ISSUE NO. 284

NATIONAL INSTITUTE OF JUSTICE
JOURNAL

12/2022

Focus on:
Justice Systems

IN THIS ISSUE

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National Institute of Justice

DIRECTOR'S MESSAGE

What an honor to write my first message for NIJ's flagship publication!

As this issue of the *NIJ Journal* goes to press, I have been director of NIJ for just over six months. It is such a tremendous privilege to direct the Justice Department's chief science agency, promoting research, technology development, and evaluation rooted in the social, forensic, and physical sciences.

I believe that scientific evidence plays a critical role in promoting an equitable justice system and improving public safety for all Americans. That is why one of my top priorities as director is to foster research that is both rigorous and inclusive.

Rigorous research can take many forms, from randomized controlled trials and strong quasi-experimental designs to qualitative research designs. In fact, many of the best studies use both quantitative and qualitative methods. I am a big believer in these mixed-methods approaches, which I like to call "numbers plus narratives." The numbers are important because they are the empirical evidence, but without the narratives, without engaging the people who are closest to the issue and documenting their perspectives and lived experiences, we do not really understand the context — and that context is all-important.

One article in this *Journal* issue, "Reentry Research at NIJ: Providing Robust Evidence for High-Stakes Decision-Making," provides a great example of this type of rigorous and inclusive research. The article discusses NIJ's reentry portfolio, which continually engages people on the ground — corrections practitioners, probation and parole agencies, people who have experienced incarceration and supervision, and community members — to guide data collection, help interpret findings, and identify implications for policy and practice.

Often the best way to pursue rigorous and inclusive research is through a multidisciplinary team of scholars. I think there is real value in bringing together different researchers, academics, and perspectives across disciplines and experiences, and so another priority of mine is to promote more interdisciplinary research. The article "NIJ's Courts Research: Examining Alternatives to Incarceration for Veterans and Other Policy Innovation" discusses NIJ's long history supporting research on alternatives to incarceration and previews the next step in that work, which will bring together a cross-disciplinary team of researchers and local program partners to examine the impact and cost-efficiency of veterans treatment courts.

To be truly inclusive, we must recognize the issue of racial inequality in the criminal justice system. This goes beyond simply throwing a race variable into a statistical model. Researchers must be intentional in looking at structural inequalities that may generate disparate outcomes based on gender, race, ethnicity, religion, sexual identity, or citizenship status. I intend to encourage studies that approach issues and problems through this type of equity lens. I am also thrilled that the W.E.B. Du Bois Program is back because it supports important research on the intersection of race and crime and violence in the administration of justice.

The article "Improving the Collection of Digital Evidence" discusses a software tool that may accelerate and streamline efforts to identify children in videos of sexual exploitation, and a technology that will provide law enforcement with a portable, scalable, cost-efficient tool for examining complex networks. Both are currently being independently evaluated to help ensure that they operate in the manner described by the grantees, they can be used for their intended purposes, and — if applicable — they are forensically sound.

This speaks to another one of my priorities, which is to infuse technology research with a strong implementation science component. We need to understand, for example, whether technology works not just in the lab, but also in the field.

And we also need to measure how well something was implemented. Were individuals trained properly? Did they follow policies and protocols? Were there hiccups during the implementation process? All of these pieces of information are important to understanding and interpreting research findings.

As a science agency, NIJ's primary mission is to generate high-quality research. But we also strive to communicate research findings in a manner that helps practitioners. My final priority is to ensure that research evidence is translated into actionable information to promote change in the field, or as I call it "evidence to action." I'm proud that the award-winning *NIJ Journal* is one excellent means of getting evidence into the hands of those who can use it. I hope you find all of the articles in this issue informative, and I look forward to continuing to engage with the field to foster rigorous and inclusive research and evidence-based practices that promote safety and advance justice for all.

Nancy La Vigne, Ph.D.
Director, National Institute of Justice

CONTENTS

NIJ BULLETIN

Publications in Brief

Five Facts About Mass Shootings in K-12 Schools

In recent decades, mass shootings have become an indelible part of the national conversation around individual liberties and public safety in the United States. Shootings in primary and secondary schools are particularly salient in this debate, and NIJ has funded numerous efforts to understand and prevent these tragedies.

This fact sheet assembles key results from four NIJ-funded studies on mass shootings in U.S. schools, establishing an empirical basis for policymakers and the public to understand who is most likely to commit acts of mass violence in schools and which interventions are most promising.

Read the fact sheet at https://nij.ojp.gov/topics/articles/five-facts-about-mass-shootings-k-12-schools.
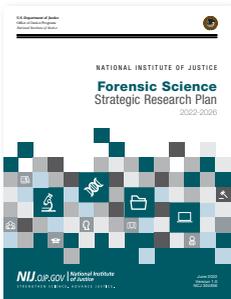
Forensic Science Strategic Research Plan, 2022-2026

NIJ's forensic science mission is to strengthen the quality and practice of forensic science through research and development, testing and evaluation, technology, and information exchange. As part of that mission, the new Forensic Science Strategic Research Plan communicates NIJ's research agenda, strategic priorities, and objectives.

NIJ has more than 50 years of experience in identifying needs, funding research, and disseminating expert knowledge to the forensic science community. By outlining NIJ's role in addressing the opportunities and challenges the community is facing, this plan informs our stakeholder engagement and articulates our dedication to the broad spectrum of fields that make up forensic science.

Read the plan at https://nij.ojp.gov/library/publications/national-institute-justice-forensic-science-strategic-research-plan-2022-2026.
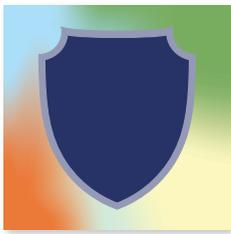
RAND Mass Attacks Defense Toolkit

After studying 600 mass attack events and plots, interviewing dozens of experts, and reviewing hundreds of references, an NIJ-funded research team identified the Mass Attacks Defense Chain, a series of defenses that work together to reduce the probability of mass attacks.

This toolkit, based on the principles of the defense chain, gives law enforcement, policymakers, and other community leaders critical tips for reducing the likelihood of and casualties from mass attacks. The toolkit also points readers to key guidance and resources for more detailed information.

Learn more and access the toolkit at https://www.rand.org/pubs/tools/TLA1613-1/toolkit.html.
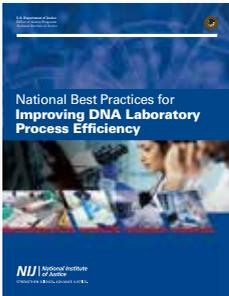
National Best Practices for Improving DNA Laboratory Process Efficiency

DNA forensic laboratories are at a crossroads. Faced with a rising demand for analysis and constrained by limited financial resources, laboratories must find new ways to reduce backlogs and increase productivity.

The recommendations in this guide, authored by experts in forensic science and laboratory management, are aimed at improving efficiency in a multitude of essential tasks — from hiring personnel to formulating case acceptance policies, managing casework, and compiling final reports that nonscientists can comprehend. The guide's recommendations are also designed to help laboratories anticipate changes that may affect their caseloads, including technological advances and new legislation.

Read the guide at https://nij.ojp.gov/library/publications/national-best-practices-improving-dna-laboratory-process-efficiency.

Five Things About Juvenile Delinquency Intervention and Treatment

For young people who have committed a crime, their first brush with the justice system can be an inflection point — a chance for the community to step in and successfully divert the course of their lives in a positive direction. To accomplish that goal, programs for addressing juvenile delinquency provide treatment and services to youth at this critical juncture in their lives. But not all programs are equally effective or backed by scientific evidence. This short summary of current knowledge about juvenile delinquency intervention and treatment programs is based on programs and practices that have been rated by CrimeSolutions, NIJ's online clearinghouse of evaluations and meta-analyses.

Read the fact sheet at https://nij.ojp.gov/library/publications/five-things-about-juvenile-delinquency-intervention-and-treatment.

Results From the National Institute of Justice Recidivism Forecasting Challenge

In the summer of 2021, NIJ hosted the Recidivism Forecasting Challenge with the goal of improving the ability to forecast recidivism using person- and place-based variables. Using historical data on persons released from prison to parole supervision, entrants were tasked with developing a model to forecast recidivism following release. In particular, NIJ sought ways to combat the weaknesses of current tools used for prediction and forecasting, which are often insensitive to gender-specific needs and suffer from racial bias.

This article, first published in *Corrections Today,* describes how the Challenge was designed, how well the predictive models performed, and what the Challenge results can teach the field about recidivism forecasting.

Read the article at https://nij.ojp.gov/topics/articles/results-national-institute-justice-recidivism-forecasting-challenge.

The Causes and Consequences of School Violence: A Review

Although school violence is on the decline, it remains a significant concern. This report, commissioned by NIJ, takes a comprehensive look at the research on school violence, including studies that were funded by NIJ's Comprehensive School Safety Initiative. The report is based on an empirical review of 55 meta-analyses and a supplemental review of 362 recent research studies.

The research found that the strongest predictor of school violence perpetration was delinquent or antisocial behavior. Other strong predictors were attention deficit hyperactivity disorder, child maltreatment, peer rejection, and moral disengagement.

Read the full report at https://nij.ojp.gov/library/publications/causes-and-consequences-school-violence-review.
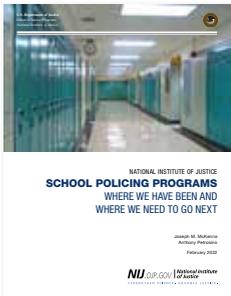
School Policing Programs: Where We Have Been and Where We Need To Go Next

School policing is believed to have started in Michigan in the 1950s; the decades since then have seen substantial growth in school policing's implementation, especially following the shooting at Columbine High School in 1999. Despite the growth of school policing, the decentralized nature of both education and policing in the United States means that programs for school policing differ widely in their approaches, outcomes, and reliance on data to inform decision-making.

This report surveys the existing literature on school policing and compiles insights from four days of expert panel discussions to chart where school policing is today. It also offers recommendations for advancing research-based school policing in the future.

Read the report at https://nij.ojp.gov/library/publications/school-policing-programs-where-we-have-been-and-where-we-need-go-next.

Five Things About Substance Use Interventions

The landscape of licit and illicit drugs is in constant flux. A continuing crisis of opioid-related deaths is compounded by novel psychoactive substances whose development outpaces the public health system's ability to track them, while state-level legalization of marijuana simultaneously raises new and difficult questions about the intersections of drug policy and criminal justice. But what does the research say about drugs and the justice system?

This short summary presents five research-based conclusions on substance use interventions, including justice system programs such as medication-assisted treatment and juvenile drug courts. It offers a starting point for delving into the drug-related research available on CrimeSolutions, NIJ's online clearinghouse of evaluations and meta-analyses.

Read the fact sheet at https://nij.ojp.gov/library/publications/five-things-about-substance-use-interventions.

News and Events

Compliant Products List: Ballistic-Resistant Body Armor

Since 1971, NIJ has been publishing performance standards for ballistic-resistant police body armor and funding the development of better armor for law enforcement officers. The NIJ Compliance Testing Program, which allows certified armor models to display the NIJ mark, has evaluated thousands of models in the decades since NIJ began this critical work for officer safety.

In July 2022, the full list of NIJ-certified body armor moved to an interactive database on NIJ.ojp.gov, where products are searchable by size range, gender, threat level, and more.

Access the database at https://nij.ojp.gov/topics/equipment-and-technology/body-armor/ballistic-resistant-armor.

Launch of NIJ-Funded Research Forensic Library at FIU

Through a cooperative agreement with Florida International University (FIU), NIJ has funded an important new resource for forensic science practitioners, students, researchers, and the general public. The Research Forensic Library, hosted by FIU's Global Forensic and Justice Center, is a curated collection of publicly accessible material relating to every discipline of the forensic sciences.

Bringing together thousands of freely available articles and reports from the scientific literature in a simple, searchable interface, the library is a first-of-its-kind tool for sharing information and advancing research in the forensic sciences.

Visit the library at https://forensiclibrary.org/.

Webinar: Learning From Doing: Evaluating the Effectiveness of the Second Chance Act Grant Program

The Second Chance Act aims to reduce recidivism and improve outcomes for people returning from state and federal prisons, local jails, and juvenile facilities. During this panel, NIJ-funded researchers describe two ongoing evaluations of programs funded under the act. The first is an evaluation of the effectiveness of the Second Chance Act Grant Program, and the second is a longitudinal examination of the program's long-term impacts.

