Elaborating the Individual Difference Component in Deterrence Theory

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Abstract

Deterrence theory and criminal justice policy hold that punishment enhances compliance and deters future criminal activity. Empirical research, however, is decidedly mixed, with some studies finding that punishment weakens compliance, some finding that sanctions have no effect on compliance, and some finding that the effect of sanctions depends on moderating factors. In this review, we do not consider whether sanctions affect compliance but instead consider the conditions under which sanctions affect compliance. Specifically, we focus on understanding the kinds-of-people dimension of sanctions and deterrence to include individual differences (in social bonding, morality, discount rate, impulsivity, social network position, decision-making competence) and situational differences (in emotions, alcohol/drug use). Upon reviewing the empirical evidence, we identify important gaps for theoretical and empirical work and comment on how this work relates to public policy.

INTRODUCTION

Criminal justice policy relies heavily on the notion that punishing criminal activity secures compliance with the law (Beccaria 1764 [1986], Kennedy 2009, Kleiman 2009). Punishing crime has two crime control consequences: (*a*) It may prevent the person being punished from committing another crime, and (*b*) it may prevent others who are contemplating crime from committing the act.[1] The first crime inhibition mechanism is specific deterrence; the second is general deterrence. A voluminous literature addresses this topic, some of which supports the view that punishment enhances compliance, some that punishment weakens compliance, some that sanctions have no appreciable effect on compliance, and some that sanctions/compliance depend on several moderating factors (Paternoster 1987, Nagin 1998, Pratt et al. 2006).

The unsettled empirical status of the effect of sanctions is perhaps most clearly evident from the Minneapolis Domestic Violence Experiment (MDVE) and its replications in the Spouse Abuse Replication Program (SARP). In the original Minneapolis study, researchers experimentally evaluated the effects of arrest, mediation, or separation on offenders' subsequent domestic violence and found that arrest deterred most effectively (Sherman & Berk 1984; see also Berk & Newton 1985 for a replication in California). This result was consistent with specific deterrence; that is, a more severe sanction (arrest) should inhibit future domestic violence more than a less severe sanction should (mediation or separation). In fact, the authors of the original study argued for a presumptive police policy of arrest in misdemeanor domestic violence cases, a policy adopted by many police departments throughout the country.

In the replications of this experiment in other cities, however, the results did not consistently or clearly favor arrest as the preferred police response to a domestic violence call. In the replication conducted in Charlotte, North Carolina, for example, neither follow-up interviews with victims nor police records indicated that arrest was a more effective deterrent to domestic violence than either issuing a citation or separating the parties involved (Hirschel & Hutchinson 1992). The evidence in the Omaha, Nebraska, replication also did not clearly favor arrest as a superior deterrent (Dunford et al. 1992). The replication conducted in Milwaukee, Wisconsin, however, was consistent with the earlier Minneapolis study in showing that arresting suspects produced a greater deterrent effect than alternative police responses, at least in the short term (Sherman et al. 1992). Findings from the Dade County, Florida, site indicated that arrest had a deterrent effect on employed offenders but seemed to make things worse for those who were unemployed (Pate & Hamilton 1992). Analyses in the other sites sometimes confirmed the finding that arresting a suspect in a misdemeanor domestic violence case had a deterrent effect depending on the suspect's personal characteristics. Although even this conditional effect was not consistent, arrest seemed to have a deterrent effect on those suspects who had stronger social bonds (had jobs or were married) but seemed to escalate violence when the suspect had weaker bonds (Berk et al. 1992, Sherman & Smith 1992, Sherman et al. 1992). The more general point is that the results of these experiments suggest that the key question is not whether sanctions deterred, but under what conditions or for which kind of persons they deterred, and when and for whom they made things worse or were simply irrelevant.

The suggestion from the original MDVE and its replications that the specific deterrent effect of sanctions is likely not uniform but conditional is also evident from empirical work on general deterrence. After careful perusal of the literature, one cannot but be struck by the fact that the effect of sanctions or sanction threats

[1]There is a third crime control consequence of punishment, incapacitation, that is not explored here (a comprehensive review exists in Nagin et al. 2009). Incapacitation refers to the use of punishment (incarceration) to prevent crime by physically restricting would-be offenders from mingling in conventional society, thereby denying them the opportunity to commit crimes (at least against the public).

is far from homogeneous and depends on several other factors. The field has understood this for quite some time and has settled on reframing the question regarding the role of sanction threats in compliance with the law. Following this understanding, we argue in this review that the issue is not whether sanctions affect compliance but rather under what conditions sanctions affect compliance.[2] Herein, we focus on understanding the kinds-of-people dimension of sanctions and deterrence to include individual differences (in social bonding, morality, discount rate, impulsivity, social network position, decision-making competence) and situational differences (in emotions, alcohol/drug use). Upon reviewing the empirical evidence, we identify important gaps for theoretical and empirical work and comment on how this work relates to public policy.

BRIEF OVERVIEW OF DETERRENCE THEORY

Rooted in conceptions of free will, deterrence is concerned with how sanction threats and the imposition of sanctions inhibit criminal activity from occurring in society at large (in the case of general deterrence) and with the persistence of crime among offenders (in the case of specific deterrence). Sanctions are presumed to deter future crime to the extent that punishment is certain, swift, and severe enough to outweigh the reward obtained from crime commission. Certainty relates to the likelihood or risk of detection and subsequent punishment, swiftness refers to how quickly the sanction is applied after the offense and subsequent detection, and severity refers to the strength or magnitude of the punishment. Moreover, deterrence is a perceptually based phenomenon or a social psychological theory, as individuals must perceive sanction threats to be affected by them (Geerken & Gove 1975). As Beccaria (1764 [1986], p. 75) noted, "[S]ee to it that men fear the laws and nothing else." Assuming that humans are rational actors who weigh the costs and benefits when deciding whether to offend, sanction threats and imposed punishments are presumed to inhibit initial criminal activity and deter its subsequent recurrence by increasing the costs of crime.

EXTENSIONS OF THE BASIC DETERRENCE MODEL

The essence of the deterrence model laid out by Beccaria and followed by Bentham remained largely intact in criminology until Becker (1968) integrated economic/utility ideas into the crime decision-making process (cf. Bushway & Reuter 2008). Zimring & Hawkins (1973) furthered the interdisciplinary study of deterrence and the legal system, and Andenæs (1974) laid out hypotheses regarding the extent to which sanction threats and sanction imposition operate across types of persons and types of offenses. In addition, important theoretical extensions were outlined in the 1980s and 1990s, some of which we discuss next.

First, Williams & Hawkins (1986), though not claiming that the formal aspect of deterrence is ineffective, argued that formal sanction threats deter crime largely by triggering informal sanction threats. Examples of this latter form of sanction threat are perceptions of those close to the offender (family, peers) as well as the internal emotions that may ensue as a function of punishment (shame, guilt). These informal sanction threats are important deterrents to criminal activity. Second, Cornish & Clarke (1986) furthered deterrence theory by incorporating elements of the rational choice perspective in an effort to parcel deterrence into a situationally based theory of crime that focuses on the risks and rewards associated with specific offenses in specific locations. This extension also highlighted important policy proscriptions for the prevention of specific crime types, largely because the risks and rewards associated with particular offenses may be perceived and viewed as more modifiable

[2] Forty years ago, Tittle (1969, p. 411) argued that "[t]he crucial question is not simply whether negative sanctions deter, but under what conditions are negative sanctions likely to be effective."

than others. A third extension involved a particular focus on the benefits associated with crime (Katz 1988). Importantly, the notion of benefits in Katz's theory was more than just instrumental, insofar as offenders may also derive emotional/mental benefits that are intangible and perhaps unrelated to the ability of deterrence to operate. A fourth extension was put forth by Stafford & Warr (1993), who furthered deterrence theory with respect to sanction perceptions by focusing attention on notions of personal and vicarious experiences in sanction threat perception (and its formation) as well as the punishment and punishment avoidance outcomes associated with criminal activity.

A vast amount of empirical research has been carried out on critical aspects of the deterrence framework, and exhaustive and competent reviews of this evidence exist elsewhere (Nagin 1998, Pratt et al. 2006, Kennedy 2009, Kleiman 2009). One of the key findings from the past 25 years of deterrence research is that threats and punishments have varying effects across the sanctioned population. People appear to respond differently to sanction threats and punishments such that an average effect of sanctions on crime at the individual level may do more to obfuscate than to clarify our knowledge regarding the deterrence process and the ability of sanctions to deter crime and foster compliance. Therefore, it is critical to establish which attributes can be used to sort individuals, such that we may better investigate how deterrence operates locally within subsets of potential offenders to parse out more policy-useful effects.

DIFFERENTIAL DETERRABILITY: HOW DO THE EFFECTS OF SANCTIONS VARY ACROSS INDIVIDUAL CHARACTERISTICS?

