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Abstract

Against a backdrop of unprecedented growth in the criminal justice system stand calls for increased government accountability, yet substantial gaps between ideal and actual practice remain. Many observers have pointed to the problem and some of its causes and solutions, including the need for performance monitoring and evidence-based practices. Less attention has been paid to how decision-making errors influence effective criminal justice practice. This article draws on examples from medicine, where decision making has been examined in more depth, and applies them to criminal justice. Its goals are to identify the types of decision-making errors that can undermine effective practice and policy in the criminal justice system, illustrate how systemic factors influence everyday decision making, and draw attention to the benefits of decision making-focused monitoring and assessment. The article concludes by discussing the implications for performance monitoring and improving the criminal justice system.

KEYWORDS: criminal justice decision making performance medicine

Introduction

Criminal justice expenditures at local, state, and federal levels have increased dramatically in recent decades, rising over 440 percent, from just under $36 billion in 1982 to over $193 billion in 2004 (Hughes, 2006; Hughes & Perry, 2007). At the same time, calls for government accountability and, in particular, a greater reliance on the use of performance monitoring and evidence-based practices have increased (Behn, 2003; Campbell, 2003; Cullen, 2005; Hatry, 2007; Julnes, 2006; Perry, McDougall, & Farrington, 2006; Welsh & Harris, 2004). Yet, criminal justice system practices and policies, including decisions about how to sanction and treat offenders, frequently go unmonitored and lack scientific support (Farabee, 2005; Lipsey, Adams, Gottfredson, Pepper, & Weisburd, 2005; MacKenzie, 2006; Marion & Oliver, 2006; Sherman, Gottfredson, MacKenzie, Eck, Reuter, & Bushway, 1997). Even when performance monitoring occurs, it rarely involves a systems-level perspective or an assessment of the quality of decision making within and throughout various stages of criminal justice processing (Bazemore, 2006; Forst, 2004; Logan, 1993; Walker, 1992, 1993). Instead, the most prominent policy evaluations typically have examined specific initiatives (Farabee, 2005; Rossi, Lipsey, & Freeman, 2004). Far less attention has been given to assessing how improved decision making in everyday practice can improve the overall operations of criminal justice.

These observations assume greater urgency when one considers the large-scale increases in the numbers of individuals affected by the criminal justice system and the impact of decisions about offenders on victims, families, communities, and the offenders themselves (Travis & Visher, 2005). Today, over 650,000 prisoners are released each year, stemming from a dramatic escalation in the use of incarceration over the past twenty-five years (Petersilia, 2003; Travis, 2005). Released prisoners are not the sole source of growth in correctional populations, however. Between 1980 and 2005, the number of individuals under local, state, or federal correctional control increased from 1.8 million to over seven million (Glaze & Bonczar, 2006, p. 2). A substantial contributor to this growth has been an increase in the number of individuals on probation and parole—as of 2005, 4.1 million individuals were on probation, 780,000 were on

parole, 740,000 were in jail, and 1.4 million were in prison (Glaze & Bonczar, 2006, p. 2). Not surprisingly, justice system personnel, including police, court, and corrections officers, have increased, almost doubling between 1982 and 2003, from 1.2 to 2.3 million (Hughes, 2006). In addition, according to the U.S. Bureau of Justice Statistics, "cases of all kinds (criminal, civil, domestic, juvenile, and traffic) filed in the nearly 16,000 general and limited jurisdiction State courts went from about 86 million to 100 million [from 1987 to 2003]" (Hughes, 2006, p. 7).

Collectively, such statistics point not only to marked growth in all aspects of the criminal justice system, but also to a corresponding implication. Namely, more than at any time in U.S. history, an increasingly large number of critical decisions must be made on a daily basis by law enforcement officers, court personnel, probation and parole officers, and jail and prison employees about how best to fight crime and handle large caseloads of individuals. These decisions influence such dimensions as: how scarce resources are expended; the types of crimes addressed; the communities and populations who are served; whether and how justice is achieved; how, if at all, victims are included in processing decisions; who is arrested, detained, sentenced, and incarcerated; who receives treatment; and which policies and programs will be supported. In short, decision making increasingly stands at the heart of everyday practice and ultimately determines the effectiveness of the system as a whole (Walker, 1992).

Even so, a critical problem remains—there has been no systematic or unifying attempt to document the quality of decisions throughout the criminal justice system, and there has been limited research on the range of decision-making errors that undermine appropriate and effective decision making. Consider, for example, the fact that most research on law enforcement focuses on arrest, not how officers treat people, even though "how the police treat people generally, and how the treat minorities in particular, appears to have a more profound impact on citizens' attitudes about the police and their willingness to cooperate than do police decisions to stop or arrest them" (Forst, 2004, p. 103). Studies of this issue would require examining how police are supposed to treat individuals, the judgment calls they make on a case-by-case basis, and the reasons why they fail to follow stated protocols or make effective decisions. Information from such studies could be used by policymakers and officials to hold the police accountable, to

identify ways to improve officers' decision making, and, ultimately, to improve citizens' willingness to cooperate with the police. At present, however, few jurisdictions systematically collect the data necessary to monitor such decision making, or therefore, to make improvements in the quality of officers' everyday decisions.

To be certain, some studies on decision making by criminal justice system actors, and in particular the discretionary decisions made by law enforcement officers, prosecutors, and judges, exists. Yet, the bulk of this literature focuses primarily on the "problem of discretion" (Walker, 1993, p. 4) and how efforts to control or minimize discretion can have unintended effects, including the displacement of discretion from one part of the system to another, as has occurred under many sentencing guideline efforts (Miethe, 1987). By and large, this literature does not define what constitutes an appropriate or effective decision by any given criminal justice system actor and it typically focuses on a limited set of actors (e.g., law enforcement officers and prosecutors). Such oversights are notable because the success of any organization, program, or policy rests on the shoulders of those charged with implementing core activities and services (Rossi et al., 2004). Ultimately, effective implementation requires that these individuals make appropriate and effective decisions—that is, that they follow established rules, policies, or guidelines, and where discretion is required, that they are guided by evidence-based practices, or at a minimum, not by inaccurate stereotypes or assumptions.

Performance monitoring efforts can sometimes lead to a focus on the quality of decision making by criminal justice system actors. More typically, however, they treat decision making as a black box and instead focus on whether various activities that should be undertaken actually are (Gaes, Camp, Nelson, & Saylor, 2004; Hatry, 2007; Mears, 2008). Put differently, performance monitoring—an empirically-based approach to monitoring program and policy implementation and associated outcomes—tends to ignore decision making. It certainly does not preclude such a focus; it simply does not in any direct way call attention to it.

A focus on evidence-based practices—that is, programs, policies, and activities shown empirically to be effective in achieving particular outcomes (Cullen, 2005; Farabee, 2005)—also does not directly lead to a focus on decision making. Rather, it leads to an emphasis on

identifying and adopting effective approaches to improving outcomes. As with performance monitoring, one is not precluded from examining decision making, but neither is one led to a systematic analysis of the quality of decision making by diverse actors and how their decisions influence a range of outcomes.

In sum, while recent efforts to place performance monitoring and evidence-based practice at the forefront of criminal justice policy are laudable, they fail to capitalize on a critical area in which improvements throughout the criminal justice system might be made—namely, the quality of decision making made by diverse system actors. This article argues that a systematic, empirical focus on decision making constitutes a critical supplement to performance monitoring and evidence-based practices, which are necessary but not sufficient tools for increasing the efficiency and effectiveness of the system. In addition, a focus on decision making offers a unique lens through which to identify those domains along which performance monitoring efforts could be most usefully directed. This issue is especially important given that monitoring can be costly, time-consuming, and unhelpful if focused on dimensions of performance that are not relevant (Logan, 1993; Rossi et al., 2004).

Sometimes insights can be gained about a phenomenon by looking away from it or by viewing it through a non-traditional perspective, the equivalent of employing a new paradigm by which to revisit topics of traditional interest (Kuhn, 1970). This article suggests that looking at parallels between decision making in the medical establishment and the criminal justice system can generate original insights while also reinforcing some existing views about how to improve criminal justice practice. The focus of medicine is, of course, fundamentally different from that of criminal justice. Physicians seek to prevent and cure disease, whereas criminal justice practitioners and policymakers seek to prevent crime while achieving, through various approaches to sanctioning, the elusive goal of "justice." Nonetheless, important parallels exist, not least of which is the fact that medical and criminal justice systems struggle to process large numbers of cases while also providing the best decisions appropriate to individual cases.

Building off of these observations, this article examines a range of "cognitive errors" that undermine physicians' diagnoses and treatments, and then identifies parallels to and lessons for

criminal justice. The analysis here highlights that systems-level factors are likely to contribute not only to specific errors but also to an accumulation of errors, many of which may amplify one another. In addition, it points to the utility both of applying performance monitoring to the entire criminal justice system, as compared with the traditional practice of single-stage performance monitoring, and of focusing particular attention on critical decision-making points throughout the system and how decisions made by policymakers, officials, and practitioners could be improved.