Watch the panel at https://nij.ojp.gov/media/video/28436.

Webinar: Taking Stock: An Overview of NIJ's Reentry Research Portfolio and Assessing the Impact of the Pandemic on Reentry Research

NIJ has made significant contributions to the field of reentry, advancing our knowledge of which approaches work when and for whom. In recent years, however, the global pandemic has made it increasingly difficult to study populations involved with the justice system.

During this panel, researchers discuss their NIJ-funded reentry projects and the impact of the pandemic on their ability to conduct research.

Watch a recording of the discussion at https://nij.ojp.gov/media/video/28441.
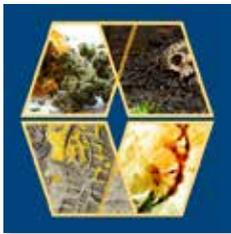
2022 NIJ Forensic Science Research and Development Symposium

NIJ's Forensic Technology Center of Excellence is committed to improving the practice of forensic science and strengthening its impact. A major part of that mission is spreading awareness of new scientific advancements. Each year, the Forensic Science Research and Development Symposium provides a platform for researchers and practitioners to discuss, discover, and share new scientific approaches and applications.

The symposium's goal is to move research from theory to practice, with sessions covering impression, pattern, and trace evidence; seized drugs and toxicology; forensic biology and DNA; and forensic anthropology and pathology.

Access the full proceedings of the 2022 symposium at https://forensiccoe.org/2022-nij-forensic-science-rd-symposium/.

Multimedia

Justice Today Podcast

NIJ brings science into the heart of the U.S. justice system to combat crime and help victims. The Office of Justice Program's Justice Today podcast lets listeners hear directly from NIJ scientists about the latest research in criminal justice — from gun violence and human trafficking to school safety and mass incarceration. Episodes include:

- Shedding Light on Assault — NIJ grantee Katherine Scafide shares how her research on detecting bruises provides clear documentation for victims of assault and domestic violence.

- Social Media and Domestic Radicalization — NIJ's Aisha Javed Qureshi discusses how scientific research is helping law enforcement understand the role of social media as a tool for spreading extremist beliefs.

- To Catch a Drug — NIJ's Frances Scott explains what novel psychoactive substances are, current research in the field, and the practical impact of this research for law enforcement and policymakers.

- A New Vision for NIJ With Director Nancy La Vigne — Director La Vigne shares how her experience in criminal justice research shapes her vision for NIJ under her tenure.

- The Science of School Safety — NIJ's Mary Poulin Carlton discusses school safety issues, including gun violence, bullying, school climate, and mental health.

- What's Possible With Rapid DNA Technology? — NIJ's Tracey Johnson explains the complexities of Rapid DNA technology, its pitfalls, and its possibilities.

- Tribal Crime, Justice, and Safety — NIJ's Tina Crossland explores the high rates of crime victimization among Native American persons and the jurisdictional complexities arising from Native American nations' sovereignty.

- The Evidence We Leave Behind — NIJ's Gregory Dutton describes what the microbiome is and how it applies to forensic science.

- From Successful Reentry to Stronger Communities — NIJ's Angela Moore, Marie Garcia, and Eric Martin discuss what reentry is and why it is important.

- Desistance: It's a Process, Not an Event — NIJ's Marie Garcia, Ben Adams, and Kaitlyn Sill unpack the complexities of desistance, which is the process of individuals ceasing engagement in criminal activity.

Listen to all episodes at https://nij.ojp.gov/library/multimedia/podcasts.

Research Findings

Meeting the Evolving Challenges of Fentanyl and Other Emerging Drugs of Abuse: Innovative Strategies for Improving Analysis

NIJ-funded researchers from the Maryland State Police looked at how drug analysis is currently conducted and reenvisioned the workflow using direct analysis real-time mass spectrometry (DART-MS) for increased safety, speed, and sensitivity.

The researchers' workflow comparison study can help laboratories estimate the expected gains from adjusting their analytical workflows, and includes a documentation package to facilitate the adoption of these methods.

Read more about the research at https://nij.ojp.gov/topics/articles/meeting-evolving-challenges-fentanyl-and-other-emerging-drugs-abuse-innovative.

Complex Drug Mixtures Analysis, Using Open-Source Search Software and Library Building Tool

For the rapid analysis of newly developed drugs, DART-MS can determine a sample's chemical composition almost instantly. However, interpreting results from complex mixtures of drugs has proved challenging because of the data processing requirements.

NIJ-funded researchers from the National Institute of Standards and Technology created a software program for DART-MS interpretation that can reliably analyze complex mixtures and identify unknown substances. The tool, which reports on the probability that a given drug is in the sample, is free and open source.

Find out more about the new tool at https://nij.ojp.gov/topics/articles/complex-drug-mixtures-analysis-using-open-source-search-software-and-library.

Addressing Trauma in Women's Prisons

From 1980 through 2017, the number of incarcerated women increased by more than 750%. Incarcerated women are more likely to experience a range of violence and other traumatic experiences before entering jail or prison; therefore, in 2017 NIJ funded a study of in-prison programs that address the needs of incarcerated women related to prior and current trauma and victimization.

The study showed how partnerships between correctional facilities and community-based organizations can help incarcerated women with healing, recovery, and reentry. However, effective implementation of trauma-informed services requires standard policies and training for corrections staff.

Learn more about the study at https://nij.ojp.gov/topics/articles/addressing-trauma-womens-prisons.

Understanding and Characterizing Labor Trafficking Among U.S. Citizen Victims

Research on labor trafficking in the United States has historically focused on victims who are undocumented immigrants, but U.S. citizens are also at risk for trafficking — especially people who have little wealth or education, individuals with cognitive disabilities, and those who suffer from drug addiction and homelessness.

NIJ-funded researchers surveyed 240 victims of labor trafficking who are U.S. citizens to learn more about how they had been exploited at work. The researchers found that respondents working in construction were more likely to encounter abuses, and respondents in the food service and janitorial sectors followed closely behind.

More detail on the study's methods and results is available at https://nij.ojp.gov/topics/articles/understanding-and-characterizing-labor-trafficking-among-us-citizen-victims.

Domestic Extremists and Social Media: Study Finds Similarities, Differences in Web Habits of Those Engaged in Hate Crimes vs. Violent Extremism

Researchers at the National Consortium for the Study of Terrorism and Responses to Terrorism studied the social media use exhibited by individuals in two nationwide databases on extremism. Out of 3,600 individuals, the researchers selected 52 subjects who had committed a hate crime or an act of violent extremism and traced their social media footprints. Their results suggested that patterns of use of different platforms such as Facebook, Twitter, and YouTube vary across ideological groups.

Read more about the research at https://nij.ojp.gov/topics/articles/domestic-extremists-and-social-media-study-finds-similarities-differences-web.

Interconnecting Mental Health and Behavioral Support Improves School Safety, Study Says

To address negative behavior among students and prevent violence, many schools rely on systems of early intervention that promote positive behavior and offer mental health support for students with behavioral problems. NIJ-funded researchers at the University of South Carolina evaluated a framework that was designed to bridge two popular school support systems and address their limitations.

The study found that this framework could broaden involvement with school administration and decrease in-school suspensions and office discipline referrals. The framework also showed signs of improving equity for Black students and other students of color.

Learn more about the framework and its potential benefits at https://nij.ojp.gov/topics/articles/interconnecting-mental-health-and-behavioral-support-improves-school-safety.

Detecting Opioid Distribution Networks Using Network Modeling and Community-Based Intelligence

NIJ-supported researchers from the Pennsylvania State University and Syracuse University looked for new ways to characterize and ultimately curtail opioid distribution networks through data-driven network analysis and the use of citizen intelligence. Their work focused on six Pennsylvania counties well known for drug trafficking along the interstate highway system.

The study found that local opioid distribution networks were generally organized by substance, not by individual actors, and there were only a few individuals who distributed multiple types of substances. The research into citizen intelligence suggested that citizen informants could accurately indicate locations of opioid distribution activity that matched official records.

A full breakdown of the study's methods and results is available at https://nij.ojp.gov/topics/articles/detecting-opioid-distribution-networks-using-network-modeling-community-intelligence.

Creation of School Shooting Open-Source Database Fuels Understanding

To better understand the root causes of school shootings, NIJ-funded researchers developed The American School Shooting Study, a national open-source database of all known shootings that resulted in at least one injury on K-12 school grounds between 1990 and 2016.

Analyzing the database, the researchers found that adolescents who committed a school shooting were mostly male, with an average age of 16; many were able to access firearms while underage, and approximately half gave a warning or made threats about perpetrating violence.

Learn more about the database at https://nij.ojp.gov/topics/articles/creation-school-shooting-open-source-database-fuels-understanding.

Public Mass Shootings: Database Amasses Details of a Half Century of U.S. Mass Shootings With Firearms, Generating Psychosocial Histories

With support from NIJ, the Violence Project assembled a comprehensive database of U.S. mass shootings from 1966 to 2019 drawn exclusively from open sources such as social media sites and online newspapers. The data on 172 individuals who committed a mass public shooting cover more than 150 psychosocial history variables, such as those individuals' mental health histories, past trauma, interest in past shootings, and situational triggers.

The assembled data showed the individuals were commonly troubled by personal trauma before their shooting incidents and were nearly always in a state of crisis at the time. Most were insiders of a targeted institution, such as an employee or a student. Except for young individuals who stole guns from family members, most used legally obtained handguns.

Read more about what the research uncovered at https://nij.ojp.gov/topics/articles/public-mass-shootings-database-amasses-details-half-century-us-mass-shootings.

Sharing Data To Improve Science

Secondary data analysis allows researchers to build on existing findings, replicate results, and conduct new analyses. Through NIJ's Data Resources Program, data collected as part of NIJ research are archived, alongside data from the Bureau of Justice Statistics and the Office of Juvenile Justice and Delinquency Prevention, in the National Archive of Criminal Justice Data and made available to support new research aimed at reproducing original findings, replicating results, and testing new hypotheses.

Learn about NIJ's Data Resources Program at https://nij.ojp.gov/funding/opportunities/nij-2016-9052.

Recent datasets updated or added to the National Archive include:

- The Comprehensive School Safety Initiative: Study of Police in Schools, California and Florida, 2011-2019

- Applying Data Science to Justice Systems: The North Carolina Statewide Warrant Repository, 2014-2019

- Firearm Involvement of Parents and Their Adolescent Children: A Prospective Intergenerational Study of High-Risk Youth, Chicago, Illinois, 1995-2022

- A Longitudinal Examination of Teen Dating Violence From Adolescence to Young Adulthood, Houston, Texas, 2010-2018

- Advancing Human Trafficking Prevalence Estimation in Hennepin County, Minnesota, 2018

- Failure to Appear: Domestic Minor Sex Trafficking Victims' Experience With the Juvenile Justice System and Their Readiness to Change, Nevada, 2016-2018

- Continuation of Dating It Safe: A Longitudinal Study on Teen Dating Violence, Houston, Texas, 2010-2018

- Social Interaction Training To Reduce Police Use of Force, Fayetteville, NC, and Tucson, AZ, 2016-2018

- A Systematic Review and Meta-Analysis of Interventions To Decrease Cyberbullying Perpetration and Victimization, United States, 2003-2019

- Assessing the Impact of Pre-Adjudication Assessment Approaches on Racial/Ethnic Disparities in Oregon, 2014-2018

- Evaluation of the OJJDP FY2010 Second Chance Act Juvenile Offender Reentry Demonstration Projects, Five United States Cities, 2010

- Multilevel Analyses of Accuracy and Error in Digital Criminal Record Data, Minnesota and New Jersey, 2017-2019

Want to stay informed about the latest research and publications from NIJ? Subscribe for updates at https://nij.ojp.gov/subscribe.

NIJ'S COURTS RESEARCH: EXAMINING ALTERNATIVES TO INCARCERATION FOR VETERANS AND OTHER POLICY INNOVATION

BY **LINDA TRUITT**

NIJ's multisite evaluation of veterans treatment courts is the latest example of rigorous applied research under its Courts Research Portfolio, which examines pretrial, prosecution, and sentencing policies as well as problem-solving courts and other alternatives to incarceration.