The deterrence hypothesis is but one of the many ways that sanctions can influence behavior. Importantly, other theories make vastly different predictions concerning the effect of sanctions on future crime and compliance. For example, although deterrence theory anticipates that sanctions deter future crime and increase compliance, labeling theory predicts that sanctions are stigmatizing and, in turn, increase future crime. Furthermore, defiance theory and reintegrative shaming theory (Sherman 1993, Braithwaite 1989) hypothesize that the effect of an imposed sanction depends not only on its content but also on how that sanction is imposed and the level of bonding between the sanctioning and sanctioned parties. In short, the effect of sanctions on compliance is not one size fits all, and it is important to recognize the differential deterrability that exists across different people with respect to sanction threats. As such, it may be more profitable to think of a general theory of sanctions rather than deterrence, labeling, or defiance theory. A general theory of sanctions would simply argue that sanctions and sanction threats are important components of compliance, leaving it to be determined the conditions under which we could expect the direction of that effect to be positive, negative, or null. In this section, we explore the varying effect of sanctions across several individual characteristics including (*a*) social bonding; (*b*) morality; (*c*) some individual differences such as impulsivity, high discount rate, or low self-control; (*d*) emotional/pharmacological arousal; (*e*) position in a social network; and (*f*) decision-making competence. This discussion is not intended to be comprehensive; rather, it provides examples that are germane to the influence of individual characteristics on sanction variability.

Social Bonding

The recognition that deterrence is conditional owes its intellectual heritage to the work on stakes in conformity (Toby 1957, Briar & Piliavin 1965) and to Packer's (1968, p. 45) early observation that "deterrence does not threaten those whose lot in life is already miserable beyond the point of hope."[3] Briefly, this

[3]Toby (1964, p. 333) was not always consistent with this line of reasoning, arguing that what prevents most people from

perspective argues that individuals will refrain from criminal acts largely because they fear losing the investments they have made in various prosocial domains (family, education, employment); the more there is to lose in the way of conventional investments, the greater the deterrent effect. Those with little or nothing to lose, therefore, would have little to fear from sanctions and would be more difficult to deter with legal threats.[4] Viewed in this way, sanctions largely deter not because people fear the formal sanctions themselves but because sanctions will put at risk investments in conformity that might have been forged over the years. These investments would include, but would not be limited to, investments in social relationships such as marriage and investments in jobs or an education. Although the idea predates their influential book, this point was developed by Zimring & Hawkins (1973, p. 128), who argued that "personal success makes an individual more susceptible to the influence of threats because success determines the amount of investment in society an individual puts at risk when committing a threatened behavior." In short, crime—and more importantly detection and punishment—stands to damage the investment one has made in different facets of their lives.

A prominent empirical example of this argument emerged from the large-scale domestic violence experiments discussed above. As we noted, in many of these studies sanctions had a deterrent effect only on those who were already well bonded to a conventional life by way of marriage or employment; for those not as well bonded to others, sanctions often made things worse.[5] In 1994, Nagin & Paternoster elaborated on this idea in an attempt to explicitly integrate deterrence/rational choice theory with social control theory. They argued that the social bond was established as a series of investments in conformity (conventional attachments and commitments) but added the notion that two individual differences, present orientation and self-centeredness, made such investments unlikely. Because they make fewer investments over time, those with a present orientation and who are self-centered are less likely to be deterred by sanction threats because they have little to lose from being apprehended for a crime. The empirical results generally confirmed their theory.

Among certain individuals in certain situations, the drive toward committing a crime may be strong because they have so little to lose that no threat will prevent their offending (Zimring & Hawkins 1973, p. 135). Conversely, for very serious criminal acts and among those individuals who hold strong morals in line with the law, a higher rate of compliance can be attributed largely to a sense of right and wrong rather than to any greater sensitivity to sanction threats (p. 121). These assumptions suggest that one's moral position with respect to a given rule is an important individual characteristic that would moderate the effect of sanctions and sanction threats. Although often considered a component of the social bond, we think moral beliefs warrant separate treatment.

Moral Inhibition

Whether it is viewed as a component of social control theory or a separate source of compliance, the depth of an individual's moral

committing crimes is that they are adequately socialized (inhibited by moral sentiments) and that "only the unsocialized (and therefore amoral) individual fits the model of classical criminology and is deterred from expressing deviant impulses by a nice calculation of pleasures and punishments. Other things being equal, the anticipation of punishment would seem to have more deterrent value for inadequately socialized members of the group." This is a line of argument developed most recently by Pogarsky (2002) and Wright et al. (2004).

[4]This was more eloquently put by the much-admired criminologist Bob Dylan in "Like A Rolling Stone" as "when you've got nothing, you've got nothing to lose." This was followed up by the hard rock band Arcade, who similarly commented, "when you ain't got nothing, you got nothing to lose."

[5]Sherman's (1993) defiance theory was developed, in large part, to provide a theoretical explanation for this empirical observation. In defiance, Sherman argues that individuals may respond to sanctions with less crime if they have some type of prosocial ties/bonds, but absent those ties they may respond to sanctions with more crime.

commitment to a rule or the extent to which they morally condemn a certain behavior moderates the impact of sanction threats. Scholars as diverse as Durkheim and Parsons (Fish 2005) and Etzioni (1988) have argued that self-interest cannot be the only or even the most important reason people obey rules. Many of us follow rules not out of self-interest but out of a sense of moral obligation or duty. We frequently obey rules because we think it is the right thing to do and not because we think we would get caught and punished for violating the rule. I may, for example, think that driving while intoxicated is a terribly wrong thing to do, so I refuse to drink and drive, regardless of whether there might be police sobriety checkpoints set up that night and, if so, on which particular streets. Independent of any cost or benefit considerations, therefore, one's moral commitment to the rules likely restrains many illegal acts such that deterrence factors are simply not salient. As McPherson (1984, p. 77) noted, "[T]here are too many subtle opportunities to cheat, and too few police officers, to make it plausible that the only effective motives supporting moral behavior are the prospects of financial or criminal penalties for immorality."

There are both between-person differences in the extent to which persons are morally socialized to obey rules out of a sense of duty and variation across offenses for the same person. So some persons are more strongly inhibited by moral restraints than others, and for any given person, moral condemnation may be more strongly felt for some offenses (murder, drinking and driving) than others (tax cheating, marijuana use). Deterrence should have very little impact when moral inhibitions are particularly strong but should have a much more profound effect in the absence of moral restraints. Morally taboo acts are not, therefore, subject to considerations of cost and benefit but are decidedly important when actors are less morally restrained. This point is elaborated by Etzioni (1988, p. 77), who argued that at times moral rules create nonmarket areas for certain people and/or for certain behaviors: "[W]hen moral commitments are prominent they in effect create nonmarkets in some areas, rather poor ones in others." In these nonmarket areas, individuals pursue courses of action without regard to instrumental considerations because, once moral rules are internalized, "individuals pursue what they consider to be a moral line of behavior even in the absence of external sanctions" (Etzioni 1988, p. 46). It is in so-called market areas, however, where we would expect to see a greater salience for the expected costs and benefits of one's actions and, therefore, a more important role for deterrent effects: "[T]he reverse is true when moral commitments slacken; additional incentives or sanctions need be introduced if the same level of compliance is to be sustained" (Etzioni 1988, p. 46). Recently, Wikström (2006) has made moral considerations and the prediction of a moderating effect of morality on the relationship between sanction threats and crime central components of his situational action theory of crime.

Empirical research has borne this prediction out on numerous occasions with many different offenses. Bachman et al. (1992) found that perceived costs and benefits affected one's self-reported intention to commit sexual assault but only in the presence of weak moral inhibitions about such behavior. Among those whose moral condemnation of sexually aggressive behavior was strong, deterrent influences were nil; among those whose moral commitments were weaker, however, the perceived benefits and costs of sexual assault mattered. Paternoster & Simpson (1996) found a similar moderating effect for white-collar crimes, and recently Gallupe & Baron (2010) found the same for drug use.

Self-Control, Impulsivity, Discounting

Early on, Fry (1951, p. 83) recognized that deterrence may operate differently among present-oriented versus future-oriented individuals by observing that the former are "limited to the recent past and the immediate future" and that, for them, the "emotional force of present desire is overwhelming in contrast to the apprehension of future pain." Zimring

& Hawkins (1973, pp. 99–100) furthered this expectation by noting that the future-oriented person is more likely to forgo the immediate rewards from crime, whereas the present-oriented person is more likely to embrace immediate rewards. More recently, it was Wilson & Herrnstein (1985, p. 50) who underscored the importance of "discounting," whereby individuals devalue future consequences with respect to criminal behavior. Conversely, Gottfredson & Hirschi (1990) have argued that individuals with low(er) self-control will be less responsive to sanction threats and punishment than those with high(er) self-control. In short, this specific individual difference, whether impulsivity, self-control, or time discounting, is one of the most studied of all individual differences with respect to differential deterrence.