Other benefits exist as well. Applying a decision-making framework to criminal justice system operations can help in identifying how and why some patterns, such as disproportionate minority confinement, exist. It can contribute to understanding why one category of decision-making errors—errors of justice (e.g., the conviction of an innocent person)—arise (Forst, 2004). In addition, and not least, it highlights an important gap in current attempts by criminal justice systems to be more accountable, efficient, and effective (Gaes et al., 2004).

The article begins first by discussing parallels between the medical and criminal justice systems and why comparisons of the two are instructive. In so doing, it emphasizes that the focus is on decision making, not the application of a "medical model" (MacNamara, 1977) to criminal justice. The article then examines and illustrates specific decision-making errors and emphasizes the particular salience of system-level considerations to understanding the causes and impacts of such errors. Drawing on these discussions, the article explores at length their implications for criminal justice practice and policy, and, in particular, the lessons for criminal justice policymakers, officials, practitioners, and researchers.

Parallels between medicine and criminal justice

At first blush, it is not necessarily evident that a focus on medicine—and, in particular, the medical system's approach to diagnosis and treatment—has much to offer efforts to understand and improve criminal justice. That impression largely derives from the fact that medical practice targets a different problem. In reality, however, important parallels exist that are notable in their own right and also illustrate the centrality of decision making and systems to efficient and

effective achievement of such societal goals as the production of more health and less crime.

First, in both medicine and criminal justice, diagnoses of various types constitute a central feature of everyday practice. Physicians attempt to diagnose whether certain diseases are present and then prescribe the appropriate treatment for the diagnosis. Similarly, policymakers must determine when crimes of various types constitute a sufficient problem to warrant special treatment, and criminal justice practitioners must develop sanctions and treatments for particular offenders or types of crimes. More generally, criminal justice practitioners must make a plethora of decisions on a daily basis, many of which are critical to the operations of the justice system even if they do not directly relate to accurate identification, sanctioning, and treatment of offenders. The police, for example, must routinely make decisions about how to respond to 911 calls and which crimes or calls receive more attention than others. Errors in judgment in such cases can, of course, have significant impacts for victims, offenders, communities, and, more generally, the effective allocation of law enforcement efforts (Forst, 2004).

Second, the accuracy of diagnosis and treatment are paramount in both systems. In medicine, misdiagnosis can lead to mistreatment or no treatment, and, given a correct diagnosis, mistreatment can lead to wasted resources and a failure to cure the disease. Notably, studies of medical diagnosis and treatment indicate that the "majority of errors are due to flaws in physician thinking" and that in situations where misdiagnoses caused "serious harm to patients," approximately "80 percent could be accounted for by a cascade of cognitive errors" (Groopman, 2007, p. 24). In criminal justice, misdiagnosis and mistreatment can have comparable impacts. For example, a failure to recognize the emergence of a gang problem can lead to a failure to implement strategies to combat the problem. In the event of accurate recognition of a gang problem, mistreatment—such as the imposition of strategies that do not actually address the specific causes of the problem—can needlessly expend scarce resources while failing to reduce it. When such a failure is visible to the public, the damage is compounded by the public's diminished faith in the competence and legitimacy of the criminal justice system. In short, in medicine and criminal justice, diagnostic and treatment errors, or, more generally, cognitive errors that influence clinical decision making, are important because they lead to inefficiency and

ineffectiveness, as well as, in the case of criminal justice, miscarriages of justice (Forst, 2004).

It should be emphasized that a focus on accurate diagnosis and treatment need not imply a "medical model" approach to criminal justice practice or crime reduction efforts. This model came into ascendance in corrections in the 1950s; the central view was that, essentially, offenders were "sick," that criminal behavior was symptomatic of their illness, and that accurate diagnosis and rehabilitative treatment could cure it (MacNamara, 1977, pp. 439-440). A variant of that approach arguably is embodied in the findings of recent meta-analyses, which show that effective offender-based programs must accurately take account of the specific criminogenic factors that give rise to criminal behavior for specific individuals (Cullen & Gendreau, 2000). Regardless, the goal here is not to evaluate the merits or pitfalls of such a model. Rather, this article seeks lessons from the medical system about ways in which problem-identification and problem-solving efforts in criminal justice might be improved. The "diagnosis" and "treatment" terminology simply provides a straight-forward terminology for capturing the idea that effective criminal justice operations, including efforts to prevent and reduce crime as well as to achieve justice, require effective decision making about a range of problems and solutions, whether the focus be on individuals, families, communities, or states.

Third, errors in judgment in criminal justice arguably are just as important as in medicine. The typical view is that accurate decisions are especially critical in medicine because they can involve life and death. Criminal justice decisions, however, ultimately involve such dimensions as justice and freedom and the lives of potential victims and communities where crime occurs. In short, the stakes may differ in kind but not necessarily in importance.

Fourth, individualized decision making in both medicine and criminal justice is considered the ideal, and yet is frequently precluded because of limited time, resources, and, in no small part, the structure and administration of the two systems. This issue assumes particular importance for these systems because, in recent decades, each has had to confront dramatic increases in the numbers of cases they process (Forst, 2004; Groopman, 2007).

Fifth, medicine and criminal justice have been subject to calls for "evidence-based" practice, but both rely to a substantial degree on practices that lack an empirical basis. To illustrate, in

obstetrics, an area of medicine the public might typically view as strongly evidence-based because it deals with life-and-death decision making, practice has not been consistently guided by research. Indeed, as Gawande (2007, p. 188) recently noted, "in a 1978 ranking of medical specialties according to their use of hard evidence from randomized clinical trials, obstetrics came in last." More generally, some assessments indicate that the vast bulk of medical treatment lacks a rigorous research foundation—for example, citing Millenson's (1997) discussion of a 1983 U.S. Office of Technology Assessment study, Sherman (2003, p. 7) noted "that 85 percent of everyday medical treatments had never been scientifically tested." Similar critiques have been raised about many of the most prominent criminal justice policy initiatives that have emerged over the years (Farabee, 2005). Notably, for example, there is no body of experimental research that quantifies the precise relationship between incarceration and specific or general deterrence (Forst, 2004, p. 161). Equally notable is the fact that one of the most important goals of criminal justice—retribution—cannot be assessed through experiments (p. 166).

Sixth, in addition to calls for evidence-based practice, there have been calls for increased performance monitoring and accountability in medicine and criminal justice, yet *systemwide* measurement of actual practices and outcomes has been limited or inconsistent in both fields, though exceptions clearly exist. Consider a typical visit to a physician. Are all symptoms recorded? Is there any recording of possible differential diagnoses? Any documentation of whether the patient adhered to the treatment? Or, perhaps most importantly, any documentation of the outcome? In each instance, the answer typically is "No" (Gawande, 2007).[1] What about the critical issue of whether patients adhere to treatment protocols? Patients may not stick to treatment plans, and in such cases treatment success diminishes (p. 220). The issue, again, is that in medicine, as with the criminal justice system, systematic performance monitoring of relevant practices and outcomes is neither regular nor uniform (Bazemore, 2006; Behn, 2003; Gaes et al., 2004; Hatry, 2007; Logan, 1993). As but one example, Federal and state governments enact numerous laws bearing on criminal justice policy or practice, but empirical examinations of the application and impact of these laws are rare.

Errors in decision making in the medical system: Lessons for criminal justice practice

This article's contention is that, as in medicine, monitoring and assessment of decision making in criminal justice can improve the system's efficiency and effectiveness.[2] Misdiagnosis of crime problems and their solutions, for example, can lead to investments in strategies that are not needed, may not work, and could be harmful. The main challenge lies in identifying which errors are most common and harmful or would improve the system most if corrected.

Table 1 reflects the distillation of a diverse range of errors in diagnostic decision making made by physicians and, as this article argues, by their criminal justice system counterparts—including policymakers, law enforcement, probation, and correctional officers, judges, prosecutors, defenders, and, more generally, practitioners. The discussion draws heavily on the errors identified in Groopman's (2007) recent review and investigation of the topic[3], with a focus on those that may be especially common or salient. Below, the article discusses each of the errors and, in each instance, provide criminal justice examples to illustrate the utility of a decision-making error framework to improving system practices and policies.