The link between post-traumatic stress disorder (PTSD) and substance use disorder is well documented in military populations, especially among veterans who return from deployment with a traumatic brain injury.[1] Veterans treatment courts (VTCs) have expanded rapidly in the past 10 years to accommodate individuals with a history of military service who enter the criminal justice system on charges ranging from driving while intoxicated to property and violent offenses. Like other types of problem-solving courts, VTCs involve multidisciplinary teams that employ a system of supervision combined with treatment and rehabilitation services to reduce relapse and recidivism. However, VTCs lack research-based guidance on target populations and basic program operations.

This article profiles key studies in the National Institute of Justice's (NIJ) Courts Research Portfolio on pretrial, prosecution, and sentencing policies that address alternatives to incarceration, including VTCs and other problem-solving courts. Collectively,

Office of Health Equity, Veterans Health Administration

these research projects demonstrate a history of successful collaborations with federal agencies, court professionals, stakeholders, and expert research teams. This article also highlights findings from NIJ's Multisite Evaluation of VTCs and discusses recommendations for practice and future research (see sidebar, "Preliminary Veterans Treatment Court Study"). Together, all of these underscore the need to

NIJ remains committed to advancing rigorous research on courts through collaboration with federal agencies, court professionals, stakeholders, and expert research teams.

promote data and research capacity to inform practice and policy, which inspired NIJ's *Courts Strategic Research Plan, 2020-2024*.[2] The plan documents NIJ's commitment to furthering the Department of Justice's mission through court research, evaluation, and policy analysis.

NIJ's Courts Research Portfolio

NIJ's Multisite Evaluation of VTCs and other problem-solving court evaluations fall under the Institute's Courts Research Portfolio. Its purpose is to sponsor research, development, and evaluation to identify court tools, programs, and policies that satisfy criminal justice goals, including public safety, cost-efficiency, and fair and equitable treatment of victims and individuals charged with a crime. Over the past 50 years, the portfolio has supported important research on court operations and case processing, prosecution and indigent defense services, and criminal adjudication and sentencing. Highlighted here are key studies that address alternatives to incarceration in the context of pretrial, prosecution, and sentencing research, followed by a discussion of VTCs and other problem-solving courts.

Pretrial Research

NIJ has an extensive history of research on the pretrial phase of criminal cases — the first opportunity to divert individuals charged with a crime from incarceration. Pretrial detention can disrupt employment and community ties for sometimes minor offenses, result in jail overcrowding that could then lead to the early release of incarcerated persons who were sentenced, and, more recently, create heightened concerns for the health of incarcerated persons and corrections staff.

In 2007, NIJ convened researchers, practitioners, and other experts who helped identify the following priorities for pretrial research:[3]

- Risk Assessment: What risk factors best determine eligibility for release versus detention?

- Public Safety: What are the rates and predictors of pretrial release violation, including new offenses?

- Court Appearances: What are the rates and predictors of failure to appear in court?

- Community Supervision: Under what conditions can individuals charged with a crime be released pretrial, and what community-based programming improves pretrial release success?

- Costs and Benefits: Under what conditions do the savings associated with pretrial release outweigh the costs of recidivism, failure to appear, and detention?

- What are other important issues, such as disparity in case processing and special cases involving serious mental illness, juveniles, and domestic violence?

Preliminary Veterans Treatment Court Study

Before embarking on more rigorous impact and cost-efficiency evaluations, NIJ collaborated with federal partners on a preliminary process and implementation study to examine a variety of veterans treatment court programs. Researchers found a mix of pre- and post-plea tracks, program participants including active service members, and more mental health and other service needs than criminal histories. They also discovered challenges in conducting participant interviews and obtaining the records necessary to analyze graduation and other program outcomes, as well as recidivism and other participant outcomes.

Exhibit 1. Failure To Appear (FTA) Rate by Reminder Type and Race/Ethnicity

FTA rates

	Control	Reminder Only	Reminder Sanctions	Reminder Combined
All Races	12.4%	11.0%	8.1%	9.5%
White	11.7%	9.6%	8.0%	8.8%
Black	18.7%	18.8%	13.5%	13.6%
Hispanic	10.5%	11.8%	4.7%	10.1%

Racial Categories
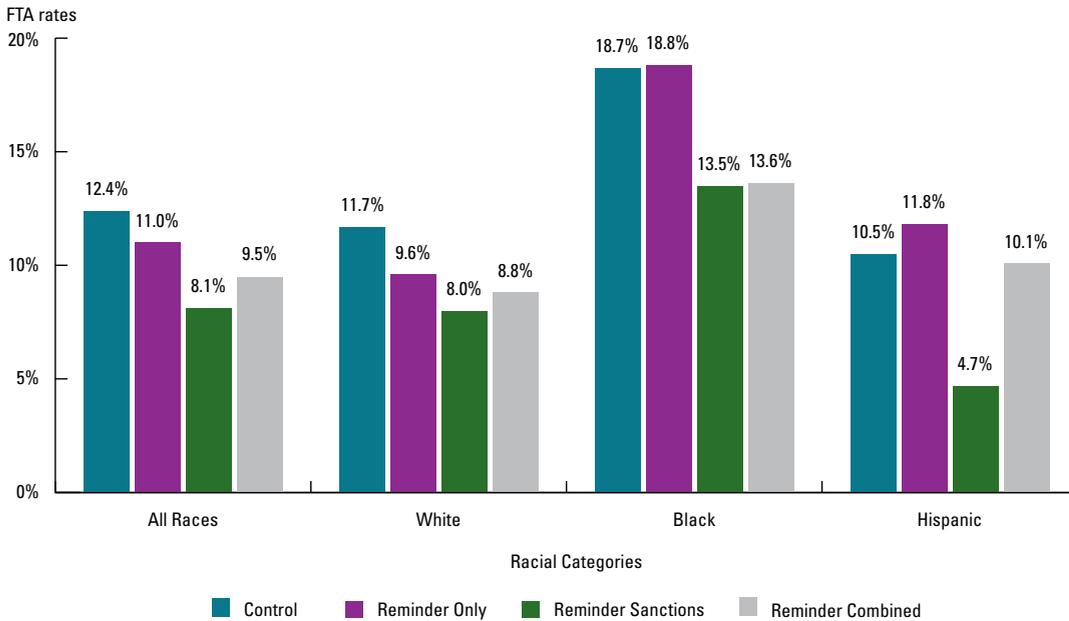
Note: n=7,865

Source: Brian H. Bornstein, Alan J. Tomkins, and Elizabeth M. Neeley, "Reducing Courts' Failure to Appear Rate: A Procedural Justice Approach," Final report to the National Institute of Justice, award number 2008-IJ-CX-0022, May 2011, NCJ 234370, https://www.ojp.gov/pdffiles1/nij/grants/234370.pdf.

NIJ research grants have since examined court notification strategies to address failure to appear for hearings (see exhibit 1). For persons charged with misdemeanors who were randomly assigned to four notice conditions prior to their court date, researchers found that any court appearance reminder was better than none (the control condition), and a more substantive reminder that made them aware of possible sanctions should they fail to appear (reminder sanctions) was better. However, a notification that mentioned sanctions but also highlighted positive consequences in the form of the procedural justice elements of voice, neutrality, respect, and public interest (reminder combined) was no more effective than the sanctions reminder alone.

The failure to appear rate was higher among Black individuals charged with a crime. This seemed to be driven by criminal history correlated with race and ethnicity. A follow-up survey suggested that those who

appeared in court had higher institutional confidence and felt they had been treated more fairly by the criminal justice system. Nevertheless, a sanctions reminder was most effective overall.[4]

More recently, a quasi-experimental investigation found that pretrial risk assessments can facilitate nonfinancial release, though with a potentially higher rate of pretrial rearrest, and that structured guidelines may help maximize pretrial release while minimizing misconduct.[5] NIJ is currently funding a process, impact, and cost evaluation of Kentucky's statewide pretrial court notification system with alternate contacts and messages.[6]

Prosecution Research

A basic line of court research concerns prosecutors — specifically their decision-making. It examines discretion and the role of evidence and other factors in charging, plea bargains, and other

Exhibit 2. Percentage of Hypothetical Cases Rejected by Prosecutors and Evidence Strength

Percentage of hypothetical cases rejected at screening

Strength of evidence (prosecutor's rating)

— Misdemeanor   — Low Level Felony   — High Level Felony
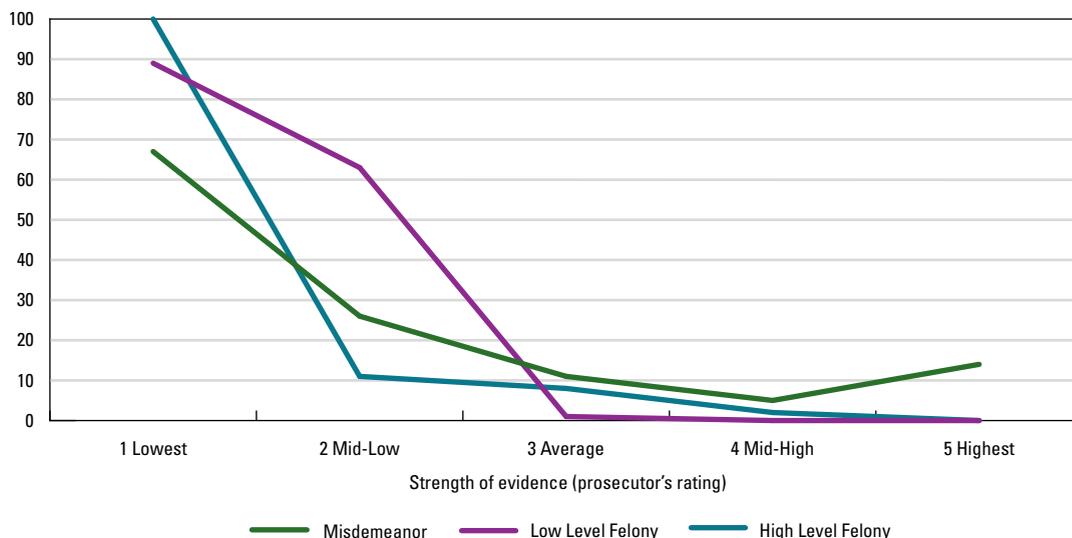
Source: Bruce Frederick and Don Stemen, "The Anatomy of Discretion: An Analysis of Prosecutorial Decision-Making — Technical Report," Final report to the National Institute of Justice, award number 2009-IJ-CX-0040, December 2012, NCJ 240334, https://www.ncjrs.gov/pdffiles1/nij/grants/240334.pdf.

case decisions. Highlights from NIJ's past qualitative and quantitative research include the following studies.