Nagin & Paternoster (1993) were among the first scholars to consider how individual differences and deterrence fit together in a rational choice model of offending. They argued and empirically demonstrated that self-control and rational choice variables (costs and benefits of offending) were associated with intentions to engage in criminal acts. In an important extension of their work discussed above, Nagin & Paternoster (1994) found that informal sanction risks interacted with self-control in predicting offending intentions and that the deterrent effect of informal sanctions was greater among those lowest in criminal propensity (i.e., highest in self-control). Piquero & Tibbetts (1996) further examined the direct and indirect effects of self-control on criminal offending as it influenced situationally based rational choice variables. Their structural equation analysis indicated that (low) self-control was associated with a higher perception of offending benefits but a lower perception of formal and informal sanction costs, which then related to intentions to offend.

Nagin & Pogarsky (2001, 2003) undertook two important investigations with respect to impulsivity and self-serving bias as it relates to the deterrence/offending association. In their first investigation, they outlined a model that integrated impulsivity and extralegal consequences to investigate young adults' intentions to engage in drinking and driving. Their analysis indicated that both sanction certainty and sanction severity predicted offending, but sanction celerity did not; extralegal consequences were as important as legal consequences in deterring drinking and driving, the certainty of punishment was a greater deterrent than was the severity of punishment, and most importantly, the influence of sanction severity diminished as individuals became more present oriented.[6]

Continuing their incorporation of situational and individual difference theories of crime and specifically assessing the role of self-serving bias, i.e., the tendency for individuals to shade judgments in a manner favorable to themselves,[7] Nagin & Pogarsky (2003) next conducted a randomized experiment in which college undergraduate students could earn extra payment by cheating on a quiz.[8] Their

[6]Their analysis used the economic concept of time discounting. In their analysis, the discount rate represented the "economic embodiment of present-orientation with higher discount rates reflecting a greater propensity to reduce the weight afforded delayed consequences" (Nagin & Pogarsky 2003, p. 879). Specifically, they found that individuals with higher discount rates were more willing to drive while intoxicated.

[7]According to Nagin & Pogarsky (2003, p. 174), self-serving bias "was measured with a scale consisting of participants' responses to two hypothetical scenarios, each of which posed a minor mishap involving the respondent and another individual, for which each side shares fault. The first involves the spilling of a pitcher of beer in a bar, and the second involves a minor car accident in a parking lot. Participants provided 7-point Likert responses to each scenario ranging from: 'I am completely at fault' to 'They are entirely at fault.' The two responses were summed to create an index ranging from 2 to 14, with larger scores indicating greater self-serving bias . . . . [S]cores were dichotomized to create a variable 'high self-serving bias' that distinguished participants scoring 10 or higher on this scale, a level placing them in the upper fifteenth percentile of the distribution of scores."

[8]It is important to review the methodology underlying this study. As Nagin & Pogarsky (2003, pp. 172–73) indicate, prior to beginning "participants were instructed that the final page of the survey contained eight multiple-choice trivia questions, each with five possible answers. Participants were told that answering at least six questions correctly would entitle them to a $10 bonus over and above the $10 payment for participating in the experiment. The trivia questions were intended to be so obscure that it would be exceedingly unlikely

analysis indicated that perceived sanction certainty lowered the prevalence of cheating but that perceived sanction severity had no effect on the prevalence of cheating and that the likelihood of cheating was heightened among individuals with more present orientation or those who were prone to self-serving bias.[9]

Nagin & Pogarsky (2004) built on these earlier efforts to examine the relationship between time discounting and punishment or the notion of delayed consequences. More specifically, these authors used data from Add Health, a large national sample of adolescents, to explore why potential sanction threats often do not deter criminal offending. Two hypotheses were put forth: (*a*) time discounting, or the tendency to deliberatively devalue the future,[10] and (*b*) poor impulse control, or the failure to consider the future.[11] Analyses indicated that although both forms of present orientation independently predicted several problem behaviors, high discounting was a better predictor of deliberative or future-related problem outcomes, whereas poor impulse control was a better predictor of urge-driven behaviors or conduct involving little forethought. At the same time, poor impulse control but not high discounting predicted violence, whereas high discounting was a stronger and more consistent predictor of property offending.

Recognizing that there has been little investigation about deterrence perceptions among offenders generally or about how individual differences moderate the relationship between sanction threats and offending among offenders in particular, Pogarsky (2007) used data from a large sample of probationers to examine how self-control moderated the sanction threat/offending association. His analysis revealed that although offenders' threat perceptions were associated with whether they successfully completed the probation program, low(er) self-control did not eliminate these deterrent effects, and in fact, deterrent effects were stronger for those with low(er) self-control.[12]

for participants to know even one correct answer, let alone six out of eight . . . . The quiz was designed so that it would be virtually impossible to earn a bonus by guessing . . . . Following instructions about the bonus opportunity, participants were directed to a separate sheet of paper in their materials that contained a duplicate trivia quiz. Participants were instructed that the reverse side of the duplicate quiz listed the correct answers. They were told that the answers were provided because at the end of the session, while the experimenter was collecting the materials and preparing for payment, there would be some administrative downtime. It was only during this final period they were told that they could satisfy their curiosity and peruse the correct answers. They were instructed that they were not permitted to look at the answer sheet until they had finalized their entire survey. Naturally, providing the answers afforded each subject an opportunity to cheat. Indeed, the obscurity of the trivia questions and miniscule bonus probability from guessing combine to form the premise of the experiment."

[9]Loughran et al. (2011a) further develop the potential mechanisms of offender self-serving bias by studying the association between overconfidence and offending. Using data from two separate samples—one of high school students involved in predominately less serious crimes (e.g., underage drinking, petty theft) and one of active offenders engaged in more serious crimes (e.g., stealing, assault)—the authors developed a measure of perceived offending skill based on two unique sets of offender risk perceptions. The first set of these perceptions was based on questions designed to elicit how likely an individual believed he or she would be caught for a certain set of crimes, which they term self-risk. The second set were based on a set of questions designed to elicit how likely the individual believed someone else would be caught for same set of crimes, which they term other risk. Loughran and colleagues then defined overconfidence as the difference between self and other risk—in other words, when a potential offender perceived someone else was more likely to be caught for a crime than themselves, this could be a manifestation of a self-serving bias (since, as the authors point out, neither of these perceptions is known with absolute certainty). Their results showed that this measure of overconfidence was both highly prevalent in risk perceptions across both samples and highly associated with higher rates of offending and arrest across a wide span of crimes, even after controlling for risk.

[10]The discounting measure contained two items reflecting the importance respondents placed on the future when making decisions: (*a*) "[E]stimate the chances you would live to age 35" and (*b*) "[H]ow often during the past week have you felt hopeful about the future?"

[11]The poor impulse control measure contained two items reflecting the tendency to act without considering the consequences: (*a*) "[I]f you wanted to use birth control, how sure are you that you could stop yourself and use birth control once you were highly aroused or turned on?" and (*b*) "when making decisions, you usually go with your 'gut feeling' without thinking too much about the consequences of each alternative."

[12]Still, the extent to which active street offenders consider the costs and rewards of crime may provide some evidence that even among those with high criminal propensity/low

In other important components of their work relevant to this review of individual differences in deterrence, Nagin & Pogarsky (2001, 2004) integrate a discount rate into the traditional expected utility (EU) model of deterrence. To the traditional utility function they added another parameter, δ, which is a discount factor that assigns a weight to future costs. The EU model now becomes

$$\text{U(benefits)} > \delta_t p \ \text{U(legal costs + extralegal costs)},$$

where the expected legal and extralegal costs of offending are scaled by $\delta_t = [1/(1 + r)]^t$. The extent to which costs are scaled depends on how many time periods the legal and extralegal sanctions are delayed, t (which captures the celerity of punishment), and r (which is the individual's discount rate). The discount rate is the extent to which the person reduces the value of future objects; those with a high discount rate are more impulsive and less patient. Notice what happens to the costs of crime when the discount rate increases from 0.10 to 0.20 (and the delay is equal to one time period). When $r = 0.10$, the discount factor is equal to 0.91. As Nagin & Pogarsky (2001, p. 872) illustrate, when the present value of a fine is $1,000, the value delayed by one time period falls to $909 with a discount factor of 0.91. When the discount rate is increased from 0.10 to 0.20, the discount factor becomes 0.83, and the value of a $1000 fine for a more impulsive individual is $833. They also show how the discount factor provides an operational understanding of the celerity of punishment. At a fixed discount rate, when the expected delay in punishment, t, increases, the discount factor also increases.