Insert Table 1 about here

Clinical algorithm error. This type of error arguably is most prevalent and most critical to diagnosis because it arises from the default mode of diagnosis used by physicians. For example, doctors typically are trained in the use of Bayesian analysis, an approach that may lead to misdiagnosis for atypical or unusual cases (Groopman, 2007, p. 5). Such errors are especially likely for problems and situations where there is little to no precedent or where little time exists to work systematically through such an analysis.[4] Consider, for example, that "studies show that while it usually takes twenty to thirty minutes in a didactic exercise for the senior doctor and students to arrive at a working diagnosis, an expert clinician typically forms a notion of what is wrong with the patient within twenty seconds" (p. 34). Indeed, "physicians begin to think of diagnoses from the first moment they meet a patient" (p. 35). To do so, they rely on "heuristics," or shortcuts. The use of heuristics occurs "largely without any conscious analysis," "draws most

heavily on the doctor's visual appraisal of the patient," and "does not occur by a linear, step-by-step combining of cues" (p. 35). For these reasons, heuristics can be essential for accurate diagnosis, especially in emergency situations where there is little time for careful assessment to help make sense of a large of data, but they can also lead to misdiagnosis if the assumptions underlying them are incorrect or do not apply to a given case.[5]

The use of heuristics in criminal justice decision making, as in medicine, is essential for managing unwieldy caseloads and large amounts of information. The potential for the greatest harm with their use occurs when they are based on incorrect assumptions or applied in non-emergency settings. The courtroom illustrates one such setting. Recent research has suggested that juries may associate a constellation of characteristics—race, age, gender, and social class—with criminality (Chiricos, Welch, & Gertz, 2004; Reiman, 2000). These constellations of individual characteristics become heuristics and may be used for the purpose of assigning guilt. Sentencing research, for example, has shown that specific sub-groups, especially young, Black males, face more severe sanctioning after controlling for such legally relevant factors as the type and severity of offending and prior record (Steffensmeier, Ulmer, & Kramer, 1998). In these instances, heuristics may contribute not only to conviction of innocent individuals but also to the failure to convict guilty individuals as well as, more generally, to unfair sentencing practices (Forst, 2004; Paternoster, Brame, Bacon, & Ditchfield, 2004).

Just as with medicine, there arise occasions in criminal justice in which decision making demands the use of heuristics. For example, police on patrol routinely confront the challenge of devising an immediate course of action in the face of incomplete information. The critical question is whether they use appropriate or accurate heuristics and operate with an awareness of the limitations of them. Here, paralleling the courtroom example above, perhaps the most prominent example of a heuristic of questionable appropriateness and accuracy is racial profiling. As Warren, Devey, Smith, Zingraff, and Mason (2006, p. 715) recently observed, "racial categorization and the associated stereotypes of dangerousness and criminality may influence [police] determination of who seems suspicious or otherwise worthy of special attention." The basic problem, one that extends to other types of profiling (e.g., age, sex), lies in

the fact that the stereotypes may have no empirical foundation in a given place or time.

Before proceeding, a note about theory bears mention. The traditional argument is that theories provide a foothold for sifting through the innumerable possibilities that might account for a particular phenomenon (Merton, 1968). A counter-argument, however, is that rigid adherence to particular theories blinds researchers or practitioners to other important explanations of the phenomenon (Mears & Stafford, 2002). In practice, practitioners likely tend in one direction or the other. Some practitioners may, for example, hew consistently toward a particular theory about crime or how certain types of cases can most effectively be handled, while others may be more agnostic and tend to "let the facts speak for themselves," following, for example, "gut instincts." This difference is problematic for everyday criminal justice practice because, to the extent a given theory or "gut instinct" is incorrect, it contributes to systematic decision-making mistakes and to inconsistency in how cases are processed.

Initial impression error. When physicians diagnose a patient based only on their initial impressions or intuitions, they may misdiagnose patients some unknown percentage of the time (Groopman, 2007, p. 9). A variant of this error is confirmation bias error, wherein the physician anchors on to a particular diagnosis and then "cherry picks" those symptoms that support it while downplaying, ignoring, or distorting the significance of other clinically relevant symptoms (p. 65). The bias results from focusing only on those symptoms or interpretations that "confirm" the initial diagnosis. This type of error is more likely to occur where little time exists for reflection, as occurs in emergency rooms (p. 75).

Initial impression error can occur at many points throughout the criminal justice system. As the racial profiling example conveys, it can occur when a police officer uses a heuristic (e.g., a stereotype about the characteristics of offenders) that predisposes him or her to having a particular type of first impression (e.g., young, Black males likely committed a given crime). In this situation, the heuristic dictates the initial impression, which in turn can reinforce to the officer the putative validity of the heuristic.

Consider the decision making at a much later stage in the criminal justice system—the initial meeting between a parole officer and a newly released parolee. This discussion typically

involves a conversation directed by the supervising officer designed to fill in gaps in the case file material to determine the most appropriate reentry plan. Imagine such a conversation between the officer and a new parolee with a history of violence but no documented drug problem. The officer's initial impression may be that drug use is not an issue, especially if he or she assumes that any such issue would surface in case file materials. The parolee may be asked whether he has a drug problem and report some infrequent experimentation but no chronic or serious use of illegal drugs. Based on this exchange, the parole officer's initial impression is reinforced and he or she then may turn their attention to other criminogenic risk factors. Observe, however, that drug problems will not necessarily be documented and that even if drug screen (e.g., urine analysis) results were available, the parolee could have passed by chance (Peters, Greenbaum, Steinberg, Carter, Ortiz, Fry, et al., 2000; Wish, Rinehart, Hsu, & Artigiani, 2006).

Conversely, a scenario could emerge in which a newly released parolee celebrates his first night home drinking with friends. Upon reporting to the parole office the next day, the parole officer may smell alcohol and form an initial impression that this individual has a drinking problem. Subsequent supervision and treatment efforts may then be directed at keeping the parolee sober, perhaps at the expense of targeting other criminogenic needs that might, if addressed, be more likely to contribute to desistance. When parole boards or other release-granting authorities mandate substance abuse counseling for offenders with any drug-related conviction offenses, such decisions may become more likely.

First impressions can, in short, be highly consequential, especially when made by individuals whose impressions carry substantial weight. The focus on parole officers in the example above is illustrative. A recent study found, for example, that these "officers and not prosecutors play the most significant role in revocation decisions" (Rodriguez & Webb, 2007, p. 23). Given the large increase in probation and parole populations nationally (Travis, 2005), any decisions, including mistakes in judgment, made by community supervision officers can have substantial impacts on overall system operations and effectiveness.

Availability error. Availability error occurs when "what is most available in your mind strongly colors your thinking about a new case that has some similarities [and leads] you to

ignore important differences and come to an incorrect diagnosis" (Groopman, 2007, p. 188). The error results from "the tendency to judge the likelihood of an event by the ease with which relevant examples come to mind" (p. 64). In such cases, a physician is more likely to see a case as being like the ones that preceded it, thus imposing a diagnosis that may not be appropriate. A variant is "last bad experience" error in which, because of a problematic experience involving a recent patient, one that perhaps led to a lawsuit, a physician considers illnesses that are not likely and, in so doing, may miss the correct, if more mundane, diagnosis (p. 189).

Within criminal justice, availability error can emerge in different guises. Prosecutors, for example, who work in areas where drug crimes occur frequently, may tend to assume that every offender they see is a drug dealer or user and then prosecute cases accordingly. Prosecutors may differ, of course, in how they believe such cases should be prosecuted. Regardless, the mistake lies in assuming that a characteristic found in prior cases applies to a new case and in applying an approach to the case that is premised on the presence of that characteristic.

A different type of example is reflected in policy fads. Although new policies may be adopted for many reasons, when a policy is widely and suddenly adopted, one reason may be a type of availability error in which policymakers draw immediate implications from a study reported in the media. Sherman and Berk's (1984) randomized experiment on police response to domestic violence in Minneapolis is illustrative. The results of the study were widely publicized and supported the notion that arresting domestic violence perpetrators has a significant specific deterrent effect. Within six years, fifteen states adopted mandatory arrest laws (Sherman, Smith, Schmidt, & Rogan, 1992), even though the authors had clearly indicated that further research on mandatory arrest was needed. The problem, which surfaced in subsequent studies, was that later research produced equivocal results (Schmidt & Sherman, 1996). In this example, a widely available and discussed study may have disproportionately colored policymaker thinking about the appropriate way to address domestic violence, leading, on the one hand, to a special emphasis on mandatory arrest laws and to a failure to consider carefully the wider range of strategies for reducing domestic violence (Mears, 2003; Roberts, 2002).

An example of the variant—"last bad experience" error—is reflected in the so-called "Willie

Horton" effect. Horton was a convicted felon, incarcerated for murder, who raped a woman while on furlough. Governor Michael Dukakis, who campaigned in the 1988 Presidential race, supported this program. His opponent ran political advertisements criticizing Governor Dukakis for his views, contributing in part to a political climate in which "get tough" views toward crime were seen as needed (Hurwitz & Peffley, 2005). Such cases may drive policymakers to focus on the "last bad case" and create laws that assume the widespread prevalence of such cases. This type of error is likely to be especially pernicious if coupled with action bias error, the tendency, as discussed below, to default to taking action rather than doing nothing.