Strength of Evidence: Researchers examined the strength of evidence in plea bargaining from the perspectives of prosecutors, defense attorneys, and judges. They used hypothetical robbery case scenarios that varied by evidence type — specifically eyewitness, confession, and DNA — and by the characteristics of individuals charged with a crime, such as criminal history. The researchers concluded that "bargaining in the shadow of the trial" applies to prosecutors who assess the probability of conviction and plea discounts. The researchers found that judges focus only on plea discounts and, although defense attorneys focus on both, they focus more on plea discounts. The researchers also found that the number of evidence pieces is important but varies by crime, and that eyewitness identification rated higher than DNA or confession in determining probability of conviction.[7]

Discretion: Researchers examined the influence of extra-legal factors on decision-making and case outcomes in two county prosecutor offices. They collected information through case records, opinion surveys, interviews, focus groups, and factorial surveys that yield responses to hypothetical case vignettes. As shown in exhibit 2, the researchers found that the objective strength of evidence was the determining factor in most screening decisions; that is, prosecutors first asked "Can I prove the case?" Then prosecutors considered contextual factors, including offense severity, criminal history, and victim characteristics. In other words, they asked "Should I prove the case?" The researchers found that all decisions were constrained by office policies, resources, and working relationships with judges and other agencies.[8]

Disparity: Researchers partnered with the New York County District Attorney's Office to track discretionary decisions along the criminal case process. They examined case files, conducted interviews, and found that the district attorney prosecuted nearly all cases

Exhibit 3. Sentences Imposed for Eligible Individuals Pre- and Post-Implementation of Kansas Senate Bill 123

Number of individuals
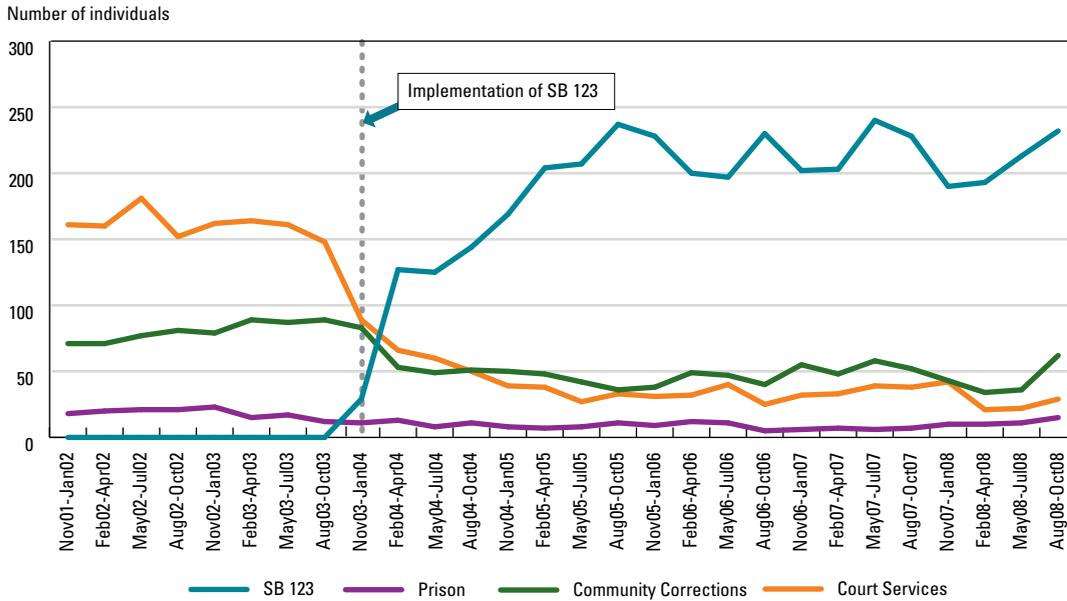
Source: Don Stemen and Andres F. Rengifo, "Alternative Sentencing Policies for Drug Offenders: Evaluating the Effectiveness of Kansas Senate Bill 123," Final report to the National Institute of Justice, award number 2006-IJ-CX-4032, March 2012, NCJ 238012, https://www.ncjrs.gov/pdffiles1/nij/grants/238012.pdf.

brought by the police with no marked racial or ethnic differences at screening. Black and Latino individuals charged with a crime benefited more from case dismissals but were also more likely to be detained, receive a custodial plea offer, and be incarcerated.[9]

Leveraging the Bureau of Justice Statistics' Federal Justice Statistics Program, another researcher found that U.S. Attorney case declinations were due to weak or insufficient evidence more than age, race, or gender disparities, and that Black and Hispanic individuals charged with a crime were more likely to receive charge reductions. However, young men belonging to racial and ethnic minority groups were less likely to have their cases declined or charges reduced, and outcomes varied across federal districts.[10]

As part of a current NIJ grant, researchers are conducting a statewide study of felony cases to examine discretion and outcomes, such as any racial or ethnic disadvantage in case processing.[11]

Sentencing Research

Criminal or penal law is the statutory or common law that defines criminal offenses and punishment. Research interests in this area include mandatory minimums, sentencing guidelines, and other legislation that modifies penal code severity and associated sentences with implications for corrections. NIJ has funded several studies on sentencing guidelines and related policies, including two studies that examine sentencing legislation reform designed to promote alternatives to incarceration for individuals convicted of nonviolent drug offenses.

Mandated Treatment: Signed into law in 2003, Kansas Senate Bill 123 mandated community-based supervision and substance abuse treatment for nonviolent individuals convicted of a first or second offense of drug possession. Researchers found that the law improved the lines of communication between agencies and promoted a team approach between supervising officers, drug treatment providers, and

people on probation. However, they also found that it kept few from prison at sentencing, had no impact on recidivism rates relative to other community-based sanctions, and had a minimal impact on prison populations (see exhibit 3). The researchers concluded that this minimal impact resulted from structural aspects of the law, including narrow eligibility requirements and mandatory sentencing and supervision procedures.[12]

Treatment Diversion: Legislation to reform New York state drug laws in 2009 removed minimum sentences that had been previously mandated under the state's Rockefeller drug laws. The new statutes allowed shorter prison and jail sentences and expanded alternatives to incarceration, including court-mandated treatment programs. Researchers examined the impact of this legislation on felony drug cases indicted in New York City. They found a modest increase in judicial diversion and a decrease in criminal sentences to incarceration. Controlling for other factors connected with recidivism, the researchers found diversion to treatment was associated with lower rates of rearrest on both misdemeanor and felony charges. However, implementation varied widely across counties. Citywide, the overwhelming majority of drug arrests did not result in diversion to treatment, preventing an assessment of the full impact of the legislation. Savings to law enforcement, corrections, and victims resulting from decreased recidivism were outweighed by higher treatment costs related to the increased use of residential over outpatient services.[13]

NIJ's Multisite Evaluation of Veterans Treatment Courts

What Are Veterans Treatment Courts?

Modeled after mental health and drug courts, VTCs are dedicated court dockets that support persons with military service who are in the criminal justice system and have been diagnosed with substance use disorders or mental health issues and other rehabilitation needs. Stable housing is chief among those needs, and groups like the U.S. Interagency Council on Homelessness (USICH) seek to prevent and end homelessness among veterans. USICH recognizes

that VTCs and other veteran-focused courts support its strategic priority to promote alternatives to criminalizing people experiencing homelessness[14] by emphasizing treatment for mental health and substance use disorders rather than punishment and incarceration.[15]

The original VTC model developed in 2008[16] underlies the program guidance used today:[17]

- Integration of alcohol and drug treatment and mental health services with case processing.

- Nonadversarial court approach with due process protections.

- Early identification and program placement.

- Continuum of treatment and rehabilitative services (including peer mentors).

- Frequent alcohol and drug testing and other monitoring.

- Graduated sanctions and incentives.

- Ongoing judicial interaction and court supervision.

- Continuing interdisciplinary team education.

- Partnerships with the U.S. Department of Veterans Affairs (VA), public agencies, and community-based organizations.

The VA's Veterans Justice Outreach (VJO) Program[18] currently serves over 600 VTCs and other veteran-focused courts. VJO specialists are members of the VTC program team who act as liaisons between the courts and the VA, conduct needs assessments, and facilitate service access.[19]

The Bureau of Justice Assistance (BJA) administers the Department of Justice's Veterans Treatment Court Program and provides grants and technical assistance to state, local, and tribal governments to develop and maintain VTCs.[20] BJA encourages drug courts to adopt evidence-based practice standards, although program models vary. In contrast to its grants for adult drug courts, BJA funds grants to VTC programs for individuals charged with either violent or nonviolent offenses.[21]

Research Partner Site Perspective on NIJ's Multisite Evaluation of Veterans Treatment Courts

Among the oldest programs in NIJ's study, Travis County (Texas) Veterans Court originated with support from the Governor's Office Criminal Justice Division and the Texas Indigent Defense Commission to promote evidence-based practices and effective funding strategies.[1] The court now accepts veterans with PTSD related to sexual trauma during military service, as well as violent offenses involving assault and weapons. As veterans treatment court coordinator Jolene Grajczyk noted, they realized "there's a bigger population to be served among returning veterans." They felt program changes happened organically, and the research validated their approach of addressing individual needs with counseling, monitoring, and other services. A former Army enlisted man, Judge Brad Urrutia explained that they do not take a highly structured military approach because "We don't know what triggers veterans." Instead, he advises, "Let's take our common background and decide how we're going to apply it to civilian life."

Note

1. Texas Indigent Defense Commission, "Veterans Defender Resource," Austin, TX: Texas Indigent Defense Commission, 2012.

In addition, the Substance Abuse and Mental Health Services Administration (SAMHSA) supports VTCs by funding grants to expand the treatment capacity of community-based treatment services instead of incarcerating individuals with substance use disorders.[22] SAMHSA also provides technical assistance for improving behavioral health services and supports for military service members, veterans, and their families.[23]

Research Findings

In collaboration with the VA, BJA, and SAMHSA, NIJ funded a multisite evaluation of VTCs to answer basic questions, including the following:

1. What are the characteristics and needs of VTC participants, and what services did they access?

2. What are the structures, policies, and practices of VTC programs?

3. What are the short-term program and participant outcomes?

The principal investigators assembled a team of researchers across eight VTC programs, which were chosen for their variety with respect to size, maturity, rurality, and other characteristics (see sidebar, "Research Partner Site Perspective on NIJ's Multisite Evaluation of Veterans Treatment Courts"). They conducted structured observations, surveyed VTC teams and service providers, reviewed program documents and agency records, and interviewed 318 participants (with follow-ups at 12 and 24 months). The following are highlights of findings from the study:[24]

• Driving while intoxicated cases may be the most frequent type of referral to the VTC programs. Most participants reported using alcohol and marijuana, and many reported high levels of exposure to stimulants while in service and via treatment regimens.[25] Programs mandated drug testing and treatment for mental health and substance use disorder issues, and compliance with medication prescriptions.

22   NIJ's Courts Research: Examining Alternatives to Incarceration for Veterans and Other Policy Innovation

Exhibit 4. Mental Health Issues Reported by Veterans Treatment Court Participants	
Issue	**Ever Experienced**
Depression	275 (87.9%)
Aggression	275 (87.9%)
Post-Traumatic Stress Disorder	263 (84.0%)
Insomnia	263 (84.0%)
Anxiety	230 (73.5%)
Suicide Ideation	169 (54.0%)
Panic Disorder	168 (53.7%)
Paranoia	158 (50.5%)
Concussion	147 (47.0%)
Obsessive Compulsive Disorder	121 (38.7%)
Traumatic Brain Injury	112 (35.8%)
Phobias	82 (26.2%)
Bipolar	80 (25.6%)

Note: n=313

Source: Julie Marie Baldwin and Richard D. Hartley, "Executive Summary: National Institute of Justice's Multisite Evaluation of Veterans Treatment Courts," Final report to the National Institute of Justice, award number 2015-VV-BX-K020, July 2022, NCJ 305014, https://www.ojp.gov/pdffiles1/nij/grants/305014.pdf.

- Participants varied in age and other characteristics across the programs, but the overall majority were male and white (25% Black, 13% Hispanic) and had served in the Army (including the Reserves and National Guard) and in recent conflicts.[26] Most had deployed to combat zones, received hazard pay, and experienced physical or psychological injury related to service.

- Mental health issues reported most frequently by VTC participants included aggression, depression, insomnia, and PTSD (see exhibit 4). Traumatic brain injury, phobias, and other issues became more prevalent during and after service.

- Program manuals did not document the protocols used to identify eligible participants. Multiple agents made referrals at all stages of case processing, and referrals were more often based on self-reported veteran status than on military records (see exhibit 5).

- The criteria considered for program eligibility were: military status, such as excluding those with dishonorable discharges;[27] current charges and criminal history, such as excluding those charged with sex and other violent felony offenses; and mental health and substance use, especially if related to military service.

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Exhibit 5. Participant Identification Mechanisms at Different Criminal Justice (CJ) Intercepts

Initial Detention
1. VJO Self-Report Form
2. CJ Self-Report Form
3. CJ Agent Question
4. Electronic System (VRSS)

First Appearance
1. Arraignment Workgroup Question
2. Participant Self-Identification

Home Court
1. Courtroom Workgroup Question
2. Participant Self-Identification

Unsupervised
1. Participant Self-Identification
2. Treatment Provider

Incarceration
1. CJ Self-Report Form
2. CJ Agent Question
3. VJO Self-Report Form
4. Defense Counsel Question
5. Participant Self-Identification
6. Treatment Provider

Community Corrections
1. Officer Self-Report Form
2. Officer Question
3. Defense Counsel Question
4. Participant Self-Identification
5. Treatment Provider

Source: Julie Marie Baldwin and Richard D. Hartley, "Executive Summary: National Institute of Justice's Multisite Evaluation of Veterans Treatment Courts," Final report to the National Institute of Justice, award number 2015-VV-BX-K020, July 2022, NCJ 305014, https://www.ojp.gov/pdffiles1/nij/grants/305014.pdf.