According to this deterrence model, then, the utility of crime decreases as legal and extralegal costs increase. The utility of crime also decreases as the probability of punishment captured by p increases. The magnitude by which punishment produces a disutility is also a function of the value of the discount factor δ_t for each individual. As it decreases, the person places less weight on the cost of future punishment. As can be seen, the value of δ_t declines as t, the time between the act and the sanction (or celerity), increases. Although Nagin & Pogarsky did not directly confront this issue, notice that if Loewenstein (1987) is correct and persons do not view delayed punishment more favorably but less favorably because they want to get their punishment over as quickly as possible, then celerity would have an inverse weight such that delayed punishment is perceived to be more costly than is more immediate punishment. We examine this issue of a negative discount rate below, but the issue as to whether celerity is a positive or negative weight in the utility function is one of the more interesting issues that deterrence researchers will need to address in future research.

One additional complication yet to be investigated in the deterrence literature is the possibility that individuals do not have intertemporal preferences that are consistent over time. Rather, when considering rewards that are delayed for longer periods, individuals tend to have smaller discount rates, yet when considering immediate rewards or those with small time delays, the same individual may exhibit a much larger discount rate, thus increasing their present orientation. Such an inconsistency in an individual's intertemporal preference is known as hyperbolic time discounting.[13]

Results from the behavioral economics literature can perhaps offer further illumination about the relationship between discounting and impulsivity for deterrence. For instance, O'Donoghue & Rabin (2000) differentiate between types of time-inconsistent individuals as either those who can or cannot foresee the

self-control (i.e., they are active offenders), deterrence considerations may manifest (Decker et al. 1993, Shover 1996, Piquero & Rengert 1999).

[13] This name is derived from the shape of such discount function, which takes the form of a hyperbola, as opposed to standard exponential discounting, when individual discount rates are stable over time.

impact of such future costs.[14] They argue that this level of sophistication can help mitigate self-control problems but not necessarily when rewards are immediate. With respect to deterrence, it is possible that discounting and impulsivity are not necessarily mutually exclusive but perhaps work in tandem. Thus, the integration of time preferences for both rewards and costs to crime and the relation of such preferences to the concepts of self-control and impulsivity in deterrence remain open questions.

Using birth cohort data from Dunedin, New Zealand, Wright et al. (2004) examined several hypotheses regarding the interrelationships between individual differences and deterrence. Specifically, these authors (p. 205) examined four sets of expectations: (*a*) that sanctions equally affect crime in the same manner across all persons; (*b*) that sanctions will be least effective among the most criminally prone (i.e., those with the lowest self-control); (*c*) the opposite hypothesis in that sanctions will be most effective among the most criminally prone; and (*d*) that the effect of sanctions on offending will be minimal both for those low in criminal propensity (whose criminal conduct is likely effectively inhibited by noninstrumental factors such as strong moral beliefs) and for those who are highest in criminal propensity (who are exceptionally present oriented and impulsive and thus lack foresight). Their analysis provided consistent evidence in favor of the third hypothesis that, among those with the lowest self-control, deterrence considerations were present and related to criminal offending, whereas among those with the highest self-control, sanction threat perceptions were shown to have little effect on criminal behavior, which is likely because for this subset of individuals other considerations such as moral beliefs prevent offending.

Lastly, Tittle & Botchkovar (2005) examined the interrelationships between self-control, motivation, and deterrence among Russian respondents. Specifically, these authors found that the failure to anticipate long-term consequences did not mediate the link between self-control and crime nor was sanction certainty heightened among those with higher self-control. Motivation, it appeared, may be more important than any type of internal or external control in reducing criminal impulses. In short, the totality of their results indicates that deterrence is not conditional but—when it is—it is greatest for those individuals with the highest criminal propensity.

Using a sample of serious-offending juveniles, Loughran et al. (2009) explored differences in perceptions of risks, costs, and rewards to offending on the basis of accumulated offending experience in terms of offending and arrest. Specifically, they identified a group of highly experienced offenders who displayed lower perceived risks of detection and punishment for crime as well as a group of less experienced offenders who reported higher perceived risk. Although the differences in risk perceptions were not altogether surprising—given that higher-rate offenders may (accurately) adjust their perceptions over time to a lower, more realistic level—what was quite important was that these groups also differed dramatically in terms of personal reward perceptions, with the high-experience group displaying much larger personal reward incentives to offending than the less experienced group. These results indicated some preexisting notions of offending rewards that (*a*) were relatively stable over time, (*b*) were not necessarily driven by experientially based upward adjustment, and (*c*) displayed group-conditional mean levels, which never crossed after a three-year observational follow-up.

Emotional and Pharmacological Arousal

Absent a state of arousal, individuals may be more cognizant of the costs associated with their decisions or at the very least be able to interpret and consider those costs

[14] O'Donoghue & Rabin (2000) refer to those who are not shrewd in their knowledge of time inconsistencies in their own preferences as naifs and those who are as sophisticates.

(Loewenstein et al. 1997). However, under different emotional/pharmacological states of arousal, people may view sanction threats very differently (Zimring & Hawkins 1973, p. 106). For example, when under an emotionally angry state, an individual may not be thinking about the future consequences of their actions and instead focus on the present emotional state and the person/thing responsible for the angry emotion. According to Zimring & Hawkins (1973, p. 106), "[P]ersons guided by impulse rather than judgment, premeditation, or reflection are by definition less likely to be restrained by threats because they are less likely to reflect on the consequences of their act." In short, decisions made under conditions of great emotional arousal may be less susceptible to sanction threats because "very high degrees of emotional arousal may eclipse thoughts of future consequences by riveting all of the potential criminal's attention on his present situation" (p. 136). Similarly, the use of alcohol and/or drugs clouds one's long-term perspective and leads a person to underestimate the long-term costs of his or her actions and focus on the short-term benefits. As Zimring & Hawkins (1973, p. 137) observed, "The ineffectiveness of threat may in some cases be due to the increased affect and more uninhibited emotional expression resulting from drug or alcohol consumption."

Recently, empirical research has investigated the interplay between emotional arousal and deterrence (Loewenstein 1996). For example, Bouffard and colleagues (2000) conducted an interesting experiment in which sexually aroused (those who were exposed to nude photographs from *Playboy* magazine) and nonaroused (those who were exposed to sexually neutral materials from fashion magazines showing women in business suits, dresses, slacks, or pants) males predicted their own sexually aggressive behavior as if they were the character in a hypothetical date rape vignette. Their findings indicated that sexual arousal increased respondents' expectations of their own sexual aggressiveness but that this impact was not mediated by perceptions of the costs or benefits associated with sexual aggression. Moreover, aroused subjects appeared to be very aware of the negative consequences of acting in a sexually forceful manner.

In another experiment, Bouffard (2002) examined the influence of sexual arousal on rational choice decision making in sexual aggression, hypothesizing that sexually aroused subjects would focus on the benefits but not the costs of offending. After viewing sexually arousing (experimental) or nonsexually arousing (control) stimuli, both sets of subjects read a hypothetical date scenario and then were asked to respond to a series of questions indicating their likelihood of engaging in several sexually coercive tactics as well as listing and rating several sanction threat perceptions.[15] Findings indicated that although sexual arousal increased the likelihood of sexual coercion as well as certain perceived benefit (but not cost) perceptions, sanction consequences only partially mediated the effect of arousal on sexual coercion. In particular, including sexual pleasure benefit perceptions rendered the previously significant sexual arousal effect insignificant, indicating some mediation.

Using a hypothetical vignette design, Carmichael & Piquero (2004) examined how rational choice and emotional arousal combine to influence the decision to engage in assaultive violence. Specifically, they examined several hypotheses: (*a*) that rational choice and angry emotions additively relate to assault, (*b*) that perceived anger influences how rational choice considerations are interpreted, (*c*) that rational choice considerations relate to assault differently across different levels of angry emotions, and (*d*) that any deterrent effect of perceived

[15] According to Bouffard (2002, p. 124), "Subjects could be randomly assigned to one of two arousal conditions, or to a no arousal condition. Subjects in the 'nude photographs arousal' condition were asked to review a set of five *Playboy*-type photographs of nude women . . . . Subjects in the 'videotape-arousal' condition were asked to review a ten-minute segment of video-tape that graphically depicted an adult male and adult female engaging in consensual sexual activity. Subjects in the nonaroused, control condition were asked to review a set of five photographs of fully clothed women taken from fashion magazines."

sanction threats vanishes under conditions of high, angry emotions. Most pertinent to our purposes, their analysis of the moderating role of angry emotions generated results consistent with Zimring & Hawkins's view that thoughts of future consequences vanish under high emotional arousal. Specifically, among those who reported high, angry emotional arousal, neither formal nor informal sanctions significantly inhibited assaultive violence.

In a related study, Piquero et al. (2004) used a hypothetical vignette whereby the respondent was singled out for punishment for engaging in a behavior that many others were engaging to examine the interplay between sanctions, self-control, and angry emotional responses. Specifically, they examined how self-control explained whether an individual perceived a sanction as fair/unfair, how sanction perceptions and self-control influenced an angry emotional reaction to being singled out for sanctioning, and whether self-control conditioned the relationship between sanction perceptions and an angry emotional state. These authors found that individuals with low self-control were more likely to perceive sanctions as unfair, that unfair sanctions and low self-control led to perceived anger for being singled out for punishment, and that self-control conditioned the effect of unfair sanction perceptions on angry emotions.