Patient attribution error. When physicians work from incorrect preconceptions or stereotypes about patients, misdiagnosis may result from selectively emphasizing symptoms and interpretations that fit with the preconceptions (Groopman, 2007, pp. 43-44). This error arises as when, for example, physicians allow certain impressions—such as that a person is mentally disordered (p. 39), looks healthy (p. 43), has a drug problem (p. 44), or is homeless (p. 55)—to govern their diagnoses. In such cases, physicians' preconceptions may lead them to attribute certain symptoms to a diagnosis that they associate with people who they believe fit a particular profile (e.g., homeless people, drug addicts); at the same time, such preconceptions may lead them to overlook, ignore, or disvalue certain clinically relevant symptoms. A similar phenomenon, in which individuals generalize on the basis of stereotypes, has been explored more generally in psychology (Gladwell, 2005).

Attribution errors likely contribute to heuristics and initial impression errors in criminal justice. Regardless, one type of such error occurs in jury decision making. To illustrate, in her study of jurors, Visher (1987, pp. 13-14) found that "the defendant's educational level [affected jurors'] judgments of defendant guilt net of evidential factors," noting that the effect may have stemmed from "jurors' attributions about the defendant's character and his propensity for criminal activity." As with various courtroom actors, jurors clearly may operate from certain assumptions about what the characteristics of a given person indicate (e.g., they may assume that educated people do not commit crime), which in turn colors their decision making.

Attribution error is most common when an individual fits a negative stereotype (Groopman,

2007, p. 44). To illustrate, a correctional intake officer may encounter an indigent, inarticulate prisoner with a history of drug abuse who seems to be experiencing delirium tremors, and assume that the prisoner is experiencing the effects of withdrawal. Such an interpretation may fit with their attribution of the individual as a drug addict. This assumption, however, may preclude consideration of other explanations—such as diabetes or dyskinesia—for the prisoner's behavior. Such decision-making mistakes, involving medical-related issues, may arise frequently in criminal justice, given the marked prevalence of mental and physical illnesses among correctional populations (Lurigio & Swartz, 2002; Mears, 2004; Travis, 2005).

Disease prototype error. Whereas patient attribution error stems from an initial assumption about an individual, this type of error stems from adhering too strongly to an assumed prototype about a given disease and then ascertaining whether the individual fits that prototype. That is, when physicians expect a disease to emerge only in certain cases—the "prototype" for the disease—they may "fail to consider possibilities that contradict the prototype and thus attribute the symptoms to the wrong cause" (Groopman, 2007, p. 44). The prototype may, for example, be that only certain populations get certain diseases, and so atypical cases (e.g., the rare time when someone unlikely to have a certain disease actually gets it) go misdiagnosed. It is the equivalent of failing to recognize that statistically significant risk factors reflect differential, not absolute, probabilities of an outcome occurring.

A focus on police resource allocation decisions highlights how prototype errors can arise in criminal justice practice. Consider drug interdiction efforts, which typically are directed toward "drug-ridden" communities where drug dealers and users are assumed to congregate. Such a focus is a logical result of problem analysis and "intelligence-led" policing (Ratcliffe, 2003). A lack of enforcement in atypical neighborhoods, and the prototype error it represents, however, has significant implications not only for unchecked criminal activity but also for concerns about equal protection and treatment.

A different type of prototype error can be seen in what has been argued to be the criminal justice system's disproportionate emphasis on male offending (Bloom, Owen & Covington, 2004). Despite the closing of the gender gap for violent offending (Heimer, 2000; Steffensmeier,

Zhong, Ackerman, Schwartz, & Agha, 2006; U.S. Bureau of Justice Statistics, 1999), violence is still an overwhelmingly male phenomenon. Violent offending by females is thus still viewed as the atypical case. The failure, however, to consider the possibility of violent and aggressive females, who unquestionably exist (Baskin & Sommers, 1997; Heimer, 2000; Reisig, Holtfreter, & Morash, 2006), has important implications. Most notably, it can lead to a failure to consistently sanction violent offenders, regardless of sex, and to fail to apply sanctions and services most appropriate to violent female offenders.

Satisfaction of search error. Diagnostic errors may arise when doctors stop searching for a diagnosis once they find one that seems to more or less fit the symptoms (Groopman, 2007, p. 169). This error may be especially common in high-volume situations because there is minimal time to do more than apply a heuristic in both the generation and interpretation of data (p. 185).

In the criminal justice system, police typically face considerable pressure to solve cases quickly. After a call for service, police seek to identify suspects as soon as possible. In turn, this emphasis, especially in high-profile cases, can lead, on the one hand, to focusing primarily on identifying evidence supporting law enforcement's selection of suspects and, on the other hand, to neglecting consideration of other suspects. As Forst (2004, p. 70) has noted: "For high visibility unsolved cases, the pressure on the police to find a pool of candidate suspects, sometimes starting with police modus operandi (MO) files and vague offender descriptions, and deal aggressively with them can be especially high." Of course, case processing pressures also confront court, community supervision, and prison system personnel and can lead to analogous errors. Consider, for example, jury deliberations—jurors may seek to come to a speedy verdict so as to return more quickly to their everyday work responsibilities and, in the course of deliberating, give precedence to information that enables a rapid decision (see, generally, Casper, Benedict, & Perry, 1989; Devine, Clayton, Dunford, Seying, & Pryce, 2001).

A different type of satisfaction of search error can arise when criminal justice practitioners seek to expeditiously arrive at a sanctioning and treatment plan. Given substantial caseloads, practitioners may prioritize the most conspicuous or seemingly obvious causal factor, such as drug use, that they believe contributes to the offender's behavior. In such cases, even though an

offender's behavior likely arises from multiple factors, only one factor is apt to be given much attention. The emphasis on drugs is, in fact, illustrative. Drug courts have proliferated in recent decades (Nolan, 2003), and their very focus on drug use and addiction arguably creates a structured incentive to give greater attention to drug problems—whose causal relationship to criminal behavior remains subject to debate (White & Gorman, 2000)—than, say, employment, family, housing, or mental health problems. Most drug courts operate under a model that calls for comprehensive assessment and services, but in practice, in a context of large caseloads and minimal resources, priority may be given primarily if not exclusively to drug treatment. There is, of course, no error if the drug use is the sole or primary cause of an offender's behavior.

Inexperience or clinical intuition error. Misdiagnosis may result when a physician, whether due to inexperience or limited clinical intuition, is unable to discern when a case calls for a unique diagnosis, or when certain symptoms, whether in isolation or in the presence of others or unique conditions, indicate a unique case (Groopman, 2007, p. 20). Inexperience error is not particular to medicine, and, indeed, it arguably is more pervasive and problematic in criminal justice because of the diverse types of needs among correctional populations, high rates of practitioner turnover, underresourcing of programs and services, and substantial correctional population growth (Lynch & Sabol, 2001; Petersilia, 2003; Travis, 2005).

Staff turnover in a context of dramatic increases in offenders under some form of correctional supervision almost necessarily leads to inexperience error.[6] Conover's (2000) account of his year working at Sing Sing prison in New York provides a colorful illustration of the repeated mistakes first-year officers, "newjacks," make—such as failing to appreciate the specific warning signs of a violent outburst from an inmate or of a riot—which in turn can lead to increased risk of harm to inmates and officers alike.

As with medical practice, criminal justice administrative structures and cultures can contribute to inexperience and clinical intuition errors. For example, a failure to train prison officers how to recognize signs of mental illness can result in officers interpreting certain behaviors as evidence of a propensity to be violent rather than, say, evidence of schizophrenia. More generally, large caseloads and concerns about such issues as consistency can lead to an

increased reliance on uniform methods of handling cases, methods that may work well in "average" but not atypical cases. Indeed, one of the more frequent complaints about mandatory sentencing guidelines, which typically have been enacted to reduce inconsistency in sentencing, is that they preclude consideration of unique dimensions of particular cases that bear on appropriate sentencing, service, and treatment decisions (Forer, 1994). Similar complaints have been leveled against systems that rely heavily on actuarially-based risk assessment instruments to the exclusion of clinical judgment (Cullen & Gendreau, 2000).

Specialist error. Medical specialists may—because of their emphasis on narrow categories of diseases—accurately diagnose diseases for diseases that fall under their purview but may be prone to misdiagnose "run-of-the-mill cases." The reason, as Groopman (2007, p. 98) has noted, is that "people used to doing complicated things usually do complicated things in simple situations—for example, ordering tests or x-rays when waiting a few days might suffice—thus overtreating people with simple illnesses and overlooking the clues about other problems that might have brought the patient to the doctor."