- All programs used a sanctions and incentives system, but some VTC staff were critical of how well the system was communicated to clients, how consistently sanctions and incentives were applied, and whether the incentives for complying were adequate.

- The programs were successful in implementing the VTC model with fidelity, specifically in creating collaborative relationships, integrating substance use disorder and mental health treatment, and providing a continuum of rehabilitation services. They were less able to promptly identify and refer participants, respond effectively to noncompliance, or offer the team continuing education.

- All but one program reported graduation rates of 50% or better; variation across programs may relate to the target population (that is, there was a lower rate if the program served individuals at high risk of offending). Participants reported very low

rearrest rates, although the interview sample was biased toward active program participants, missing those participants who were terminated.

This study relied on the programs to provide information on VTC participants, and on a convenience sample of active participants to self-report recidivism and other outcomes. Based on their experiences, the researchers identified several recommendations for future studies and ongoing self-assessment by the programs. Recommendations include partnering with researchers for formative program assessments, as well as more proactive self-monitoring by the programs, including tracking referrals and participants through termination and post-program. This information is necessary to confirm that the program is equally accessible to everyone in the targeted population, that its resources align with the services that participants need, and to identify patterns of behavior that affect program retention. Information

NIJ's Courts Strategic Research Plan

NIJ's *Courts Strategic Research Plan, 2020-2024*[1] identifies a comprehensive set of objectives and action items under four strategic research priorities. The first priority is promoting and supporting research to develop the courts' workforce at all phases of professional development: education, recruitment, training, mentoring, coaching, leadership, and retention. The focus is not only on individuals, but also on interpersonal supports and organizational values that affect work group norms.

The second priority addresses the basic concerns of courts and related agencies, such as court operations, case management, case outcomes, and court policies and procedures. These require constant assessment and change to maintain the court's capacity to respond to contemporary case needs. Topics of interest include information sharing, videoconferencing and other technologies, specialized case units or court dockets, forensic evidence, pretrial services, sentencing, victims, witnesses, and juror management.

The third priority focuses on the fair and impartial administration of justice and supports courts in learning more about their multiple and evolving roles. These roles include monitoring cases for conviction integrity, providing appropriate counsel, ensuring that victims' voices are heard, and preserving the perceived legitimacy of the judicial system. Specific research concerns include the dynamics of the community and criminal justice stakeholders and their influence on the court, as well as the impact of court strategies on the administration of justice and public safety.

The fourth priority is a departure from previous NIJ strategic research plans. It underscores the lack of valid and reliable information necessary to support robust court research studies or self-monitoring and planning efforts by the courts. It addresses the need for strategies that enhance the capacity of courts and related agencies to collect, analyze, and share data. This would improve the quality of research and increase the use of empirical evidence in determining court practice. Enhanced data and information sharing support problem identification, performance measurement, and rigorous research and evaluation efforts.

Note

1. National Institute of Justice, *National Institute of Justice Courts Strategic Research Plan, 2020-2024,* Washington, DC: U.S. Department of Justice, National Institute of Justice, April 2020, NCJ 254684.

on criminal history and other aspects of participants' backgrounds, as well as housing and other dynamic factors, will aid in interpreting graduation, relapse, and recidivism outcomes across participants and over time. Research methods should include: interviews and objective records collection for all participants admitted to the program (regardless of their program status, incarceration, etc.); and independent verification of arrests and other program violations, as well as criminal justice contacts and treatment service access, which are community supervision conditions.

Forthcoming Research Dissemination and Funding Opportunities

NIJ issued the *Courts Strategic Research Plan, 2020-2024*[28] to communicate its continued commitment to advancing research on courts. The plan identifies a comprehensive set of objectives and action items under four strategic research priorities (see sidebar, "NIJ's Courts Strategic Research Plan"):

1. Develop the courts workforce and enhance court workgroups.

2. Advance court practice.

3. Support the fair and impartial administration of justice.

4. Promote data and research capacity building.

Collaboration with federal agencies, court professionals, stakeholders, and expert research teams has been key to the success of NIJ's Courts Research Portfolio. NIJ will disseminate research findings via the National Drug Court Resource Center[29] and other practitioner outlets, and develop future research projects that examine the impact and cost-efficiency of VTCs in fiscal year 2022.[30] NIJ plans to fund pretrial, prosecution, and other court research under its Research and Evaluation on the Administration of Justice solicitation.[31] And NIJ will continue to promote jurisdictions' capacity for data and rigorous applied research that will inform the field's efforts to protect public safety, deliver justice fairly, and examine alternatives to incarceration and other policy innovations.

About the Author

Linda Truitt, Ph.D., is a senior social science analyst who coordinates NIJ's Courts Research Portfolio and the Drugs and Crime Research Portfolio.

For More Information

Visit NIJ's courts webpage at https://nij.ojp.gov/topics/courts.

Notes

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23. "Service Members, Veterans, and Their Families Technical Assistance (SMVA TA) Center," Substance Abuse and Mental Health Services Administration, https://www.samhsa.gov/smvf-ta-center.

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26. Recent conflicts include Operation Iraqi Freedom (OIF), Operation Enduring Freedom (OEF), Operation Freedom's Sentinel (OFS), and Operation New Dawn (OND).

27. Program eligibility criteria are at the discretion of each VTC; that is, not all programs limit admission to veterans with an honorable discharge status, and programs may partner with service providers outside the VA health system.

28. National Institute of Justice, *Courts Strategic Research Plan, 2020-2024*.

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31. National Institute of Justice funding opportunity, "NIJ Research and Evaluation on the Administration of Justice, Fiscal Year 2021," grants.gov opportunity number O-NIJ-2021-60004, posted January 12, 2021, https://nij.ojp.gov/funding/opportunities/o-nij-2021-60004; and National Institute of Justice funding opportunity, "NIJ FY22 Research and Evaluation on the Administration of Justice: Diversion and Restorative Justice," grants.gov opportunity number O-NIJ-2022-171225, posted March 25, 2022, https://nij.ojp.gov/funding/opportunities/o-nij-2021-60004.

Resources

Drug Courts: https://www.ojp.gov/pdffiles1/nij/238527.pdf

National Drug Court Resource Center: https://ndcrc.org/

Interactive Map of Treatment Courts: https://ndcrc.org/interactive-maps/

Problem-Solving Courts: https://nij.ojp.gov/topics/articles/problem-solving-courts

Veterans Experiencing Homelessness, Veterans Justice Outreach Programs: https://www.va.gov/homeless/vjo.asp

Treatment of Co-Occurring PTSD and Substance Use Disorder in VA: https://www.ptsd.va.gov/professional/treat/cooccurring/tx_sud_va.asp

Justice for Vets: https://justiceforvets.org/

BJA Adult Drug Court Discretionary Grant Program: https://bja.ojp.gov/program/adult-drug-court-grant-program/overview

Veterans Treatment Court Grant Program: https://bja.ojp.gov/program/veterans-treatment-court-grant-program/overview

Service Members, Veterans, and their Families Technical Assistance Center: https://www.samhsa.gov/smvf-ta-center

Federal Justice Statistics Program: https://www.bjs.gov/index.cfm?ty=tp&tid=6

Federal Criminal Case Processing Statistics Query Tool: https://www.bjs.gov/fjsrc/

U.S. Sentencing Commission Research: https://www.ussc.gov/research

NCJ 300986

EVIDENCE

8

CASE NO. _____ ITEM NO. _____

DATE _____ TIME _____ AM/PM

PLACE _____

REMARKS _____

OFFICER _____

EVIDENCE

EVIDENCE TO BE OPENED BY AUTHORIZED PERSONNEL ONLY

IMPROVING THE COLLECTION OF DIGITAL EVIDENCE

BY **MARTIN NOVAK**

Two NIJ-funded projects introduce new methods and tools for collecting and processing digital evidence in cases involving child sexual abuse materials and large-scale computer networks.

D igital evidence can play a critical role in solving crimes and preparing court cases. But often the complexity and sheer volume of evidence found on computers, mobile phones, and other devices can overwhelm investigators from law enforcement agencies.

During an investigation of suspected child sexual abuse materials, for instance, a computer forensic analyst will typically spend hours reviewing hundreds of videos from seized media. The analyst looks at whether a human is present in a particular image. Next, the analyst needs to determine whether the human in the image is an adult or a child. This process is time-consuming, stressful, and prone to error.

This is just one example of the challenges facing law enforcement agencies when it comes to digital evidence. Departments around the country find themselves unable to keep up with rapidly evolving technologies and the quantity of digital evidence they produce. Many departments have limited budgets and

lack proper equipment and training opportunities for officers. The result is often large backlogs in analyzing digital evidence.[1]

To help address these challenges and improve the collection and processing of digital evidence, the National Institute of Justice (NIJ) provided funding to Purdue University and the University of Rhode Island. Purdue University created the File Toolkit for Selective Analysis Reconstruction (FileTSAR) for large-scale computer networks, which enables on-the-scene acquisition of probative data. FileTSAR then allows detailed forensic investigation to occur either on site or in a digital forensic laboratory environment, with the goal of ensuring admissible digital evidence.[2] The University of Rhode Island developed DeepPatrol, a software tool using machine intelligence and deep learning algorithms to assist law enforcement agencies in investigating child sexual abuse materials.

Both of these projects are advancing the field of digital forensics. DeepPatrol may change the way law enforcement conducts forensic examinations

Both projects help move the field forward with new methods and tools for collecting and processing digital evidence, but these new methods and tools will need to be independently tested and validated.

by accelerating and streamlining efforts to identify children in videos of sexual exploitation. FileTSAR provides law enforcement with a portable, scalable, cost-efficient tool for examining complex networks.

Automating Image Detection

Automating the process for detecting sexually exploitative images of children would drastically reduce the amount of time that investigators have to spend looking at suspected files and would allow them to concentrate on other aspects of the case. However, poor image quality, image size, and the orientation of the individual in the image present significant challenges to automation. Also, determining whether an unidentified individual in an explicit video is an adult or a child often requires expertise in anthropomorphic indicators of age, knowledge that would be difficult to automate.

One current solution for detecting child sexual abuse in a video involves capturing representative key frame images that the analyst must review manually. Although this is an improvement over having to view an entire video, this method is still time-consuming and may not reduce the analyst's workload.

To help address this capability gap, NIJ sought proposals for the development of innovative tools that would automatically detect prepubescent individuals in videos of varying quality. Ideally, the tools would also be able to detect postpubescent individuals who have not yet assumed the full physical characteristics of an adult.

In developing DeepPatrol, researchers from the University of Rhode Island leveraged research in machine intelligence/vision and the implementation of deep learning algorithms and Graphic Processing Unit technology.[3] Instead of relying on expert-designed features, deep learning techniques learn useful feature hierarchies directly from the data, outperforming previous state-of-the-art methods on traditional and complex vision tasks. Media can be processed in real time, including live video, to detect for the presence of child sexual abuse imagery.

As shown in exhibit 1, the file crawler first identifies every image and video file in a given directory, including subdirectories. The frame extractor then separates each video into a sequence of unique frames, which will be processed as images. The extracted images from each video are saved in their own subdirectory. The current video sampling rate for DeepPatrol is one frame per second. In North America, the standard frame rate for video is 30 frames per second. For a two-minute video, then, 3,600 separate images could be extracted.[4]

Next are two steps that use deep learning:[5] the face detector and a pornography detection classifier. The face detector uses the Single Shot Scale-Invariant Face Detector (S^3FD), a publicly available, real-time face detector that uses a single deep neural network with a variety of scales of faces. Neural networks are computational learning systems that use a network of functions to understand and translate a data input of one form into a desired output, usually in another form. The concept of the artificial neural network was inspired by human biology and the way neurons of the human brain function together to understand inputs from human senses.[6] S^3FD is particularly suited for detecting small faces.