Several studies have explored how alcohol conditions the effect of deterrence in offender decision-making models. For example, Exum (2002) conducted a randomized experiment in which alcohol intoxication and anger arousal levels were manipulated and then examined how alcohol and anger related to intentions to engage in assaultive violence depicted in a bar fight vignette.[16] Results from his analysis indicated that alcohol and anger interacted to increase one measure of aggressivity (other- as opposed to self-referent aggression), but the perceived costs and benefits of violence were unaffected by either type of arousal. Moreover, his investigation of the mediation hypothesis (that the effects of arousal on aggression are mediated by cost/benefit perceptions) indicated that alcohol and anger continued to interact to influence (other-referent) aggression, contrary to the mediation hypothesis. In short, there was little evidence that visceral arousal affects behavior by altering the perceived costs and/or benefits from offending, and instead that visceral arousals make deliberative processes break down.

Location in a Social Network

Network analysis has shown that one's position in a social network influences one's own behavior and the influence one has over others. **Figure 1** shows a rough diagram of three people's positions in a social network (Person A, B, and C). Each node or circle represents a person, and each line represents interaction or communication with the other node or person, with line thickness representing interaction frequency. The importance of understanding one's position within a social network for our concern is that both the ability to be deterred and the ability to deter another are influenced by one's position within the social structure.

In **Figure 1**, Person A is at the center of the network, and he has social interactions and communications with all other members of the group except one (Person C). In addition, these

[16] According to Exum (2002, p. 941), "All participants were randomly assigned to either an 'Alcohol' or a 'No Alcohol' condition. Those in the Alcohol condition were given 1.5 ounces of 50% ethanol (vodka) per 40 pounds body weight (0.045 liters per 18 kg), diluted in a 1:2 solution with orange juice. Those participants randomized to the No Alcohol condition were given 4.5 ounces of orange juice per 40 pounds of body weight (0.135 liters per 18 kg)." Furthermore, "To induce anger, the experimenter falsely accused the participant of arriving 30 minutes late to the research laboratory. The experimenter's accusations were crafted such that the participant knew he had arrived at the scheduled time but was nevertheless unable to offer evidence to counter the experimenter's claims. To compound these unjust accusations even further, the experimenter informed the participant that his payment for participation was in jeopardy as a result of his 'tardiness.' In the 'No Anger' condition, the experimenter neither accused participants of being late nor did he challenge their payment for participation" (Exum 2002, p. 942).

interactions and communications with other persons are the most frequent in the group. Person A clearly touches every member of the group, frequently, and would be a likely source of great social influence. Person B is slightly less central in the group's network. This person has fewer connections with other persons than does Person A, and the interactions and communications that B does have are less frequent than are those of Person A with his others. Person C is the most isolated or peripheral member of the group. Person C has regular interactions with only one other person (a person who is also peripheral), and the interaction/communication C has is not frequent. Person C is unlikely to be a source of much influence. Research in social networks has shown that we are influenced not only by those with whom we have direct contact and interaction but also by those whom they are in contact with. In fact, investigators suggest that there are three degrees of influence such that we are influenced by our direct contacts, our direct contact's contacts, and our direct contact's contact's contacts (Christakis & Fowler 2009). If so, then Person A would not only provide more of a deterrent effect (informally of course) because he is a frequent and diffuse source of communication, but he would also be more easily deterred by others because he has many network connections (i.e., he is a dense member of the social network). Conversely, Person C would not be a good source of deterrence for others (because she would influence so few others) nor would she be easily deterred by others (because she would be influenced by so few others).

If we hypothetically presume that the collection of persons shown in **Figure 1** is a group of adolescents or a gang, we can see that deterrent strategies might be sharpened by becoming more targeted through looking at the position of a person in the social network. Deterrent effects might be more or less pronounced depending on one's position within the social network. Because deterrence involves a process of threat communication, it seems reasonable to expect that a greater deterrent effect will be found by sending deterrence messages

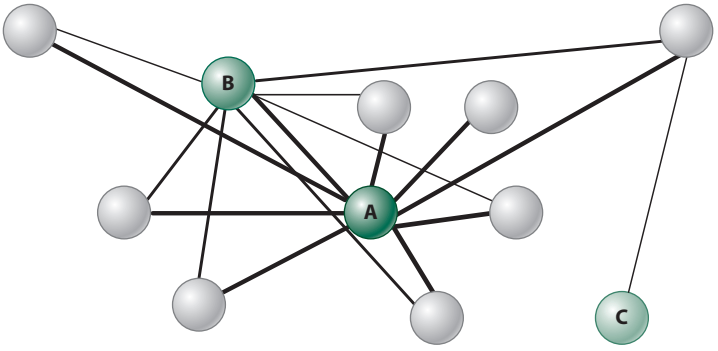

Figure 1

Sociogram of a hypothetical network structure depicting the positions of Persons A, B, and C in a social network. The thickness of the line represents the frequency of the interaction or communication.

though the best chains of communication. As Zimring & Hawkins (1973, p. 149) observed more than 35 years ago, "The first task of the threatening agency is the communication of information."

In the past, deterrence has considered persons strictly as individuals, almost socially isolated, atomistic individuals, who, though they may be part of groups, are not significantly influenced by groups. As a consequence of this view, law enforcement efforts have been directed at individuals without regard to their social position in a network. The police would, therefore, diffuse their law enforcement efforts at the entire group, regardless of the social position of individuals within that group. In other types of interventions, such as outreach, gang workers adopted a similar strategy: They directed their efforts to reduce gang violence, for example, by diffusely applying the same effort to every member of the group or to the group as a whole. Thinking about individuals as having positions within social networks changes all that. Looking at **Figure 1**, if one wanted to get a deterrent message to the group, then targeting Person A rather than Person C would be far more efficient and productive. If Person A could be persuaded by the police that the certainty of punishment (for example) was now greater because of enhanced policing, or if Person A could be persuaded by a gang social worker that

legitimate sources of income were available for him and others of the gang, then this message would be diffused throughout the group. Because of his central position and the frequency of interaction with other members of the gang, the communication of the social control effort would easily reach all members of the group. If, however, every group member were targeted for intervention as in the past, the efforts directed at Person C (and others in the group who are nearly as isolated as Person C) would be far less effective.

Other scholars have noted that one's position in a social network has implications both for the ability to be deterred by sanctions and sanction threats and for the ability to deter others. For example, Operation Ceasefire was an effort by the Boston Police Department to send a strong deterrent message to city gangs with the hope of reducing illicit firearms use and trafficking and youth homicide in general (Braga et al. 2001, Kennedy et al. 2001). Rather than send a message to all Boston gangs, the researchers first developed a sociogram similar to **Figure 1**, which showed the interactions among various Boston gangs (the nodes or participants in a social network analysis can be individuals as in **Figure 1** or groups as in the Operation Ceasefire project). This sociogram revealed that some Boston youth gangs were more connected to other gangs, whereas still other gangs were more socially isolated. Part of Operation Ceasefire's deterrence plan was to target specifically those gangs who were more centrally located in the gang network and therefore had more connections to other gangs in the city. It was expected that targeting these centrally located and more socially connected or dense groups would produce a greater deterrent effect on youth violence than a diffuse campaign against all gangs because deterrent threats directed at these centrally located gangs would be more easily communicated to many others through their network connections. For deterrent purposes, then, targeting central and therefore influential people in a network would be more efficient than merely imposing sanctions or sanction threats when the opportunity arrived.[17] Perceptions of sanction threats may be based less on an individual's experiences and more on their position within a social network.

McGloin (2005, p. 619) analyzed social network information on more than 700 gang members in Newark, New Jersey, by noting that "[m]any gang interventions focus on individuals." She suggested that the network position of some members (the number and frequency of their connections with other gang members, for example) would make them a target for strategic focus. In particular, she observed that some people in the gang social network are cutpoints: persons who serve as the point of connection between individuals or between some groups and others. Targeting these individuals or groups (by trying to change them or by focusing on them for removal from the group) would have a more profound effect on disconnecting or disorganizing the group than would another member.

Although an undertheorized and underresearched area, one's position within a social network is an important individual characteristic that would affect how easy or difficult it would be to deter someone. Because deterrence involves a process of threat communication, deterrence would be much more salient among those who are more centrally located within any social network.

