.1 State = 81.0
Robbery	731,780	377,457 (51.6%)	106,130 (14.5%)	Fed = 1,514 State = 38,784 (5.5%)	Fed = 1,579 State = 34,130 (4.9%)	Fed = 93 State = 106.0	Fed = 59.5 State = 54.0
Assault	5,330,010	808,776 (15.2%)	478,417 (9.0%)	Fed = 286 State = 71,060 (1.3%)	Fed = 253 State = 51,163 (1.0%)	Fed = 33.0 State = 66.0	Fed = 27.1 State = 38.0
Burglary	3,443,700	1,807,157 (52.5%)	289,844 (8.4%)	Fed = 58 State = 87,957 (2.6%)	Fed = 57 State = 65,968 (1.9%)	Fed = 32.6 State = 52.0	Fed = 25.0 State = 24.0
Larceny-Theft	14,915,900	6,109,538 (41.0%)	1,166,362 (7.8%)	Fed = 1,470 State = 93,253 (0.6%)	Fed = 1,394 State = 57,958 (0.4%)	Fed = 27.3 State = 37.0	Fed = 12.8 State = 17.0
Motor-Vehicle Theft	937,050	1,071,175 (114.3%)	148,225 (15.8%)	Fed = 150 State = 14,368 (1.5%)	Fed = 139 State = 10,920 (1.2%)	Fed = 28.0 State = 35.0	Fed = 23.2 State = 15.0

Column (a): U.S. Department of Justice, Bureau of Justice Statistics, Criminal Victimization in the United States, 2000 Statistical Tables, Table 91, at <http://www.ojp.usdoj.gov/bjs/pub/pdf/cvus00.pdf>. [last visited May 15, 2003]

Column (b): Offenses known to police (2000), Table 3.112, Sourcebook of Criminal Justice Statistics 2001, at <http://www.albany.edu/sourcebook/1995/pdf/t3112.pdf>.

Column (c): Estimated number of arrests (2000), Table 4.1, Sourcebook of Criminal Justice Statistics 2001, at <http://www.albany.edu/sourcebook/1995/pdf/t41.pdf>.

Column (d): Disposition of cases terminated in U.S. District Courts (2000), Table 5.17, Sourcebook of Criminal Justice Statistics 2001, at <http://www.albany.edu/sourcebook/1995/pdf/t517.pdf> (federal). Felony convictions in State courts (1998), Table 5.42, Sourcebook of Criminal Justice Statistics 2001, at <http://www.albany.edu/sourcebook/1995/pdf/t542.pdf> (state).

Column (e): Defendants sentenced in U.S. District Courts (2001), Table 5.25, Sourcebook of Criminal Justice Statistics 2001, at <http://www.albany.edu/sourcebook/1995/pdf/t525.pdf> (federal). Felony sentences imposed by State courts (1998), Table 5.43, at <http://www.albany.edu/sourcebook/1995/pdf/t543.pdf> (state) (numbers determined by converting percentages incarcerated back to totals through Table 5.17 supra).

Column (f): Sentences imposed in cases terminated in U.S. District Courts (2000), Table 5.19, Sourcebook of Criminal Justice Statistics 2001, at <http://www.albany.edu/sourcebook/1995/pdf/t519.pdf> (federal). Mean and median length of felony sentences imposed by State Courts (1998), Table 5.46, Sourcebook of Criminal Justice Statistics 2001, at <http://www.albany.edu/sourcebook/1995/pdf/t546.pdf> (state).

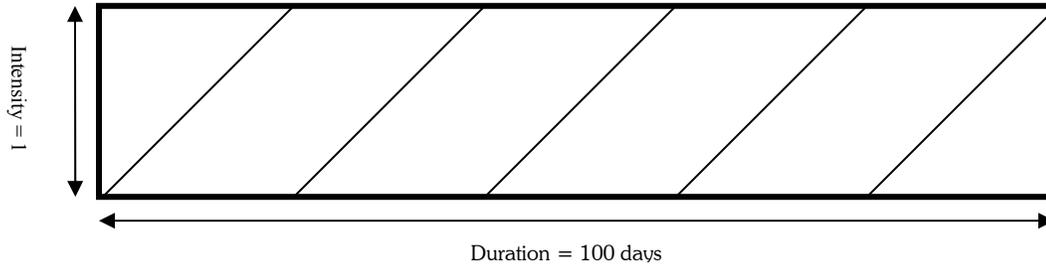
Column (g): Time served to first release by Federal prisoners (2000), Table 6.52, Sourcebook of Criminal Justice Statistics 2001, at <http://www.albany.edu/sourcebook/1995/pdf/t651.pdf> (federal). Estimated time to be served in State prison (1998), Bureau of Justice Statistics, Table 1.5, at <http://www.ojp.usdoj.gov/bjs/pub/pdf/scscf98.pdf> (state).