Meanwhile, the pornography detection classifier uses OpenNSFW, a publicly available convolutional neural network developed by Yahoo, to detect pornography. A convolutional neural network is a specific type of neural network model designed for working with two-dimensional image data.[7] The pornography detection classifier inputs an image and provides a probability score between zero and one. Scores greater than

Exhibit 1. How DeepPatrol Works
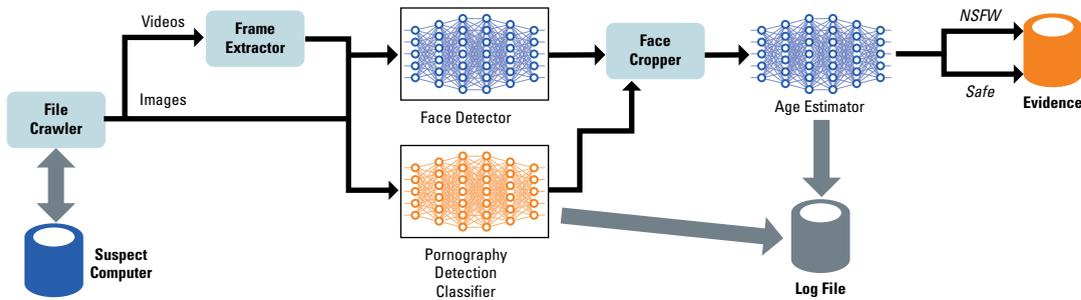
Source: Marco Alvarez Vega, "DeepPatrol: Finding Illicit Videos for Law Enforcement," Final summary report to the National Institute of Justice, award number 2016-MU-CX-K015, April 2020, NCJ 254636, https://www.ojp.gov/pdffiles1/nij/grants/254636.pdf.

0.8 indicate a high probability that the image is pornographic. Scores less than 0.2 indicate that the image is safe. The pornography detection classifier then converts the image to an RGB color format and, using the face cropper, resizes it to 256 by 256 pixels.

The age estimator then takes the output from the face detector, pornography detection classifier, and face cropper to estimate the age of the person in the image. Pornographic images that contain minors are flagged as potentially being child sexual abuse materials. The estimated age and the pornography detection classifier score are sent to a log file.[8]

In order for this framework to become a commercially viable computer forensics tool that criminal justice practitioners can use on active cases, additional research will be necessary. For example, the current run time for a case with approximately one million files — including frame extraction, face detection, age estimation, and nudity detection — is 39 hours. This is an intensive resource demand on any agency for any computer forensics process. Reducing the duration of the DeepPatrol process is an essential step in making this platform commercially viable.

The Defense Cybercrime Institute is currently evaluating DeepPatrol using case studies that involve closed investigations with known outcomes to determine whether the algorithms and processes used by DeepPatrol would meet the *Daubert* standard for repeatability, reliability, and acceptance by the scientific community.

Processing Large-Scale Computer Networks

In 2014, an NIJ-funded report by the RAND Corporation listed the lack of tools for examining computer networks as a continuing area of concern for state and local law enforcement in processing digital evidence.[9] Large-scale computer networks — those that contain at least 5,000 devices, including computers, printers, and routers — are often identified as a potential source of digital evidence in investigations ranging from terrorism to economic crimes.

Digital forensic processing of large-scale computer networks entails some significant challenges when compared to traditional computer forensics. Large-scale computer networks involve diverse configurations, operating systems, applications, connectivity, hardware, and components. In a distributed computing system, data are more volatile and unpredictable than on standalone devices. Applications, resources attached to the network, differing configurations, data storage, or the network topology may obscure information that may be of evidentiary interest. Because networks may be distributed across multiple jurisdictions, only portions or segments of the data may be readily accessible to investigators in the jurisdiction(s) where the crime occurred.

Exhibit 2. How FileTSAR Works
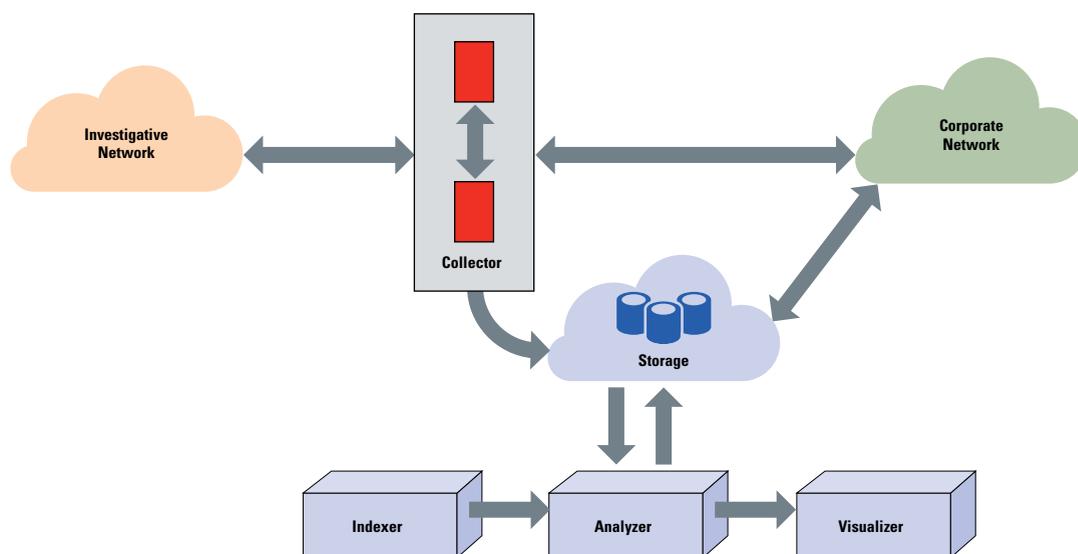
Source: Based on Kathryn Seigfried-Spellar, "FileTSAR Final Summary Overview," Final summary report to the National Institute of Justice, award number 2016-MU-MU-K091, April 2020, NCJ 254635, https://www.ojp.gov/pdffiles1/nij/grants/254635.pdf, 5.

NIJ sought proposals to develop innovative new tools that would allow agencies to conduct digital forensics processing of large-scale computer networks in a forensically sound manner. This included tools capable of reassembling transferred files, searching for keywords, and parsing human communication such as emails or chat sessions from captured network traffic.

With funding from NIJ, Purdue University developed FileTSAR for large-scale computer networks. FileTSAR follows the Computer Forensics Field Triage Process Model,[10] developed by Marcus Rogers and his colleagues, for on-the-scene acquisition of probative data. It then allows detailed forensic investigation to occur either on site or in a digital forensic laboratory environment without affecting the admissibility of evidence gathered via the toolkit.[11]

As shown in exhibit 2, FileTSAR is connected to the large-scale computer network via the collector, which implements two distinct operational components: a trigger engine and a capture engine. The trigger engine monitors all available network traffic flowing

into and out of the network and indicates when specific criteria occur in those network flows.

Based on the criteria for the specific digital forensic investigation, multiple options exist. Those criteria can spawn an event that will initiate the capture engine to record the network data. The capture engine can capture all network traffic (referred to as "catch it as you can") or operate in a variety of selective modes (referred to as "stop, look, listen"). Both the trigger engine and capture engine will output data in an industry-accepted format that is compatible with existing incident response systems, and provide a standardized interface into the storage system and indexer module.

The indexer takes input from the collector and processes it for file contents. The data are archived into the active case directories within the storage subsystem and can be explored, searched, and visualized later. The analyzer identifies the interrelatedness of files, flows, packets, users, and timelines. The analyzer also reconstructs documents, images, email, and Voice over Internet Protocol.

The visualizer identifies trends, patterns, or repetitions. It contains a web-based dashboard, accessible only by authenticated users. This authentication provides system accountability, logs all activities, and maintains the chain of custody for any evidence gathered.

The key to using FileTSAR is its logging capability. This allows an investigator to maintain chain of custody and explain to a jury where the evidence was located and how it was obtained. Another investigator can also replicate FileTSAR's processes on the same evidence.

Purdue University achieved the original goal of FileTSAR — to capture network traffic and restore digital evidence, in its original file format, in large enterprise network settings. This capability, however, requires high-performance storage units and assumes that high-performance servers or workstations will be located on premise within the law enforcement agency.

Licensed versions of FileTSAR are distributed free of charge to law enforcement agencies via a dedicated website.[12] Currently, FileTSAR is licensed to 120 agencies around the world. At least 30 of these agencies have implemented FileTSAR, including the 308th Military Intelligence Battalion, the Nigerian Police, Portugal's Cyber Crime Unit, the Grant County (WI) Sheriff's Office, and the United Kingdom's Royal Navy. Of the remaining 90 licensed agencies, it is uncertain how many have implemented FileTSAR. Component parts for the virtual machines necessary to run the system are made in China and are currently unavailable due to the COVID-19 pandemic.

Although the current version of FileTSAR is ideal for large law enforcement agencies, a more easily deployable, compact version would have greater utility for the 73% of U.S. law enforcement agencies with 25 or fewer sworn officers. With this goal in mind, NIJ recently funded Purdue University's proposal to develop *FileTSAR+ An Elastic Network Forensic Toolkit for Law Enforcement*.[13]

More Testing Is Needed

Both of these projects help move the field forward with new methods and tools for collecting and processing digital evidence. DeepPatrol provides a framework for automating the detection of child sexual abuse in videos. FileTSAR provides law enforcement agencies with the capability to conduct digital forensics processing of large-scale computer networks in a forensically sound manner.

The acceptability of these approaches to the criminal justice community will depend on the admissibility of the evidence each produces. These new methods will need to be independently tested and validated, and subjected to peer review. Any error rates will need to be determined, and standards and protocols will need to be established. And the relevant scientific community will need to accept the two approaches.

To this end, NIJ plans to have FileTSAR and DeepPatrol independently evaluated by NIJ's Criminal Justice Testing and Evaluation Consortium. This will help ensure that the tools operate in the manner described by the grantees, they can be used for their intended purposes, and — if applicable — they are forensically sound. NIJ expects both of these evaluations to produce reports that will be publicly available once the evaluations are completed.

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For More Information

Learn more about NIJ's work in digital evidence and forensics at https://nij.ojp.gov/digital-evidence-and-forensics.

This article discusses the following awards:

- "DeepPatrol: Finding Illicit Videos for Law Enforcement," award number 2016-MU-CX-K015

- "File Toolkit for Selective Analysis & Reconstruction (File TSAR) for Large Scale Computer Networks," award number 2016-MU-MU-K091

Notes

1. All data in this paragraph are from Sean E. Goodison, Robert C. Davis, and Brian A. Jackson, "Digital Evidence and the U.S. Criminal Justice System: Identifying Technology and Other Needs To More Effectively Acquire and Utilize Digital Evidence," RAND Corporation, 2015, https://www.ojp.gov/pdffiles1/nij/grants/248770.pdf.

2. Marcus K. Rogers et al., "Computer Forensics Field Triage Process Model," *Journal of Digital Forensics, Security and Law* 1 no. 2 (2006): 19-37, https://commons.erau.edu/cgi/viewcontent.cgi?article=1004&context=jdfsl.

3. Machine learning is the study of computer algorithms that improve automatically through experience. Deep learning is part of a broader family of machine learning methods based on artificial neural networks with representation learning. Learning can be supervised, semi-supervised, or unsupervised (see "What Is Deep Learning?: 3 Things You Need to Know," MathWorks, https://www.mathworks.com/discovery/deep-learning.html). Graphics processing units are specialized electronic circuits designed to rapidly manipulate and alter memory to accelerate the creation of images in a frame buffer intended for output to a display device (see "What Is a GPU?," intel, https://www.intel.com/content/www/us/en/products/docs/processors/what-is-a-gpu.html).

4. The formula is: 30 frames per second × 60 seconds × 2 minutes = 3,600.

5. Deep learning is a machine learning technique that constructs artificial neural networks to mimic the structure and function of the human brain (see "A Beginner's Guide to Neural Networks and Deep Learning," Pathmind, https://wiki.pathmind.com/neural-network).

6. "What Is a Neural Network?," DeepAI, https://deepai.org/machine-learning-glossary-and-terms/neural-network.

7. Jason Brownlee, "How Do Convolutional Layers Work in Deep Learning Neural Networks?," *Machine Learning Mastery* (blog), April 17, 2020, https://machinelearningmastery.com/convolutional-layers-for-deep-learning-neural-networks/.