Differences in Decision-Making Competence

A final relevant individual difference that could condition the effect of sanctions or sanction threats is how well individuals make decisions. In a recent series of articles, Paternoster & Pogarsky (2009) and Paternoster et al. (2011) have described an individual-level trait that they call thoughtfully reflective decision

[17] Research has shown that not only behaviors but also ideas are transmitted though social networks. For example, obesity is spread not only by the weight gain we see in others but by their attitudes toward food and more importantly the attitudes of our friends' friends and our friends' friends' friends (Christakis & Fowler 2007).

making (TRDM). TRDM describes a process of rational decision making that involves four elements: (*a*) thinking about the most important alternatives to our goals, (*b*) collecting information about these possible alternatives, (*c*) thinking intelligently about how likely it is that each alternative will allow us to achieve our goal, and (*d*) revisiting the decision and learning from it. TRDM may be competent and intelligent decision making because it is the type of decision making that will most likely allow us to obtain our goals. Paternoster and colleagues showed that TRDM was inversely related to short-term (one year) and long-term (three years) participation in crime. Moreover, TRDM was positively related to the formation of personal, cultural, and social capital such that those persons who were more thoughtfully rational in their decision making were more likely to make investments in different forms of capital. We have previously argued that variations in the social bond condition the effect of sanctions and sanction threats. It is reasonable to presume that investments in different types of capital have the same effect. Nevertheless, this remains an emerging area of inquiry within the deterrence research area, but one that we believe holds much promise.

FUTURE DIRECTIONS

Citizens and policy makers make important assumptions about the law, the administration of punishment, and the criminal justice system and its actors with respect to deterrence. Researchers have explored many questions that emanate from these assumptions including the following: Do sanction threats deter individuals from offending? Will more certain and more severe punishments affect compliance? Does deterrence work? This review argues that these are simply the wrong questions to be asking in a serious debate about deterrence and its relevance to policy. Instead, the more appropriate questions include when, under which conditions, and for which subsets of individuals can sanction threats be useful for deterring individuals from crime.

Our review suggests there are both individual-level and situational-level factors to consider in answering these questions. However, although finer distinctions centering on kinds of people have aided our understanding of the deterrence process, open questions remain about how individuals respond to and are ultimately deterred by sanctions. Next we briefly outline some directions for future research.

Heuristic Biases

One primary and fruitful area centers on individual differences related to the use of heuristic biases, or cognitive shortcuts, in decision making under uncertainty. For instance, two recent studies using an offender-based sample suggest how the conceptualization of risk perceptions in individuals may be thought of as another type of individual difference by which deterrence mechanisms may vary. In the first, Loughran et al. (2011c) observed a threshold risk level, or a tipping effect, above which higher levels of perceived risk were associated with a reduction in offending (as predicted by deterrence theory) but below which no such relationship existed. They reasoned that sanction risk threats below this threshold were overwhelmingly deemed to be noncredible by potential offenders and thus were not considered in their decision-making calculus. These individuals who perceived extremely low risks were, in essence, undeterrable by conventional sanction threats. In a second study, Loughran et al. (2011b) considered not only the individual's level of perceived risk but also his or her level of uncertainty, or ambiguity, about this perception. They observed a substantially larger deterrent effect for perceived risk when the individual's risk perception was more ambiguous as opposed to certain, but only for instrumental crimes. Thus, they concluded that an individual's level of uncertainty about the perceived risks to offending was inducing an additional deterrent effect in the individual. Pogarsky et al. (2011) further explore the role of differences in how individuals operationalize risk perceptions, offender cognition in the deterrence and crime decision paradigm, as well

as the more specific implications for deterrence and policy.

Loughran et al. (2011b,c) represent an inflection point in the deterrence literature, which is characterized by a sharp departure from the traditional logic of rational choice and can be framed as an integration of principles from research on judgment and decision making, sometimes referred to as behavioral economics, into the study of criminal decision making. Behavioral economics is premised on the notion that individuals not only deviate from strictly rational behavior when facing uncertain decisions (such as crime) but do so in predictable ways. We now continue to lay out some other key concepts from this literature concerning individual differences in decision making and consider how these ideas may inform future deterrence research.

Decision Framing

Traditional models of rational choice, which are derived from the economic theory of EU (von Neumann & Morgenstern 1947), make the explicit assumption that individuals are rational, utility-maximizing agents. However, Simon (1979) challenged this seemingly impractical notion by introducing the concept of "bounded rationality," thereby implying that individuals have limited capacities for rational decision making and thus look for ways to reduce or simplify the decision for the purposes of evaluation. One such component of the crime decision that likely influences would-be offenders is its context or frame. Tversky & Kahneman (1981) define the term decision frame as "the decision-maker's conception of the acts, outcomes, and contingencies associated with a particular choice." They go on to add that "the frame that a decision-maker adopts is controlled partly by the formulation of the problem and partly by the norms, habits, and personal characteristics of the decision-maker" (p. 433). According to rational choice, an offender faced with a decision to commit a crime should arrive at the same decision calculus regardless of the framing of the decision; however, results from behavioral economics suggest that the framing of the decision is eminently important to the crime decision-making process.

Tversky & Kahneman (1981) illustrate how the framing of a decision not only can influence individual decisions but also can induce a reversal of preferences by presenting subjects with a hypothetical scenario for combating the outbreak of a rare Asian disease among 600 infected individuals. In the first framing task, subjects were asked to choose between an option that would save 200 lives with certainty and another option that would save 0 lives with 2/3 probability or all 600 lives with 1/3 probability. In the second framing task, subjects were asked to choose between an option where 400 lives would be lost with certainty and another option where no lives would be lost with 1/3 probability or all 600 lives would be lost with 2/3 probability. Notice that these two scenarios are exactly the same problem,[18] yet subjects overwhelmingly chose the certain option (i.e., saving 200) when the problem was framed as saving lives, while overwhelming choosing the risky option (i.e., a chance to lose 0 lives) when the same problem was framed as losing lives. This result demonstrates one of the key predictions from behavioral decision theory, i.e., that individuals contemplating risky decisions involving gains are often risk averse, whereas individuals contemplating choices that involve losses are typically risk seeking. This implies that even among would-be offenders with equivalent risk certainty perceptions, those framing crime decisions as potential losses are perhaps willing to bear more risk in their decision-making calculus.

Of course, although framing effects in crime decisions could constitute a situational difference, they could also qualify as an individual difference. For instance, the role that framing plays in situational differences among

[18] In both cases, the certain option would yield 200 lives saved and 400 lives lost while the probabilistic option would yield 0 lives saved and 600 lost with probability 2/3 and 600 lives saved and 0 lives lost with probability 1/3.

individuals is transparent. If the same decision, say the decision to engage in an illegal drug deal from which one realizes income, can be thought of as a pure gain (i.e., income the offender might not have had otherwise) or a loss (i.e., income the offender would lose out on and would regret if he or she did not realize it), this could potentially affect the risks that the offender may be willing to take to obtain it. In the latter case, for example, the individual may be more risk seeking than in the former case.

However, framing effects can also potentially be thought of as an individual difference. For instance, an individual's framing context could systematically change over the course of an individual criminal career, as the offender gains become realized. This is based on ideas taken from prospect theory (Kahneman & Tversky 1979), which was designed as a more realistic alternative to EU/rational choice as a descriptive theory of choice under risk. In prospect theory, individuals do not frame decisions on the basis of absolute wealth, but instead on the basis of changes in wealth relative to a reference point of some value function. This reference point can shift over time; that is, it can be reset as an individual's wealth shifts. Thus, individuals are risk averse to gains above this reference point and risk seeking below it, not necessarily in absolute gains and losses. To explain, recall the previous example of an individual facing a decision to engage in drug selling. Suppose the individual has generated a certain amount of income from drug selling in weeks prior to the decision; he or she may likely have shifted his or her reference point so that not generating any (or less) income as in previous weeks is not viewed by the individual simply as a nongain in (i.e., zero) utility, but rather a loss in utility relative to what he or she has become used to because the illegal income reference point has shifted upward in the framing of the decision. We can think of this as resetting, in which case the individual may actually become more risk seeking as this reference point shifts upward over time as his or her criminal career progresses. More generally, this presents an intriguing opportunity to consider decision-making processes between and within offenders over the life course (Piquero et al. 2003, Piquero & Moffitt 2005).

Also related to this idea of how individuals view losses are several other important concepts, logically related to the framing of decisions, which may play a role in how individuals are deterred. For instance, consider the concept of loss aversion (which is predicted by prospect theory), which states that an individual's response to possible losses is more extreme than his or her response to potential gains.[19] Therefore, the implication for deterring individuals who are contemplating crime decisions, when abstaining from the crime is framed as a loss, is that deterrence is brought about in dramatically different ways.