Specialist error can occur in criminal justice as well. For example, specialists may "see" only the symptoms or problems related to their area of focus: drug treatment providers may "see" only drug problems, mental health providers may "see" only mental illness, and so on, when in fact other factors may contribute to an individual's offending patterns. As with satisfaction of search error, addressing one criminogenic factor will likely be ineffective if other factors are ignored (Cullen & Gendreau, 2000; MacKenzie, 2006). That is true not only at the individual level but at a systems level. To illustrate, consider the possibility that gang and prison management experts may, in some cases, be prone to see more of a problem than exists. "Get tough" responses to immigrant crime have, for example, been spurred in no small part by law enforcement attention to immigrant gangs. The presence, though, of immigrant gangs, or even an influx of such gangs, does not mean that immigrants, legal or illegal, are increasingly committing crime or that increased immigration causes increased crime (Butcher & Piehl, 1998; Freilich & Newman, 2007; Mears, 2001).

One related consequence of specialist error is overdiagnosis and mistreatment. One positive

drug screen may, for example, lead a drug treatment provider to immediately recommend increased supervision and substance abuse counseling. A dysthymic period affects most everyone at some point, but to a mental health counselor it may resemble symptoms antecedent to major depression or disordered behavior and, accordingly, lead the counselor to recommend treatment. In both cases, the "proactive" response may be appropriate "on average" but nonetheless be inappropriate in a large number of cases.

Affective error. This type of error may arise when physicians prefer diagnoses that are more favorable than "the less appealing alternatives" (Groopman, 2007, p. 47). Put differently, physicians, like many people, are subject to a tendency to let hope and optimism dictate their judgment—"[physicians] lull themselves into thinking that what we wish for will occur when we get the first inkling, however fragmentary, that our wish may come true. In short, [physicians] value too highly information that fulfills [their] desires" (p. 47).

As with the other types of errors, examples of this type of error can be found in criminal justice. Consider court-appointed defense attorneys, who frequently receive limited compensation for their work with indigent defendants. In such cases, some attorneys may fail to exercise due diligence in defending their client and do so in part based on a hope that an outcome that they feel is certain will not in fact occur. Such errors may be especially likely in situations where pressure to quickly plea bargain cases allows limited time or support for exploring a full range of legal strategies. Like doctors, defense attorneys also may be influenced by their attachments to defendants, and allow such attachments to affect the legal strategies they pursue.

Different types of affective errors may arise in criminal justice. For example, prosecutors may pursue charges that they feel are not necessarily the appropriate ones but that they believe will sit better with the public. In addition, with some crimes, such as rape, systematic mislabeling, or vague labeling, of the offense may happen out of a desire to protect victims (e.g., a rape may be classified as an "aggravated assault"). Such labeling, however, may lead to misclassification by the criminal justice system.

Inattention error. Physicians may become prone to making "easy" diagnoses, in turn misdiagnosing cases where clinically relevant symptoms actually indicate that different diseases

are present (Groopman, 2007, p. 77). At least three types of inattention error exist, each of which in part stems from pressures in high-caseload settings to diagnose and treat cases quickly. The first is listening error, wherein physicians fail to listen carefully to patients, or to elicit and respond thoughtfully to clinically relevant information from patients (p. 17). The second, a variant, is committed non-listening error, wherein physicians cease listening to a patient, especially when they feel that all possible explanations have been exhausted, that they have actually accurately diagnosed an illness, or simply do not like the patient (pp. 25, 125).[7] The error lies in the fact that, in such situations, physicians may fail to hear a relevant clinical symptom or have not actually exhausted all possibilities. It is more likely in situations where physicians are unaware of their limitations, too strongly assume that their diagnoses are correct, that it is not possible to diagnose a problem, or lack the experience or knowledge to diagnose an illness, the latter being an especially acute problem if the physician does not recognize his or her limitations (p. 125).[8] The third type arises from reliance on technology, such as rote filling in information on templates, which may lead to misdiagnosis through a reduced likelihood of discerning or intuiting connections from clinically relevant information that would lead to a correct diagnosis (Groopman, 2007, p. 99). Under these circumstances, "the doctor's mind is set on filling in the blanks on the template," and thus "is less likely to engage in open-ended questioning, and may be deterred from focusing on data that do not fit on the template" (p. 99).

Such errors are likely in criminal justice, where individualized sanctioning and treatment frequently are promoted but where large caseloads largely preclude such individualized and careful attention. Consider, for example, that "85 percent of all U.S. parolees are supervised on regular caseloads, averaging 66 cases to one parole officer, in which they are seen (face to face) less than twice per month" (Petersilia, 2003, p. 84). Large caseloads would, on the face of it, appear to preclude officers from providing more than superficial monitoring or assessment of parolee behavior. In addition, excessive caseloads might well contribute to institutionalize officer inattention and related errors, leading officers to fail to identify when a particular individual may be especially prone to recidivate.

Risk assessments increasingly are called for and used in criminal justice settings, and their

major advantage is that they can create more objective assessments about individual offenders (Cullen & Gendreau, 2000). Such approaches, however, also may lead to situations in which risk assessors miss what might otherwise be obvious problems for a given offender. For example, a constellation of risk factors might be due to a problematic family situation (Agnew, 2005), yet the risk assessment might not draw attention to that fact because of the emphasis on counting a range of specific factors to create an overall risk score.

Action bias error. When doctors feel compelled "toward action rather than inaction" and thus pursue any diagnosis—out of overconfidence or "when a physician is desperate and gives in to the urge to 'do something'"—they may misdiagnose patients (Groopman, 2007, p. 169). Physicians also may feel compelled to provide any diagnosis or, indeed, simply to make one up, rather than acknowledge that they do not know what illness a patient has (p. 160).

Policymakers appear to be especially prone to action bias, which results in ever-increasing numbers of new policies, few of which ever are evaluated and many of which not only are poorly implemented but likely are ineffective. For example, in the wake of the murders of Polly Klaas in California and Meghan Kanka in New Jersey—both perpetrated by released offenders—the public pressured state legislatures to abolish parole (Petersilia, 1999). By 1999, fourteen states abolished parole release, and many more increased restrictions on release decisions. Although abolishing parole was a politically palatable response to public fear, many have argued that it led to an unnecessary and ineffective correctional practice that ultimately endangered rather than ensured public safety (Burke, 1995; Kuziemko, 2006; Petersilia, 1999).

Action bias error also occurs at the practitioner level. Criminal justice practitioners are required, by policy, practice, or specific rules, to automatically take action in certain cases. For example, if a parolee is even a few minutes late for their check-in, a parole officer might be required to document the fact that the parolee was late and to apply some type of sanction. Although such steps may make sense in some cases, it likely is unnecessary in many others.

Similarly, courtroom actors are subject to action bias error. Prosecutors may feel compelled to obtain more convictions and to do so quickly. In so doing, they give priority to their role as adversaries—acting in opposition to defense lawyers—rather than their role as fact finders. As

noted by Forst (2004, p. 118): "Prosecutors err . . . when they play the role of adversary aiming for a high conviction rate rather than fact finder in pretrial disclosure proceedings." Finally, defendants accused of particularly heinous crimes may be subject to action bias error on the part juries, who may feel a moral obligation to hold someone accountable (Hoiberg & Stires, 1973).

Framing (ripple effect) error. A diagnosis may be incorrect and, because it "frames" the description of the patient, may have ripple effects by predetermining not only the initial but also all subsequent selection and interpretation of clinically relevant information (Groopman, 2007, p. 3, 22). Incorrect framing of a case may lead subsequent physicians to think about the patient only through one frame and ignore other possible diagnoses (p. 22).

In criminal justice, some individuals may, from an early age, be cast as "offenders," and then the label follows them. "Sex offender," for example, conjures images of individuals who are sick psychopaths who never change and commit terrible acts. Yet, a wide range of offenses fits within that broad category. In addition, under many laws, initial labels have long-term repercussions. Regardless of the specific sex offense, for example, a "sex offender" will typically be subject to mandatory sentences and be required to have their address and personal information included on sex registries (Sample & Bray, 2003). Similarly, preconceptions about what causes a particular individual to offend (e.g., mental illness) may lead to long-term treatments and interventions, including supervision plans, that bear little relation to the true cause (e.g., low self-control) of the person's offending.

Framing error can operate at the systematic level as well. Farrington, Jolliffe, Loeber, Stouthamer-Loeber, and Kalb (2001) have highlighted the possibility in their focus on which individuals garner police attention and by research on how probation officer reports and detention decisions influence conviction and sentencing decisions (Bridges & Steen, 1998; Sampson & Lauritsen, 1997). In the Farrington et al. (2001) study, the authors argued that parents' criminality may engender police and court bias in responding to the behavior of the parents' children. Put differently, the children of known criminal parents may be more likely to arouse police suspicion and interference, and their behavior may then be addressed more punitively by the courts. A large literature reveals an analogous framing error effect by place—

residents in some areas may be given more intense police scrutiny, leading to disproportionately more arrests relative to areas with similar levels of offending (Ratcliffe, 2003).