8. For results of the DeepPatrol algorithm training using the APPA-Real dataset, see Jared Rondeau and Marco Alvarez, "Deep Modeling of Human Age Guesses for Apparent Age Estimation," paper presented at the International Joint Conference on Neural Networks, Rio de Janeiro, Brazil, 2018.

9. Goodison, Davis, and Jackson, "Digital Evidence and the U.S. Criminal Justice System."

10. The Computer Forensics Field Triage Process Model proposes an onsite or field approach for providing the identification, analysis, and interpretation of digital evidence in a short time frame, without the requirement of having to take the systems/media back to the lab for an in-depth examination or acquiring complete forensic images (see Rogers et al., "Computer Forensics Field Triage Process Model").

11. Rogers et al., "Computer Forensics Field Triage Process Model," 20.

12. "Tools: FileTSAR," Purdue University, https://polytechnic.purdue.edu/facilities/cybersecurity-forensics-lab/tools.

13. National Institute of Justice funding award description, "FileTSAR+ An Elastic Network Forensic Toolkit for Law Enforcement," at Purdue University, award number 2020-DQ-BX-0008, https://nij.ojp.gov/funding/awards/2020-dq-bx-0008.

NCJ 300985

The W.E.B. Du Bois Fellowship for
Research on Reducing Racial and Ethnic Disparities in the Justice System

The W.E.B. Du Bois Fellowship Program supports quantitative and qualitative research that advances knowledge on the intersections of race, crime, violence, and the administration of justice within the United States. The program funds studies that examine public policy interventions designed to reduce racial and ethnic disparities.

NIJ launched the W.E.B. Du Bois Program in 2000. It supported scholarly research until 2018, when the program was paused. It was relaunched last year.

In summer 2022, NIJ awarded nearly $2.7 million in fellowships to both experienced researchers and those early in their careers.

They will examine a diverse set of issues, including:

- How state-ordered diversion programs may introduce new pathways to inequality through shadow costs.

- How eliminating peremptory challenges affects jury selection and racial diversity on juries.

- How drug courts influence racial disparities in drug sentencing outcomes.

- How decriminalizing the possession of drugs for personal use impacts racial and ethnic differences in criminal justice outcomes.

Read more about the awards and the W.E.B. Du Bois Program at
https://nij.ojp.gov/funding/fellowships/web-du-bois-program.

REENTRY RESEARCH AT NIJ: PROVIDING ROBUST EVIDENCE FOR HIGH-STAKES DECISION-MAKING

BY **ERIC MARTIN** AND **MARIE GARCIA**
NIJ is committed to promoting rigorous research on how best to successfully integrate individuals returning from jail or prison.

Reentry matters. Millions of American adults are incarcerated in local jails and state and federal prisons. Another several million are under criminal justice supervision in the community. As individuals serve their sentences and are released from custody, one thing is certain: The majority of them — approximately 95% — will return to their communities, families, and friends.[1] As they leave custody and become our neighbors, it is important that we invest in these individuals and help them succeed and contribute positively to their families and their communities. Many will leave the institutional setting with the skills necessary to become contributing members of our local neighborhoods. But, unfortunately, many will not. As an example, many individuals will return to custody. The Bureau of Justice Statistics found that 44% of individuals who left state prison were arrested[2] at least once in their first year after release.[3] Within nine years of release, 5 of 6 of those previously in state prison had been rearrested. The number of people who will reengage with the criminal justice system highlights the critical importance of reentry.

Why does reentry matter? Reentry is a critical transition for individuals returning to their communities, whether they have been away for decades or a matter of days. The difficulty, however, is that individuality can make this transition more complicated. People reentering have unique needs, and often these needs — for example, ongoing issues like mental and behavioral health — have not been addressed before release or during the reentry process. The reentry process and how long it lasts can vary from person to person.

Further complicating the matter is, at times, the inconsistent evidence for what helps individuals successfully reenter the community. The "what works in reentry" literature has consistently found that housing, employment, family unification, mental and physical health treatment, and meeting other critical needs are vital to post-release success.[4] If people reentering are able to find housing and employment and address other critical needs, they are more likely to be successful in the community and not return to custody. But what works for whom and when?

Matching supervision style and programming with a person's criminogenic risk and need is critical to promoting positive reentry and reducing recidivism.

Over the past several decades, the National Institute of Justice (NIJ) has been a leader in the study of reentry. Former NIJ Director Jeremy Travis helped popularize the term "reentry" in the late 1990s when he said that interest and progress in understanding "'prisoner reentry' has been nothing short of remarkable."[5] Since then, reentry has remained a priority for NIJ. In the 21st century, several federal reentry initiatives have invigorated the attention paid to the needs of persons who have been convicted of crimes as they return to society. Policymakers, practitioners, and community and criminal justice stakeholders, as well as others, have learned — and continue to learn — what works and what matters in the reentry process.

This article provides an overview of reentry, focusing on NIJ's contributions to the field and identifying gaps in our collective empirical knowledge. It starts by discussing what is known about common barriers to successful reentry and describing federal efforts to help state and local agencies address those barriers. It then highlights NIJ's efforts to advance sophisticated risk assessment algorithms and introduces NIJ's evaluations of graduated sanctioning programs. This article concludes with a discussion of NIJ's ongoing research evaluating local reentry programming.

Barriers to Reentry

Research has identified common barriers to successful reentry, including but not limited to the difficulty of obtaining gainful employment, stable housing, and education and strengthening prosocial support networks.[6] These factors represent barriers because they can inhibit treatment and the ability

to overcome criminogenic needs (the triggers or situational factors that may lead someone at risk to commit a new crime).[7]

The federal government has initiated comprehensive programs to assist jurisdictions in addressing the needs of individuals returning from incarceration. The Serious and Violent Offender Reentry Initiative (SVORI) in 2003 and the Second Chance Act (SCA) in 2008 provided support to state, local, and tribal governments to address common reentry barriers. These large federal initiatives were complemented by smaller programs facilitated by individual agencies that helped address specific reentry issues.

These initiatives offered opportunities for program evaluations to generate research on how best to address criminogenic risk and needs. Findings from these evaluations also provide insight into desistance from crime and how to help individuals overcome substance use disorders, gain prosocial skills, and alter their attitudes toward crime and violence.

For example, evaluations of SVORI highlighted the different reentry risks and needs for males and females. NIJ-supported researchers found that men tend to benefit from programs that promote attitudinal change, such as treatments that address criminal attitudes and anger management and promote healthy personal relationships. Women, on the other hand, tend to respond better to practical skills training, such as having a reentry case manager and going through life skills training. The evaluations found that SVORI programs helped reduce rearrests and lengthened the time to arrest; however, SVORI participation did not reduce reincarceration. SVORI programming did appear to be more beneficial to participants as time went on. This may point to the possibility that SVORI participation offered some keys to long-term success in overcoming the difficult transition from prison to the community, which is usually seen early on in missed community supervision appointments and positive drug tests.[8]

Evaluations of the SCA found that, like SVORI, it did not reduce reincarceration. The SCA did, however,

successfully provide participants with greater access to programs. It increased job placement and employment outcomes, but this did not seem to translate into recidivism-reduction gains.[9] These findings suggest that the process of reentry is complex, and that helping individuals overcome reentry barriers may not on its own be enough to lower recidivism.[10]

No Reentry Panacea

Evaluating the success of national initiatives like SVORI and the SCA is difficult. These programs were able to provide individuals with services and educational, housing, and employment opportunities that may have been previously unavailable — yet their impact on recidivism, when taken as a whole, was limited. This could be due, in part, to the myriad and complex factors that can trigger incarceration, whether through the revocation of parole because of a violation of the conditions of a community sentence or because of the commission of a new criminal offense. An individual's needs may interact with the systemic disadvantages of the neighborhood and community to which they are returning. Understanding how a need will be met by a particular program or service is not straightforward, nor is knowing how the individual will respond to a program or even how open to change they may be.[11]

Reentry programs alone may not be adequate. In other words, a program needs to be delivered at the right time on the individual's trajectory of change to promote successful reentry.[12] For example, individuals may want to change, but they might have an underlying substance use disorder and inadequate skills to thrive on their own. A job services program alone would not address a substance use disorder issue; matching appropriate services with needs at the right time would likely be more effective. The likely inadequacy of addressing just one criminogenic need may speak to the popularity of case management as a reentry tool to help ensure that individuals receive tailored services to meet all of their unique needs. In fact, case management was the most common reentry service provided under the SCA.[13] However, this does not mean that case management is widely

successful, as the evaluation of SCA programming showed that it largely did not produce an effect.[14] Although having a case manager seemed to increase the time to arrest for females, it seemed to shorten the time to reincarceration for males. The research team surmised that this may have been due to increased monitoring of those working with a case manager.[15]

There are a number of programs and services available to meet the needs of an individual returning from incarceration. A case manager can tailor these services to meet specific immediate needs, though this may not prevent recidivism unless the individual is ready to change and can persevere in spite of the significant barriers that often stand in the way of successful reentry.

Assessing Risk

Services should align with a person's criminogenic needs. In fact, a mismatch in services may inadvertently contribute to recidivism.[16] Smaller caseloads give community corrections officers a greater ability to accurately assess clients' needs and direct them to more beneficial treatment programs based on those assessments.[17] Unfortunately, even under the best conditions, a community corrections officer's caseload is about 50 people on probation or parole, which makes it difficult to understand each person's triggers and barriers to success.[18] Before individuals are placed on supervision, a number of decisions must be made about their potential risk of recidivating. In the past, practitioners relied on tacit knowledge to make professional judgments about the recidivism risk of an individual leaving prison and under community supervision. Today, there are more than 400 risk assessments in use across the criminal justice system.[19] These risk assessment tools can make actuarial predictions based on risk factors that are both static (factors not subject to change, such as criminal history) and dynamic (factors that are amenable to potential intervention, such as negative peer associations and substance use), while still incorporating the practitioner's professional assessment.[20]

Developing New Technology To Promote Reentry Outcomes

While NIJ continues to pursue its research agenda of rigorously evaluating innovative reentry programming, the Institute is also actively engaged in technology development to improve reentry outcomes. NIJ facilitated the creation and application of enhanced artificial intelligence (AI) and machine learning to refine our understanding of the risk of recidivism and to explore the possibilities of timely intervention with individuals who are most at risk for recidivating. NIJ's efforts began in 2019 with a solicitation seeking AI solutions to assist community corrections and continued in 2021 with a challenge to develop enhanced risk assessment models. Both are discussed below.

Artificial Intelligence Technology Development

NIJ's 2019 solicitation *Artificial Intelligence Research and Development To Support Community Supervision* resulted in two funded research projects aimed at developing AI tools to improve reentry outcomes for individuals on community supervision. These projects mark an important step in fielding this technology to help community corrections officers positively intervene with individuals in their caseloads.

The first award, made to Purdue University, will facilitate the development of a new AI-based support and monitoring system (AI-SMS). The AI-SMS will consist of a deployed smartphone application distributed to and worn by a sample of individuals under parole supervision in Tippecanoe County, Indiana. This application is intended to allow community supervision officers to interact with individuals under parole supervision, augment their program, and send alerts to officers about individuals who are at risk of recidivating.

In the second project, RTI International — in partnership with Applied Research Services and the Georgia Department of Community Supervision — will implement the Integrated Dynamic Risk Assessment for Community Supervision, which will enhance risk assessments with dynamic, real-time risk factors and guide community supervision officers' interventions.

For more information on these projects, see https://nij.ojp.gov/topics/articles/tapping-artificial-intelligence.

Enhanced Machine Learning Predictive Tools

In fiscal year 2021, NIJ released the NIJ Recidivism Forecasting Challenge, which sought to promote the development of enhanced and accurate risk assessments in community corrections while, at the same time, mitigating potential racial bias and considering unique gender differences. Challenge participants used a de-identified dataset from the Georgia Department of Community Supervision to predict recidivism among individuals on parole over a 12-, 24-, and 36-month period. Participants were also encouraged to use other datasets or information deemed useful to predict recidivism.

The Challenge received more than 150 submissions forecasting recidivism for each year over a three-year period. In total, 28 teams won prizes. The winning teams submitted the most accurate models predicting male and female recidivism separately in each of the three years. Awards were also given to participants who created models that were equally accurate for both Black and white individuals

under parole supervision. Challenge winners submitted papers to NIJ discussing their models and what information they deemed most useful or predictive of recidivism. Challenge winners also participated in a symposium on how to advance risk assessments so that community corrections can have a greater understanding of risk across race and gender. NIJ will provide information from the winners' papers and the symposium to the field in forthcoming publications.