Another important idea is the concept of mental accounting introduced by Thaler (1985), which provides a description of how individuals mentally and cognitively keep track of financial transactions. Mental accounting, which has been applied mainly in areas such as credit and stock purchases, makes some important predictions as to how individuals may deviate from behavior predicted by the standard economic choice model. For instance, one key prediction made by mental accounting is that individuals tend to underweight opportunity costs in decision making. This is a critical point for crime if, for instance, some individuals forgo legitimate education opportunities (and the opportunity for legitimate future income that may be associated with it) and are routinely underweighting this as a possible cost of criminal activity. Another implication of mental accounting is that consumption enjoyment is not necessarily separate from payment decisions. Loewenstein & Prelec (1998) elaborate a perspective of hedonic interaction between consumption and payment, whereby consumption evokes considerations of payment. The degree to which consumption evokes thoughts of payment is referred to by the authors as the "pain of payment." Again, such an interaction is directly

[19] So, for instance, the pain of losing $100 is reflexively greater than the utility of winning $100.

relevant to the study of crime decisions, where such pain to pay may be importantly linked to risk and cost perceptions of would-be offenders, who are not weighing such cost and reward decisions independently of each other but rather in conjunction. In particular, individuals with a lower pain to pay would respond quite differently to deterrence mechanisms.

We bring these concepts of framing and associated items into a discussion of deterrence for several important reasons. First, the literature studying certainty effects of risk generally tends to view perceived risk as a de facto trait—for instance, all individuals with, say, a 50% risk certainty perception are treated equally in models testing for certainty effects. We argue here that just because two individuals perceive the same level of risk to a certain crime does not necessarily equate them—indeed, one individual is likely willing to bear (perhaps substantially) more risk in a certain offending situation than the other. Second, the crime literature on risk-seeking individuals typically treats this as some sort of psychological trait, e.g., one individual is more risk seeking than another. Although this idea is certainly not incorrect, we believe it is generally incomplete. The discussion here is aimed at hypothesizing ways in which situational determinants of the crime can change the risk tolerance within individuals in certain contexts and over time. Third, and perhaps most importantly, this idea of framing effects in crime is another reason to revisit the traditional models of rational choice and revise them in a manner more consistent and useful for describing actual criminal behavior.

Preferences for Costs, Risk, and Benefits to Offending

Standard models of decision making assume that individuals have preferences that are well defined and, furthermore, that decision makers are dispassionate when enumerating costs and benefits of a decision. However, new insights from economics have demonstrated that individuals' preferences are not necessarily well defined, and there is often inherent uncertainty in how an individual values both pleasure and pain. We have already discussed how framing may be one influence on individual preferences, yet this concept can be probed more deeply beyond framing effects. For example, Ariely et al. (2003) argue that the ways in which individuals value things, such as bad outcomes, is surprisingly arbitrary; however, relative valuation of pains is in fact orderly. They call this condition "coherent arbitrariness."[20] Ariely et al. (2003, p. 103) conclude that "changes or differences in prices or other economic conditions will have a much greater impact on behavior when people are made aware of the change or difference than when they are only aware of the prevailing levels at a particular point in time." That is, valuation of costs and benefits, although arbitrary, is still relative.[21]

The impact for deterrence is substantial. When considering possible pains to offending (e.g., sanction costs, risks), these absolute values might seemingly generate little deterrent effect when considered by an individual in a vacuum. However, the implication is that individuals should respond judiciously to new information about changes in things such as perceived detection probabilities, policing levels, fines, and punishments (cf. Pogarsky et al. 2004); yet these same individuals should be considerably less deterred by the levels of these same things. Sherman's (1990) finding that fluctuation in policing rates is a deterrent supports this argument. Operationally, this concept implies that

[20] As Ariely et al. (2003, p. 97) explain: "Coherent arbitrariness has two aspects: coherence, whereby people respond in a robust and sensible fashion to noticeable changes or differences in relevant variables, and arbitrariness, whereby these responses occur around a base-level that is normatively arbitrary."

[21] For example, Ariely et al. (2003) point out that if an individual has a willingness to pay (WTP) $10–$50 for a rare wine, she may or may not be willing to purchase a rare wine for $25. However, if the individual decides (for some other reason) that she would purchase an average bottle for $25 and then immediately is asked if she would be willing to purchase the rare bottle for $25, then she would accept because the ordering of the wines would convince the subject that the rare bottle should be worth more than the price of the average bottle.

some offenders will only consider risks and costs if (*a*) the magnitude of these factors has materially changed and (*b*) the offender has been made aware of this change; otherwise, the offender may not consider these factors much, if at all.

Related to this idea, Kahneman et al. (1999) advance the idea of affective valuation, which argues that stated willingness to pay (WTP) is more likely to reflect expression of attitudes than actual revealed economic preferences. For instance, they showed that dollar amounts awarded by participants in contingent settings and jurors in civil cases were associated with other measures such as attitudes and attractiveness. With respect to costs and risks to crime (and to a lesser extent, nonmonetary benefits), it is possible that the subjective elicitation of these quantities from would-be offenders does not exactly reflect the actual amounts that are weighed in a benefit-cost calculus but rather some contingent ordering of these factors across crimes and outcomes. For instance, consider an offender who reports a 50% chance of being caught for dealing drugs and a 70% chance of being caught for breaking into a home and stealing. These quantities may be intended merely to order the likelihood of being caught for the crimes but are unimportant in the calculus of deciding on either one in isolation.

We recognize that a sizeable empirical knowledge base on deterrence theory focuses on absolute levels of risks and costs (or, alternatively, differences between individuals), yet comparatively little attention has been devoted to understanding the process by which offenders respond to changes in realized levels. Furthermore, the meaningfulness of these absolute cost and risk measures is likely affected by other problematic complications, including anchoring effects (e.g., Jacowitz & Kahneman 1995), whereby seemingly arbitrary things such as one's social security number can influence perceptions; projection bias (e.g., Loewenstein et al. 2003), whereby individuals cannot accurately account for the time changes in their relevant states (e.g., for possible crime costs); and durability bias (e.g., Gilbert et al. 1998), whereby individuals can project the intensity of affect (e.g., personal rewards to crime) into the future but overstate the duration of this feeling. These factors could obfuscate traditional measures of offending costs, risks, and benefits, thereby making them difficult to interpret in isolation, as has typically been done in the deterrence literature. Further exploration into how such possible inconsistencies in how individuals logically value costs and benefits of offending in their decision making is a rich area for future exploration.

Negative Time Preferences

Standard rational choice models, which are modified to include discounting of future benefits and costs as outlined by Nagin & Pogarsky (2001, 2004), as well as predictions from classical deterrence theory, make the implicit assumption that individuals have a positive discount rate, i.e., presently realized gains are preferred to equal gains in the future, whereas presently realized losses loom heavier than equal losses in the future.[22] But what if, as we suggested above, this traditional constraint of this model, sometimes referred to as the discounted utility model (Samuelson 1937), was relaxed? Specifically, we may wish to relax the assumption that an individual's discount rate must be positive. It is not difficult to imagine scenarios in which an individual might reveal having a negative discount rate, or what might be thought of as a negative time preference for both gains and losses.

The concept of negative time preference is rooted in the notion that an individual may derive utility from anticipating the arrival of a positive outcome (e.g., a vacation) and thus prefer to delay the benefit. Similarly, a negative discount rate would also presume to derive a disutility from waiting for an unpleasant outcome (e.g., punishment). Thus, such

[22] To see why, note that the discount factor $\delta_t = [1/(1+r)]^t$ used by Nagin & Pogarsky (2003) assumes that the discount rate $r > 0$. By construction, then, this would constrain $\delta_t < 1$, meaning all future values $E(u_t)$ would be strictly less than the present value, since $E(u) = \delta_t E(u_t)$.

individuals would prefer to get the bad stuff over with quickly (i.e., working out at 6:00 AM instead of at 4:00 PM). The concepts of savoring and dread nicely capture a negative time preference for gains and losses, respectively. Loewenstein (1987) reports results from an experiment in which individuals display such time preferences for (nonmonetary) outcomes. Individuals in this experiment reported a WTP more, on average, to delay receiving a kiss from their favorite movie star by three days than they were to receive such a kiss immediately or delayed by only an hour. Alternatively, individuals were willing to pay more to avoid receiving an electric shock delayed by an hour than an immediate shock, and substantially more to avoid receiving a shock delayed by one year. Both of these findings are in contradiction to standard rational choice theories of discounted utility.