Unproven diagnosis and treatment error. Certain diagnoses and treatments may lack much if any rigorous empirical support and yet be used (Groopman, 2007, pp. 135, 206, 217).[9] Two variants exist. First, common diagnosis and treatment error occurs when certain diagnoses and treatments are commonly used and yet lack a solid empirical foundation (Groopman, 2007, p. 135). In pediatric cardiology, for example, much of daily practice consists of making up solutions "on the fly" (p. 135). Over time, physicians may come to believe certain treatments are the only and best ones, and thus fail to consider other potentially better interventions (pp. 137-140). This error also emerges when certain treatments are viewed as appropriate for all cases, even when no disease is present or when different approaches might be indicated. To illustrate, post-menopausal women frequently are encouraged to take estrogen even when there is no disease present—the goal is to prevent onset of heart disease and stroke—or when such treatment may not be appropriate for them (p. 218). Second, idiosyncratic diagnosis and treatment error occurs when physicians come to believe in certain diagnoses and the effectiveness of specific treatments even though both the diagnoses and treatments are unproven (pp. 206, 217). Pharmaceutical companies, for example, pressure physicians to write prescriptions for certain drugs even where use of the drug may be unwarranted and where the effectiveness, as well as the relative effectiveness of the drugs (as compared with other drugs), may be unknown or based on only a handful of studies (p. 206).[10]

Unproven treatment error appears highly prevalent in criminal justice, reflected in part in crime policy fads, such as the increased use of drug courts (Nolan, 2003) and supermax prisons (Mears & Watson, 2006). There also are trends in common treatment from one decade to the next—as noted above, parole once was popular and increasingly is less so (Travis, 2005). Examples of programs and policies that have been enacted without formal testing or evaluation are ubiquitous in criminal justice, and, indeed, in many social policy arenas (Mears, 2007). Policies designed around the idea of selective incapacitation are illustrative. Beginning with the long-standing and well-replicated observation that a small group of chronic offenders is

responsible for a large portion of all crime (Wolfgang, Figlio, & Sellin, 1972), the logical policy application was to identify and incapacitate that group of offenders in hopes of achieving substantial reductions in crime. The consequences of such policies, however, have been far from a realization of the original intent (Shichor, 1997) and have been undermined in no small part by the limited accuracy of many risk prediction instruments (Hart, Michie, & Cooke, 2007).

Unproven treatment error is also evident in attempts to transplant effective practices and policies from one implementation site to another, without sufficient consideration of how context influences effectiveness (Bardach, 2004; Heckman & Smith, 1995). To illustrate, in her discussion of the Greater Newark Safer Cities Initiative, which proved successful in reducing violent in Newark, New Jersey, McGloin (2005) emphasized the importance of a thorough, context-specific problem analysis, and noted that the effectiveness of the "pulling levers" strategy, central to the Initiative, stemmed from the three years of collaboration, regular meetings with all stakeholders, spatial mapping, and network analysis of Newark data.

In sum, many of the cognitive errors that lead to poor decision making in medicine have analogues in criminal justice decision making. Other types of errors exist that do not appear to have obvious parallels to criminal justice.[11] Ultimately, as is discussed below, what is needed is not only an index of errors that occur at various stages of the criminal justice system but also identification of those that may be unique to any given stage.

Implications for criminal justice policy, practice, and research

A systematic and comprehensive focus on decision-making errors provides a platform for improving the efficiency and effectiveness of the criminal justice system, especially if coupled with current performance monitoring efforts and a commitment to evidence-based practice. To this end, a number of implications arise from a focus on decision making. These implications provide a roadmap for policymakers, officials, practitioners, and researchers to take steps toward making improved decision making and monitoring a central feature of the criminal justice system, changes that in turn can increase the effectiveness of this system.

First, for any benefits to arise, research on the various types of decision-making errors is paramount. In particular, studies should be undertaken that assess the prevalence of different types of decision-making errors throughout all stages of the criminal justice system (e.g., enactment of criminal law by legislators, assignment of law enforcement to particular areas, arrest, detention, sentencing, incarceration, supervision and treatment) and among all practitioner groups (e.g., judges, prosecutors, probation, parole, and correctional officers).[12] A systems-oriented perspective is critical to such research because it highlights the fact that some errors may be more prevalent at certain stages, and that errors at any given stage may contribute to those at other stages. For example, action bias errors may be more common among prosecutors than among probation officers, and framing errors that take place at the prosecution stage may be continue to exert an effect on decision making at the reentry stage.

Research on the various types of decision-making errors should be coupled with research on which types of errors are most consequential. Such research is essential because it is neither feasible nor necessary to monitor the system for virtually all errors (Forst, 2004, p. 6) and because reducing some errors may have greater impacts. Specialist error, for example, may be particularly problematic among policymakers. Their narrow, and indeed almost exclusive, focus on creating laws to address exigent societal problems may lead them to develop extreme responses to "run-of-the-mill" problems. Given that such errors can have profound ripple effects throughout the criminal justice system, they merit especially close monitoring. In identifying the most prevalent and consequential errors, it is, at the same time, important to identify the causes of such errors to be able to reduce or eliminate them.

Second, efforts to improve decision making should be guided by a focus on systemic rather than "silver bullet" solutions, especially given that many errors result from the structure, culture, and interconnectedness of different parts of the criminal justice system. The appeal of "silver bullet" solutions lies, of course, in their simplicity. In commenting on the state of medical practice, Gawande (2007, p. 21) has written: "We always hope for the easy fix: the one simple change that will erase a problem in a stroke. But few things in life work this way. Instead, success requires making a hundred small steps go right—one after the other, no slipups, no

goofs, everyone pitching in." His comments were directed to medical practice but apply equally well to the criminal justice system (Marx, 1995). In both medicine and criminal justice, for example, the sheer volume of cases alone dictates that certain types of errors will occur (Groopman, 2007, p. 86; see also Gawande, 2007). When physician caseloads expand, they necessarily have less time to spend with each patient. They therefore must increasingly rely on a limited set of heuristics, thus increasing the likelihood that heuristic errors will occur (Groopman, 2007, p. 178). A similar process can be expected to unfold in criminal justice, especially in corrections, where populations have greatly increased (Forst, 2004; Travis, 2005).

Other systemic factors may increase decision-making errors. Physicians, for example, occupy a status role in which nurses and other practitioners may be reluctant to challenge them, use language that frequently may create a barrier between them and patients, and treat patients who, in general, lack the knowledge or wherewithal to challenge their decisions. Similarly, the adversarial nature of courtroom proceedings likely ensures that certain decision-making errors occur. For example, criminal court prosecutors focus on convicting criminals, and thus may be prone to availability and attribution errors—that is, because they see criminals on a daily basis, they may assume that most defendants in fact are guilty (availability error), and because they assume such guilt they may tend to focus only on those facts that support the "diagnosis" of guilt (attribution error) (see, generally, Davis, 2007). More generally, research shows that workgroup culture varies from court to court, and that this culture influences decision making, including, not least, sanctioning and treatment determinations (Ulmer & Bradley, 2006).

A systems focus highlights the interconnectedness of the various components of the criminal justice system, and, in particular, how multiple errors may occur at the same time, how one error may amplify the effects of another, and how an accumulation of errors may contribute to such decisions as whether someone is treated, incarcerated, or paroled. To illustrate, if a satisfaction of search error occurs early-on by a probation officer, that assessment may color any written or orally transmitted descriptions of the offender, as might occur with a pre-sentence investigation report, in turn creating a framing error with ripple effects for sentencing and classification decisions (Forst, 2004, p. 174).

Third, and more concretely, a focus on decision making can contribute to more effective individualized processing, sanctioning, and treatment decisions, including efforts to customize prevention programs to the unique contexts of specific communities. In criminal justice, both the causes of and effective treatment for offending among specific individuals may vary, and so successful attempts to prevent and reduce offending among such individuals must proceed on a case-by-case basis. As meta-analyses indicate (e.g., Cullen & Gendreau, 2000), individualized sanctioning and treatment can lead, on average, to better outcomes (e.g., reduced recidivism). The critical task, then, lies with ensuring that practitioners responsible for making sanctioning and treatment decisions make appropriate and effective decisions about particular individuals.

In a similar vein, a focus on decision making can highlight the importance of individualizing crime prevention strategies for local communities. Epidemiological efforts must, if they are to be successful, take account of the unique conditions in communities (Rothman & Greenland, 1998). It is not necessarily the case that different treatments are needed, as may be the case with offenders, but rather that different strategies for distributing a treatment may be necessary because of the specific social conditions or cultural traditions in particular communities (Gawande, 2007; Mrazek & Haggerty, 1994). Similarly, crime prevention efforts are more likely to be effective when they involve, as with community policing programs, local citizen and police partnerships to identify the specific causes of crime in an area and how best to address them given the unique social and historical context of the area (Greene, 2000; McGloin, 2005). Such efforts may be more effective if coupled with systematic, empirical analysis, and the application of general knowledge about crime causation (Peak & Glensor, 2004; Ratcliffe, 2003). Here, again, the lessons from medicine point to the need to identify how decisions are made to allocate crime prevention resources, what assumptions underlie the decisions, and whether there is any flaw—a cognitive error, for example—affecting the decisions.