THE PROBLEMS OF ADAPTATION AND DURATION NEGLECT

The studies in the text suggest that the reality of the prison experience is better represented by Bar 2 below (the adaptation calculation), rather than by Bar 1 (the naive calculation system). Consider those two bars. Assume that the affect associated with a day in prison is a negative 1. (We will now drop the negative sign, since it will be constant in all of the calculations. That means that a larger number represents an experience that is affectively worse than an experience with a smaller number.) Therefore, under what we have called the naive calculation system in Bar 1 a jail term of 100 days is registered as 100 negative units, since we assume the affect associated with a day in prison is always about the same as the affect associated with any other day in prison. Under the assumption of Bar 1, if we double the length of prison sentence we double the punishment achieved.

But the empirical findings we cite above hold that the perceived negativity of each objectively equally awful day of punishment experience perceptually declines somewhat over the period of time that the person spends in confinement. This is shown for the 100 day period in Bar 2 below. Note the implication for the total punishment amount of the longer period. By the end of the 50th day of the sentence, the intensity of the punishment experienced is less than it was at the start of the sentence. The next 50 days does not accomplish a doubling of the punishment, because the intensity of the punishment has already declined and continues to decline over the remaining period. Without attempting to assign a precise value in punishment units, the value of the 100 day prison experience will be significantly less than the 100 punishment units experienced under the naive assumptions in Bar 1.

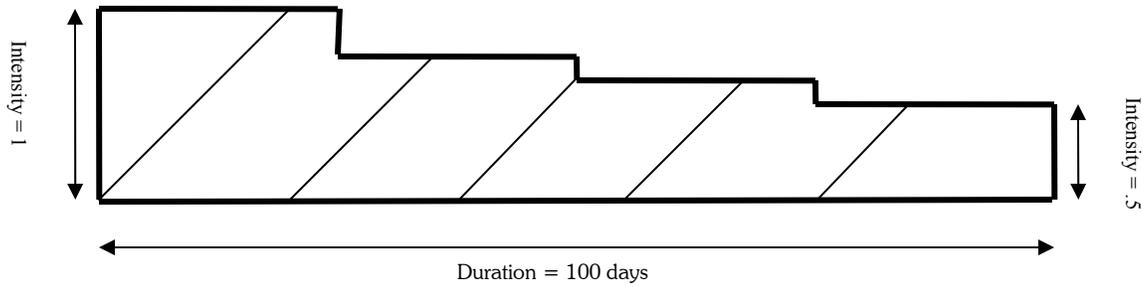
BAR 1
“Naïve Calculation”



Total Punishment
Unit Calculations*

100 units

BAR 2
“Adaptation Calculation”



<100
>50
units

* Punishment unit calculation = Intensity x Duration = total area within the bar

This aspect of adaptation to punishment is problematic because it means that imprisonment becomes increasingly less cost-efficient as punishment. Each unit of prison time will have a near constant cost, but the punitive bite of each unit will become increasingly less.

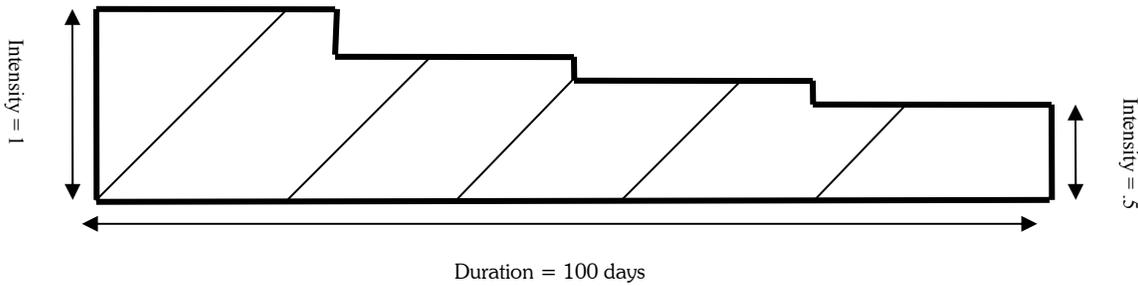
Still, it is important to see that what remains common to both of these representations is that the *duration* of the negative experience is a strong determinant of the negative quality of the experience that is retained in memory by the punished individual. More specifically, the duration of the punishment interacts multiplicatively with its intensity to produce the total punishment amount of the prison experience. In the Bar 2 cases, the intensity of the punishment declines as the days pass, so we have to multiply the duration of the punishment by the *average intensity* rather than assuming the high and level intensity shown in Bar 1. This general assumption of the approximate multiplicative effect of the duration of punishment is the conventional wisdom.