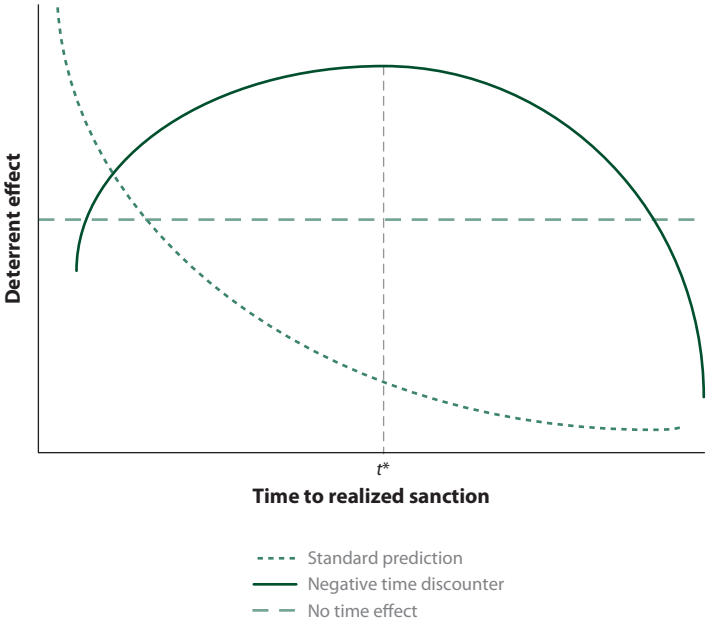

Figure 2

Possible deterrent effects responses to sanction celerity. This figure describes three potential deterrent mechanisms for delayed sanctions: a constant time effect, wherein a sanction has the same deterrent effect no matter when it is realized, i.e., by an individual who does not discount or has a constant discount rate of 0; a diminishing deterrent effect over time, which is consistent with both classical deterrence theory and a positive discount rate for punishment, where the sanction has less of a deterrent effect the farther into the future it occurs; and an increasing deterrent effect over time, consistent with an individual having a negative discount rate for punishment based on the idea of dread, where the deterrent effect increases over time until a sufficiently far along point in the future where it begins to lose its relative meaning. t^* denotes the future time of indifference when additional disutility from dread is netted out by a sufficiently long enough time delay to make the sanction less meaningful.

The implications are quite substantial for deterrence that some individuals have a negative time preference. The prediction from a descriptive choice model incorporating a negative discount rate for realized punishment and sanctions is wholly at odds with the traditional Beccarian notion of the deterrent effect of the celerity of punishment. The latter school of thought assumes that individuals should be more strongly deterred by swifter punishments because those punishments tending farther into the future would be reduced in terms of their current costs. In contrast, those with a negative time preference for punishment would be deterred by sanctions that would occur later in the future because, in addition to being deterred by the punishment itself, such an individual would also be deterred by the disutility or dread of waiting for said punishment.[23]

Figure 2 provides a graphical depiction summarizing the possible deterrent mechanisms of the celerity component to realized sanctions as predicted by an individual's time preference. First, the intermittent dashed line indicates an individual who does not consider the time component to punishment at all—such an individual will be constantly deterred by a sanction no matter when it is realized, hence the flat line. Next, the regular dashed line shows the deterrent effect of the traditional deterrence model, whereby swifter sanctions yield a larger deterrent effect that diminishes rapidly over time as the sanction is delayed farther in the future. We may think of these individuals

[23] The negative discount rate utility model laid out by Loewenstein (1987) actually predicts a "hump shape" to the time preference utility function, suggesting that there is a point in the future when an individual becomes indifferent about waiting any longer for the outcome, as it is so far in the future that the (dis)utility of waiting is too far out to matter. So for instance, the dread of waiting for an electric shock, say, 25 years from now would be sufficiently far out so as not to invoke enough dread from anticipation to pay a premium to avoid it over the present.

as positive time discounters, as they perceive presently realized sanctions to be greater (i.e., worse) than those realized in the future. Finally, the solid line shows the predicted deterrent effect for those with a negative time preference for punishment. There is an increase in the deterrent effect for delayed sanction because such individuals will dread the delay in waiting for the sanction in addition to the sanction itself. The deterrent effect will increase until time t^*, at which point the delay will be sufficiently far enough in the future that the individual will be indifferent to waiting any longer, and the effect will decline thereafter.

Deterrence research has historically eschewed the celerity component to sanctioning in favor of testing the more established components of certainty and severity. Perhaps this is due to the ease of measurement as well as to the more intuitive nature of these two latter mechanisms. However, the relative dearth of empirical results concerning the deterrent effect of celerity (especially when compared with results testing certainty and severity) has perhaps prevented scholars from advancing more nuanced and informed theories about the role played by the swiftness of punishment in deterring individuals. We thus advocate for deeper scholarship aimed at understanding how celerity functions as a deterrence mechanism and offer the notion that individual differences in time preference may be a point of origin in this endeavor.

Bayesian Updating

According to Becker's (1968) model of rational choice, there are three logical ways an individual can be deterred: increase the costs to committing crimes; decrease the benefits to committing crimes; or increase the probability of detection, i.e., risk. Importantly, even if costs, rewards, and risks to crime are meaningful in an absolute sense, they are nonetheless inherently subjective components. That is, an individual must form some subjective distribution about these perceptions, and, as Nagin (1998) contends, these beliefs may or may not be grounded in reality. Thus, with the accumulation of offending and sanctioning experiences, individuals will likely revise their subjective beliefs about these components to incorporate this new information into their subjective beliefs and develop more accurate perceptions of risks, costs, and benefits. This notion of revising or updating subjective prior beliefs in accordance with new information learned from experience is based on Bayesian learning theory and was first empirically explored within a deterrence framework by Pogarsky & Piquero (2003).

However, learned offending experience (e.g., getting arrested) will only work to deter individuals if two things ultimately happen. First, individuals' risk perception of detection and/or cost must increase in response to the arrest; second, this increase in risk/cost perception must lead to a reduction in the probability of reoffending. As explained by Pogarsky et al. (2004), both of these linkages must be active for deterrence to operate as hypothesized. There is now evidence from multiple samples—including some using active offenders—showing that individuals do systematically update risk perceptions in response to offending and punishment experience (Anwar & Loughran 2011, Lochner 2007, Matsueda et al. 2006, Pogarsky & Piquero 2003, Pogarsky et al. 2004). Yet the connections to deterrence are still quite fuzzy for several reasons.

First, each of the aforementioned studies that report evidence of Bayesian updating show that individuals are updating on average, and often this mean effect is quite small in magnitude. Yet the amount to which individuals are updating their perceptions likely varies greatly. Thus, one important but unresolved issue deals with why some of these offenders appear to update their perceptions, and others do not. Anwar & Loughran (2011) show that one reason some individuals update less is based on experience—that is, those more seasoned and active offenders are more set in their perceptions and therefore revise them less in response to newly learned information. However, experience can only explain part of this variability in responsiveness to new information. Important

individual-level factors are likely associated with willingness and/or ability to revise sanction threats and offending rewards perceptions. This hypothesis bears particularly on policy, especially if such factors are identifiable and relevant legal factors that can potentially be exploited for identifying individuals who may or may not be amenable to deterrence.

There is a second open and possibly more important question from the literature on updating that deals with its linkage to future offending. Specifically, given that individuals update their subjective perceptions of risks and/or costs, does this imply that these revised perceptions are in turn associated with a reduction in future offending? In the relatively nascent literature on crime perception updating, this association is still generally unexplored. It is thus not clear how within-individual changes in risk and cost perceptions ultimately correspond to changes in later offending. Furthermore, even if there is some connection that can be demonstrated, it is likely that there are individual differences that may be moderating the degree of this association. Exploring if and how this linkage works is a critical next step.

In sum, the burgeoning area of research on crime perception updating and perceptual deterrence has made some important advancements, demonstrating that individuals do engage in risk updating and therefore are potentially deterrable. Although this set of results is certainly necessary (and encouraging) to establish linkages to deterrence, it is by no means sufficient nor comprehensive. In addition to the future directions discussed above, we call for more research in this potentially fruitful area for deterrence, on extensions dealing with topics such as substitution effects stemming from crime-specific updating (Anwar & Loughran 2011, Nagin 1998), information cascades (e.g., Hung & Plott 2001), peer learning effects, and non-Bayesian updating.

Biological Factors

Another direction for future research considers and attempts to unpack the potential influence of biological and psychological characteristics in influencing decision-making processes (Wright et al. 2008). Although a complete understanding of their contribution relative to other (social) factors still awaits further inquiry, several studies have directly implicated these characteristics in human behavior (Séguin 2009), whereas other studies have found that alcohol/drug use facilitates crime (aggression) by altering aspects of executive cognitive functioning, especially those associated with attention, reasoning, and risk assessment, and by affecting emotions, especially decreasing anxiety/fear or by increasing arousal (Assaad & Exum 2002, p. 77). To the extent that biology influences thinking and decision making, these early findings raise provocative issues associated with the degree to which people should be held accountable for their actions and deserving of punishment (Wilson 2010, p. 105)—regardless of the amount of will or choice involved in the decision.

CONCLUSION

In the end, the issues raised throughout this article are all meant to consider and explore the differential deterrability that exists across persons in sanction threat perception, response to sanction threats, and response to punishment. Our review of this emerging area of research and directions outlined for future research help to underscore the point that individuals do not always respond in lockstep to deterrent threats and punishment imposition and that sometimes they vary in expected and unexpected ways. Unpacking this heterogeneity is important for theory and research, and this knowledge will, in turn, help to inform a more effective policy discussion and subsequent policy effort. In short, criminologists should develop and empirically assess the origins and sources of variation in the preferences and constellation of risks/rewards that influence decision making and thus encourage crime (McCarthy 2002, p. 437), as well as the importance of situational factors that are implicated in the crime decision-making process (Jacobs 2010).

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Contents

Indexes

Errata

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