Fourth, an emphasis on decision making can highlight the importance of performance monitoring and, in turn, increase accountability by explicitly identifying individuals or groups responsible for specific decisions. For example, monitoring efforts frequently entail repeated measurement of various activities that a given agency or program is supposed to undertake. By

focusing on activities rather than specific systems agents, however, organizations obscure who exactly is responsible for the activities. By contrast, by focusing on decision making as an organizing principle for performance monitoring, organizations must explicitly identify not only which decisions are important, but also who is responsible for making them.

Fifth, systematic efforts to monitor and assess decision making throughout the criminal justice system can draw attention to the fact that "evidence-based" programs need not be, and often cannot be, based on the "gold standard" of research—experiments. Instead, in many instances, recourse to other types of research is needed. Studies of "what works" are, of course, essential to identifying programs that can reduce recidivism (Farabee, 2005; Farrington & Welsh, 2007; MacKenzie, 2006; Sherman, 2003). Yet, much of what occurs in criminal justice cannot be studied through experiments. The same is true in medicine; for example, randomized clinical trials involving different birthing techniques are not conducted, nor would such research be ethical (Gawande, 2007). In addition, experiments frequently focus on unrealistic scenarios—the use of a particular intervention in isolation from other interventions, sufficient funding, resources, and staffing, and the like (Heckman & Smith, 1995). They also typically privilege individual-level focused interventions, given that experiments with communities involve too many challenges (Mrazek & Haggerty, 1994). In turn, excessive emphasis on experiments to the exclusion or diminishment of monitoring efforts, can indirectly create the groundwork for a fundamental cognitive error among policymakers, practitioners, and researchers—namely, the notion that the causes of crime lie primarily with individuals rather than with social conditions.

Juxtaposed against such issues stands the fact that basic monitoring efforts of critical decisions can serve to identify areas where substantial improvements can be made to reduce recidivism or, more generally, to improve decision making (Walker, 1992). For example, many criminal justice systems use risk and needs assessment instruments to determine which individuals merit closer supervision or, say, drug treatment. To what extent, however, do practitioners use the resulting information? Also, how often do they use it appropriately? How often are decisions about detention and treatment based on subjective assessments rather than the use of objective, actuarial assessments? Given that the latter have been found to be more

accurate (Cullen & Gendreau, 2000), any substantial discrepancy would point to a need for change, which in turn could result in improved supervision of offenders and potentially, in turn, reduced recidivism rates (Petersilia, 2003; Piehl & LoBuglio, 2005).

Finally, one way to encourage monitoring of decision-making errors throughout the criminal justice system, and performance monitoring more generally, is to charge state-run independent agencies with monitoring and assessing criminal justice system practices. The need for such an agency stems from at least two considerations: most criminal justice systems are not unified under one umbrella agency and, even when they are, monitoring efforts by criminal justice system researchers may be viewed as biased. By contrast, a legislatively established autonomous agency could be charged with providing ongoing assessments of criminal justice system decision making and activities. Full autonomy is not realistic, but close approximations, such as the now disbanded Texas Criminal Justice Policy Council, exist (see, generally, Blumstein, 1997; Cullen, 2005; Petersilia, 1991). The U.S. General Accountability Office represents another potential model to guide states in developing independent agencies charged with continuous, systematic assessment of criminal justice operations.

Conclusion

Despite calls for increased government accountability and the fact that performance monitoring can be critical to increasing the accountability, efficiency, and effectiveness of criminal justice systems, there remains much room for improvement (Gaes et al., 2004). There is, in particular, a need to focus on the quality of decision making made by actors throughout the criminal justice system. This focus on decision making as it occurs throughout the system is critical given that what occurs in one part of a system can influence another. Yet, at present, few states have independent agencies responsible for ensuring that all aspects of the criminal justice system are monitored, much less for monitoring decision making among diverse system actors.

The situation cannot be attributed to a decreasing need for accountability. To the contrary, the increases in correctional populations and expenditures, the broad-ranging harms that can

result from recidivism, miscarriages of justice, and the impact of system inefficiencies and ineffectiveness on taxpayers, victims, offenders, families, and communities—these all point to the need for more, not less, accountability.

Against that background, this article highlights the centrality of decision making to efforts to promote accountability in the criminal justice system and to increase its efficiency and effectiveness. Although a large body of studies exist that sometimes examine specific decision points (Walker, 1993), such as police officer decisions to conduct traffic stops, to date no systematic foundation exists for organizing such studies or for identifying the types of decision-making errors that can undermine effective decision making.

As a corrective to the problem, this article argues that efforts to improve the efficiency and effectiveness of the criminal justice system can emerge by drawing lessons from other social policy arenas, the medical system in particular. Such a comparison highlights that decision making is a critical dimension throughout the medical and criminal justice systems—not just at a few select points where key personnel have the ability to exercise considerable discretion (Miethe, 1987; Walker, 1993)—and that an understanding of that fact requires recognizing the role of systems in affecting decision making. Larger caseloads, for example, increase the likelihood that different types of "cognitive errors" occur, accumulating with or amplifying the effects of one another and potentially causing ripple effects that ultimately lead to inefficiencies and poor outcomes. To illustrate, an officer who inappropriately profiles a person—a prototype error—may lead to that person being arrested and even prosecuted and sentenced while the true offender remains untouched. In a high-volume urban district, prosecutors may feel pressure to process cases quickly and so be more likely to commit "satisfaction of search" errors, where they rapidly search for and find guilt and then cease questioning their judgment. The effects of such errors can be compounded in situations where public defenders, due to similar caseload pressures, commit listening errors and so fail to adequately represent clients.

This article detailed a series of implications for policymakers and criminal justice officials, practitioners, and researchers. Here, these implications are summarized. First, not all decision making is necessarily plagued by errors or especially consequential. Thus, any effort to

incorporate decision-making monitoring into a broader performance monitoring strategy requires that researchers first document which errors occur most frequently and appear likely to have the greatest impact. For example, policymakers, because their main role is to create policy, may be especially prone to commit action bias errors in which they feel compelled to implement any policy, regardless of the evidence for a problem or the effectiveness of the policy for the problem. Such errors would seem to merit close attention precisely because they can result in costly investments in strategies that not only consume considerable resources but also impose demands on systems that already are overburdened.

Second, policymakers' and officials' efforts to improve decision making should be targeted toward the system as a whole, rather than isolated parts of it. Such an approach can help ensure that systemwide changes, if needed, can be identified. It also can serve as a reminder that "silver bullet" approaches to increasing the efficiency and effectiveness of the criminal justice system are unlikely to work.

Third, at the same time, policymakers, officials, and practitioners should focus on ways that decision making can be improved at many specific points throughout the criminal justice system. Here, again, investing in systematic, empirical monitoring of decision making can provide a platform for making improvements in such dimensions as efforts to individualize sanctioning and treatment and to develop appropriate and effective community-level crime prevention efforts.

Fourth, a decision making-focused performance monitoring system should be used to establish who is accountable for specific activities and outcomes and to evaluate how well those who are accountable performed. From this perspective, it is not sufficient simply to establish whether, for example, specific activities were or were not performed. Separate from establishing such facts is the need to assess whether appropriate decisions were made and whether room for improvement—through better decision making—could be obtained.

Fifth, a decision-making monitoring system should be used by policymakers and criminal justice officials, practitioners, and researchers to identify areas where improvements can be made. Such an approach holds the promise of yielding significant increases in the efficiency and effectiveness of the criminal justice system, possibly more so than a sustained attempt to focus

only on adopting evidence-based practices. Indeed, as the evaluation literature establishes, even the best programs and policies will fail if poorly implemented (Rossi et al., 2004), and if decision making is poor, than so, too will be the implementation of most programs and policies. More generally, poor decision making can contribute to misguided, and, in turn, ineffective, practice.

Ultimately, accountability stems from identifying who is responsible for specific actions, monitoring those actions, determining when problems exist, and taking corrective steps. When the actions occur within a systems context, such efforts require that monitoring occur by an organization charged with assessing a given system. For this reason, the final, and central implication arising from the analysis here is the need for state level agencies that operate, to the extent possible, independently of the criminal justice system, legislatures, and the executive branch. The Texas Criminal Justice Policy Council and the U.S. Government Accountability Office illustrate two ways in which such agencies might be structured.

Much of what happens in criminal justice occurs within a "black box" (Mears, 2008). The almost inevitable result is that needless errors in judgment occur that impose substantial costs on individuals and society. In his recent Sutherland Address, Nagin (2007) argued that "choice" should be moved to center stage in criminological research. His focus was on the need for greater research on the diverse factors that influence the choices—criminal behavior, in particular—individuals make. Extending that general argument to criminal justice system actors, this article submits that one way to illuminate the "black box" is to implement performance monitoring for documenting and assessing decision making throughout all parts of the justice system, including decision making by all of the diverse actors within it. In short, systemwide decision making should be moved to the center stage of accountability efforts in criminal justice.