However, recent psychological research suggests that duration does not play anything like the major role that intuition gives it in determining punishment amount. Instead, in these experiments the amount contributed by duration to the remembered experience of pain was small. In other experiments, participants generally declined to experience a shorter period of intense pain, and preferred to experience a longer period that began with an intense pain of the exact duration of the one in the shorter period, and then, without the subjects becoming aware of it, added a period of less-intense pain. If duration were given the weight that conventional wisdom assumes, the subjects would have chosen to repeat the shorter pain experience. But they did not. To explain these results, Kahneman suggests that people retain a 'snapshot' of the negative experience that pools by averaging two aspects of the painful episode: the affective value of the most extreme pain experienced during the episode and the affective value of the pain experienced near its end.

The results of these studies are completely neglected by the conventional wisdom, which includes the duration of the punishment as a multiplicative determinant of its total pain as depicted in Bar 2 (reproduced below). Under the duration-influenced punishment calculation, for the sentence in Bar 2, which lasted 100 days, the punishment effect is less than 100 and more than 50, depending on the precise extent and timing of the adaptation step-downs in intensity. But the remembered punishment amount registered under the 'duration neglect' calculation of Bar 2 is the average of the sum of the maximum intensity (1, at the start) and the end intensity (.5), giving a total remembered punishment amount of 75+.

Now compare this to a much shorter sentence, as represented in Bar 3 below, which represents a relatively short sentence that manages to be as aversive at its end as at its beginning. The startling realization is that this short sentence will be experienced as more aversive than a much longer sentence that is equally aversive at the beginning but less so at the end! The point here is that lengthening sentences may actually reduce their recalled negative character if the end experiences are relatively less aversive!

BAR 2
“Standard Duration Calculation”



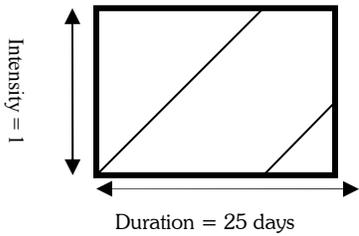
Standard “Duration”
 Calculation*

“Duration Neglect”
 Calculation**

<100
 >50

.75+

BAR 3
“Duration Neglect Calculation”



25

1.0

* Standard “duration”
 calculation: Intensity x Duration (total area within the bar)

** “Duration Neglect”
 calculation: $\frac{\text{Maximum Intensity} + \text{End Intensity}}{2}$ (memory of a longer duration is a minor extra feature, represented by a “+”)

¹⁰⁰ Levitt reports that:

States in which juvenile punishments are lenient relative to adult punishments see much greater declines (or smaller increases) in crime as a cohort passes to the adult court. For example, in states in which the juvenile courts are most lenient vis-a-vis the adult courts, violent crimes committed by a cohort fall by 3.8 percent on average when the age of majority is reached. In contrast, violent crimes *rise* 23.1 percent with passage to the adult criminal justice system in those states in which the juvenile courts are relatively harsh compared to the adult court.

Levitt, *Juvenile Crime and Punishment*, above n [6] at 1159.

¹⁰¹ Terry M. Williams, *The Cocaine Kids: The Inside Story of a Teenage Drug Ring* (1989) at 19.

¹⁰² Anup Malani, *Does the Felony Murder Rule Deter? Evidence from the FBI Crime Data* (unpublished manuscript).

¹⁰³ *Ibid* at 22.

¹⁰⁴ *Ibid* at 305.

¹⁰⁵ One could speculate that those criminals who know of the felony-murder rule and nonetheless have undertaken the offense are persons who have already judged that the risk of death-causing conduct is worth taking.

¹⁰⁶ See Robinson & Darley, *At Its Worst*, above n [7], at ??.

¹⁰⁷ Our conclusions are consistent with another recent review of aggregate effect studies authored by Anthony Doob and Cheryl Marie. See Anthony Doob and Cheryl Marie Webster, 'Sentence Severity and Crime: Accepting the Null Hypothesis' in Michael Tonry (ed) *Press. Crime and Justice: A Review of Research. Volume 30* (2003). As they point out, 'most of these reviews (of the impact of sentence severity on crime levels) have concluded that there is little or no consistent evidence that harsher sanctions reduce crime rates in western populations.' They argue that, based on the weight of the evidence, including recent evidence made available by 'three strikes' laws, we should now accept the conclusion that we will not obtain general deterrence effects by alterations in sentence severity that are 'within the limits that are plausible in western countries.'

¹⁰⁸ See V.A.C. Gatrell, *The Hanging Tree* at 59-60 (1994).