Notes

1. Gawande (2007, p. 207) has written about the problem, observing: "In recent years, there has been a proliferation of efforts to measure how various hospitals and doctors perform. No one has found the task easy. One difficulty has been figuring out what to measure." One notable federal monitoring effort, conducted between 1986 and 1992, focused on hospital death rates (pp. 207-208); however, "death rates are a poor metric for how doctors do. . . . What one really wants to know is how we [doctors] perform in typical circumstances—some kind of score for the immediate results, perhaps, and also a measure of the processes involved. For patients with pneumonia, how often does my hospital get them the correct antibiotic, and on the whole how do they do? How do our results compare with those of other hospitals?" (p. 208).

2. Forst (2004) has investigated ways in which "errors of justice" arise (e.g., wrongful convictions) and how they can undermine the perceived legitimacy of the justice system. The focus of the present research is more broadly on cognitive decision-making errors, such as occur in medicine, that may influence the quantity and quality of decision making throughout all stages of the criminal justice system, and in turn, the system's efficiency and effectiveness.

3. In some cases, a type of error identified by Groopman (2007) was renamed to clarify distinctions among the different types examined here. The topic of clinical decision making has been increasingly investigated in medicine (Downie & Macnaughton, 2000; Mamede, Schmidt, & Rikers, 2007; Redelmeier, 2005; Sandhu, Carpenter, Freeman, Nabors, & Olson, 2006).

4. Under this clinical algorithm approach, diagnosis proceeds in linear manner, evaluating hypotheses one by one, and assigning statistical probabilities each step of the way (Groopman, 2007, p. 11). In reality, few doctors think this way, and even if they do, may assign incorrect probabilities or fail to think "outside the box" in situations where doing so might result in a more accurate diagnosis and thus treatment (p. 12). Such error is less likely when sufficient time exists to work systematically through various differential diagnoses, as occurs with "bedside rounds" during medical training. The problem, however, is that sufficient time rarely exists in day-to-day practice and that doctors typically make decisions on their own, not in groups (p. 34).

5. Such errors are likely given that doctors are not formally trained in the use of heuristics and their limitations (Groopman, 2007, p. 36). Put differently, many physicians lack well-developed and accurate pattern recognition skills and thus may make more mistakes (pp. 167, 196). They also may fail to recognize when an accurate diagnosis may require considering diagnoses beyond those suggested by the heuristics on which they are relying. One example—radiologists may review up to 25,000 cases annually (p. 178). In this field, "conclusions from first impressions, or 'gestalt,' are supposed to be the mark of good training, much as 'shooting from the hip' is prized among ER doctors" (p. 178). The approach can lead, however, to errors that, without a review process, go unchecked. The problem is acute when measurement error (e.g., taking x-rays of only part of what may be clinically relevant) and intraobserver variability (e.g., differences in how clinicians interpret the data) exist (pp. 179-181).

6. In theory, an endless supply of former correctional officers willing to return to the field of corrections might exist. That, however, does not appear to be the case.

7. Notably, Groopman (2007) asked physicians what they would do if they "perceived a negative attitude from their doctor"; they reported that they would "find another doctor" (p. 26). That view is of interest because it indicates that the "insider" perspective is that physicians who harbor a negative view of patients are unlikely to change their decision making algorithm.

8. This type of error can also be termed "yin-yang out" error—a patient may be "worked up the 'yin-yang'" and then be put "out" (i.e., dismissed)—the "failure to think of a new direction, because you assume all have been explored," is a "yin-yang out" mistake (p. 72).

9. Such error may stem from uncertainty error, which occurs when physicians disregard the amount of uncertainty concerning the evidence for a specific diagnosis and its treatment, leading to misdiagnosis or arbitrary treatment, as occurs when the default treatment for a given illness at one hospital is different than that used at another (Groopman, 2007, p. 153).

10. Many examples exist, including the increased promotion of testosterone drugs to enhance sexual function (p. 206), such pain medicines as Vioxx (p. 213), and surgery for back pain (pp. 224-231). This problem is amplified by certain medical insurance industry practices, such as

greater and more certain reimbursement for certain practices (p. 228).

11. Two examples illustrate the point. The first is rare illness retreat error. Here, misdiagnosis occurs when physicians retreat from exploring whether rare diagnoses fit particular cases even though a rare illness may actually be present (Groopman, 2007, p. 127). Modern medicine, as influenced by the health insurance industry, strongly shies away from performing exploratory tests to identify rare illnesses. That is, there is a bias against looking for "zebras" (i.e., rare illnesses) in a context where most of the time there are horses (i.e., run-of-the-mill illnesses) (p. 127). "In fact, some physicians are called to account for ordering too many tests because they may turn up only one correct diagnosis out of twenty-five, a hundred, or five hundred, and because the money would be better spent on something else. Unless, of course, that one zebra case turned out to be the bean counter's own child" (p. 127). "To add to that pressure, doctors who hunt zebras are often ridiculed by their peers for being obsessed with the esoteric while ignoring the mainstream" (p. 127). In addition, physicians frequently will lack the "courage of their convictions" because of their minimal experience with "zebras" (p. 127).

The second is phrasing error—how a physician "phrases his recommendations can powerfully sway a patient's choices" (Groopman, 2007, p. 242), leading patients to decisions that may not be in their best interests. For example, patents will more likely accept a recommendation when the treatment is stated in positive ways (e.g., you have a 30 percent chance of living) rather than negative ways (e.g., you have a 70 percent chance of dying) (p. 242). The error is not misdiagnosis but rather of consciously or unconsciously pushing patients to accept certain treatments over others. This error is manifest in other ways, as when physicians deliver information in a way that leads patients to trust overly in their assessment (p. 266).

12. In a similar vein, Forst (2004) has noted that one type of error of justice—inappropriate sanctions—can be caused by "officials in any of the three branches of government" (p. 173), including legislators, probation and parole officers, judges, governors, and presidents. By extension, attempts to reduce inappropriate sanctioning requires attention to all these groups.

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Table 1. Types of Errors in Decision Making in Medical Practice*

- **Clinical algorithm error**. Mode of diagnosis may lead to misdiagnosis for unusual cases. Two key types: Bayesian error may arise when there is insufficient time or information for a Bayesian analysis; heuristics error may arise when emphasis is placed on certain patterns over relevant ones.
- **Initial impression error**. Initial impressions or intuitions may be incorrect; a variant is confirmation bias error (a physician anchors on to a diagnosis and "cherry picks" supporting symptoms).
- **Availability error**. What is most available in a physician's mind may dictate diagnosis; a variant is "last bad experience" error (exploration of unlikely diagnoses to avoid more bad experiences).
- **Patient attribution error**. Preconceptions about patients and their attributes may cause misdiagnosis by leading to selective emphasis of symptoms and interpretations that fit with the preconceptions.
- **Disease prototype error**. Physicians may expect a disease to emerge only in certain "prototypical" cases, leading to misdiagnosis in atypical cases.
- **Satisfaction of search error**. Occurs when physicians stop searching for a diagnosis once they find one that seems to more or less fit the symptoms, even if the diagnosis is incorrect.
- **Inexperience or clinical intuition error**. Due to inexperience or limited clinical intuitiveness a physician may be unable to discern when a situation calls for a unique diagnosis.
- **Specialist error**. Given their narrow focus, specialists may misdiagnose "run-of-the-mill" cases.
- **Affective error**. Occurs when physicians prefer diagnoses more favorable than less appealing ones.
- **Inattention error**. Due to seeing high volumes of similar cases, physicians may make "easy" diagnoses, thus misdiagnosing cases where symptoms indicate that other diseases are present. Three key types: listening error may arise when physicians fail to listen carefully to patients; committed non-listening error may arise when physicians feel that they have exhausted all possible explanations or have accurately diagnosed an illness; reliance on technology error may arise when rote filling in of information reduces the discerning of connections necessary for making a correct diagnosis.
- **Action bias error**. Occurs when physicians feel compelled "toward action rather than inaction" and thus pursue any diagnosis, even a made-up one.
- **Framing (ripple effect) error**. Errors in initial diagnosis may cause ripple effects of misdiagnosis because care occurs within a system, and initial framing of cases may dictate subsequent diagnosis.
- **Unproven diagnosis and treatment error**. Certain diagnoses and treatments may lack much if any rigorous empirical support and yet be used. Two key types: common treatment error may arise when certain treatments are commonly used and yet lack a solid empirical (scientific) foundation; idiosyncratic treatment error may arise when physicians believe in idiosyncratic diagnoses and treatments. Such errors may stem from uncertainty error, which occurs when physicians disregard the amount of uncertainty concerning the evidence for a specific diagnosis or treatment.

* Source: Adapted from Groopman (2007).