For more information on the Challenge, go to https://nij.ojp.gov/funding/recidivism-forecasting-challenge.

Even with these advances, there are some critical limitations in how risk assessment tools can support reentry programming. Although more accurate than professional judgment alone, risk assessment tools may exacerbate bias and perpetuate racial and ethnic disparities. In other words, a risk assessment tool may create a negative feedback loop based on the tool's predictive indicators. In this case, individuals from marginalized communities, including communities of color, who are more likely to have early involvement with the criminal justice system will be indicated as posing a greater risk and thus receive more intensive supervision, which may lead to increased recidivism. As stated above, matching supervision style and programming with a person's criminogenic risk and need is critical to promoting positive reentry and reducing recidivism. In addition, using risk assessment tools that are accurate across race and gender is critical. Currently, common risk assessment tools predict risk most accurately for white men.[21] This may inhibit correctional agencies' ability to effectively meet the needs of all individuals under supervision.

Another limitation of risk assessment tools is their passivity. Risk assessment tools make important decisions based on probabilistic averages. On their own, the tools cannot replace a meaningful relationship between an individual and a community corrections officer. These tools can help triage community corrections' scarce resources and attempt to direct services and supervision to those who need it most, but they cannot by themselves effect change. (See the sidebar "Developing New Technology To Promote Reentry Outcomes" for more information on NIJ's efforts to advance risk assessments.)

Role of Sanctioning

The goal of community corrections is to ensure that individuals under community supervision comply with their conditions of supervision, do not commit new crimes, and are provided services that address their criminogenic needs to improve long-term outcomes. It is expected that missteps and minor violations will occur — reentry can be complex and nonlinear. The difficulty lies in deciding whether an individual may still be successful on a community sentence after a violation or whether the community sentence should be revoked. Many violations, by themselves, may not warrant the prison term that often results from revocation of a community sentence. If individuals accumulate multiple violations, however, officers may need to decide when it is time to call for revocation.

Hawaii created a probation model — Hawaii Opportunity Probation with Enforcement (HOPE) — in which every violation resulted in a short but swift sanction that did not remove the individual from probation. The theory behind HOPE was that the sanction would be severe enough to help modify behavior and introduce accountability, but it would not be as severe as revoking the probation sentence. Individuals would experience the sanction — typically a few days in jail — shortly after the violation was detected, thus reinforcing the link between the sanction and the behavior that led to the violation. This, in turn, would help promote behavioral change among those on probation and parole.[22]

Although initial findings suggested that the HOPE probation model was effective,[23] an NIJ multisite

demonstration on the U.S. mainland was not able to replicate the initial successes. HOPE participants were found to have fewer arrests than those on regular probation in two of the four jurisdictions, but overall there was no difference in time-to-arrest or probation revocations.[24] Difficulties in organizational culture and communication among implementing partners, along with the model's statutory framework, made it challenging to implement HOPE consistently across the four sites, particularly in terms of achieving a uniform definition of probation failure and a return to prison.[25] The HOPE experience illustrates the challenges of adopting a community corrections or reentry program from another jurisdiction, even when the program has some initial indication of success.

Implementing an Effective Reentry Program

Effecting change is hard, especially for those involved with the criminal justice system. The reentry field has benefited from numerous program evaluations that show which interventions are promising and which may actually make matters worse.[26]

Deciding whether to implement a particular reentry program or use a suite of best practices is a difficult choice for criminal justice agencies. First, the agency must understand the conditions that led to the success of any program that it seeks to adopt. Not only must the agency decide if it can replicate the core components of the reentry program, it must also determine if the reentry program is well aligned with its environment or target population. To further complicate matters, the role of the environment and other contextual factors that contributed to the successful implementation may not be fully understood.

Should an agency decide to adopt a reentry program, staff buy-in is critical. An NIJ-funded project examining the implementation of an evidence-based program found that it was easier to change the language community corrections officers used to describe what they were doing than to actually modify what they were doing.[27] Research shows that building

staff buy-in for a new approach, although difficult, is often much easier than ensuring that staff have adopted the necessary changes to how they do their jobs.[28] Not only must staff understand what to do, they also may have to approach their jobs in an entirely different way in order to implement the program with fidelity. This is a heavy lift for any community corrections agency to undertake.

The Need for Randomized Controlled Trials

The stakes are high in reentry decision-making. It is critical for jurisdictions to implement programs that work, assess risk, and assign appropriate programming to the right individual. Individuals face numerous hurdles upon release from prison or jail. Ineffective programs are not only a poor allocation of time and resources, they may also contribute to recidivism.[29] Sound evidence is needed about what programs are effective, for whom, and under what conditions. Several years ago, NIJ dedicated a research portfolio specifically to reentry programming that relies on evaluations using randomized controlled trials (RCTs). When implemented with rigor, RCTs offer the highest degree of confidence in study outcomes. Because these studies randomly assign participants into treatment groups (those who receive the specific program under study) and control groups (those who do not receive the program being evaluated), the research team is able to isolate the effect of the reentry program (or supervision strategy) on the participants in the treatment group. All other factors that likely influence an individual's success in reentry are cancelled out because all participants have an equal likelihood of being assigned to the treatment group or control group.[30]

In lieu of randomization, researchers often employ quasi-experimental designs, which use advanced analytical tools to mimic the treatment and control logic of an RCT by trying to compare program participants with similar individuals who did not receive the program. In some instances, program implementation can be so broad that there is no identifiable control group. Here, the research

team may compare recidivism rates before and after program implementation to try to assess the program's overall impact.

Unfortunately, recent NIJ-funded research has shown that quasi-experimental designs in criminal justice research tend to overestimate the treatment effect.[31] In other words, quasi-experimental evaluations may show that a program has a significant impact on reentry outcomes when, in fact, the impact may be minimal. By the same token, this type of evaluation may show that a program has a moderate or minimal impact when it has no effect at all.

There are times when RCTs are not feasible. In these cases, many program evaluations are based on robust quasi-experimental designs. However, because the barriers to successful reentry are so great and the resources of community corrections agencies are so scarce, NIJ has made a commitment to support reentry evaluations that use RCT designs to provide practitioners and the individuals who rely on them with the soundest possible evidence to guide reentry programming.

In 2018, NIJ issued its first solicitation that prioritized RCT evaluations of promising reentry initiatives. Corrections researchers and practitioners responded overwhelmingly to the call, recognizing the critical need for sound research in this area. In the first year, NIJ funded five projects totaling more than $5 million. Given the success of the first year, NIJ quickly institutionalized this solicitation as a standing program. After three years of funding, the program has now grown to 13 ongoing research projects totaling approximately $17 million in research funding. To put this in context, over the same three-year period, NIJ funded 25 corrections-related research projects from four different portfolios (including reentry), representing an investment of approximately $27.7 million. Of this, the reentry portfolio represents more than half of the projects and 60% of the research investment.

Themes of Ongoing Reentry Research

NIJ's 13 ongoing reentry research projects can be grouped together under a few general themes. These projects were submitted independently of one another, and NIJ purposely offered significant flexibility to the field to guide the selection of topics. Thus, the themes of these projects can be considered a snapshot of the areas of critical research need in reentry today. The general themes include evaluations of:

- Young adult reentry programs.
- Treatment for individuals on parole with past traumatic brain injuries.
- Risk-need-responsivity strategies.
- Emerging technology.
- Innovative treatment modalities.

Young Adult Reentry Programs

Three ongoing evaluations are examining interventions for moderate- to high-risk young adults.[32] One program seeks to address past trauma and its likely consequences, particularly impulsivity and aggression, among individuals released from prison. The remaining two programs focus on interventions for young adults in jail, mainly cognitive behavioral therapy with case management. One program also includes a subset of participants who will live together in a dedicated housing pod. With these projects, NIJ hopes to understand how treatment and dedicated housing interact to impact reentry outcomes.

Traumatic Brain Injury

The study of traumatic brain injury is an emerging area for NIJ. There is an increasing awareness that many individuals who are incarcerated suffer from past traumatic brain injuries, some unknowingly.[33] These injuries often make it more difficult to perform functions necessary for successful reentry, such as securing employment or building technological literacy. NIJ has two ongoing projects that focus on screening individuals for traumatic brain injury and providing tailored services — both case management and therapy — to meet their needs.[34]

Risk-Need-Responsivity Strategies

NIJ is supporting two projects that evaluate risk-need-responsivity strategies.[35] Both programs under evaluation seek to improve outcomes on the major post-release reentry barriers mentioned above. The first evaluation is taking place in a prison setting and examining a stand-alone 16-week curriculum administered to medium- and high-risk individuals before release. The second evaluation includes multiple treatment methods of a similar program given to individuals both pre- and post-release from jail, pre-release only, and post-release only, as well as no programming. Taken together, findings from these evaluations will provide critical evidence on the impact of continuity of programming pre- and post-release for individuals returning to the community.

Emerging Technology

NIJ is also supporting two projects that examine the use of technology to enhance reentry outcomes.[36] One is a virtual reality job interview program that seeks to enhance individuals' post-prison employment chances. The second will evaluate the impact of a web-based reentry planning and management tool. Medium- to high-risk individuals will receive a yearlong subscription to the web-based tool prior to their release from prison; their subscription will continue through early reentry. The study will assess how the web-based interactive tool can enhance standard reentry programming. At the conclusion of these projects, NIJ hopes to provide the field with evidence on the possibilities and limitations of advanced technological tools to aid conventional reentry programming.

Innovative Treatment Modalities

The remaining projects cover a variety of reentry topics.[37] The evaluations include studying how expungement affects employment outcomes, how restorative justice can enhance therapeutic community treatment for individuals with substance use disorders, and how parole officer home visits can be used as a rehabilitative tool and not just a surveillance strategy. These evaluations cut across the myriad functions community corrections agencies and

their partners provide for individuals reentering their communities. These projects — coupled with those discussed above and corrections-related projects from other NIJ research portfolios — will provide robust evidence on how best to promote successful outcomes among individuals returning from jail or prison.

Conclusion

In this article, we discuss NIJ's investment in the field of reentry writ large, from evaluating federal initiatives, advancing risk assessments, and examining innovative programming such as HOPE, to evaluating local reentry work. All of this work is aimed at helping individuals succeed during the reentry process.

Reentry matters. How the criminal justice system addresses the risk and needs of individuals returning to our communities matters. We know there is a critical need to accurately align the community supervision strategy and reentry programming with the individual's criminogenic needs. We also know it is difficult to understand the factors that contribute to positive behavioral change on an individual basis, along with which carrots and sticks (including sanctioning) are available to correctional agencies. We know that assessing risk has the potential to exacerbate criminal justice biases and racial and ethnic disparities and thus potentially inhibit successful reentry. And importantly, we know it is difficult to find a program that works and to know how to implement it successfully.

Supporting the field of criminal justice by promoting rigorous research is critical to understanding what works for whom and under what circumstances. For more than three decades, NIJ has invested in reentry research in order to help the field answer these important questions — and it will continue to do so with a renewed focus on rigorous research designs. Understanding and building evidence about what works and what does not work in reentry programming and community supervision will enable the criminal justice system and its stakeholders to help individuals succeed when they return to the community.

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For More Information

Learn more about NIJ's reentry research at https://nij.ojp.gov/topics/corrections/reentry.

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The Hidden Costs of Reentry:

Understanding the Barriers to Removing a Criminal Record

Millions of adults are incarcerated in U.S. jails and prisons, and millions more are on parole or probation. As these individuals serve their sentences and leave custody, they return to their communities, families, and friends. In the language of the justice system, this process is called reentry.

As a leader in research on reentry, NIJ has a long history of studying ways to improve this transition — for example, job training, mental health counseling, and substance use programs. However, an aspect of reentry that has not typically received as much attention is the impact of criminal records, which can trigger numerous collateral consequences that intensify the challenges of reentry.

NIJ brought together three panelists with backgrounds in law, justice, and public policy to discuss the accuracy and permanency of criminal records and the barriers to reentry that they pose.

► **Watch the webinar at https://nij.ojp.gov/media/video/28416.**

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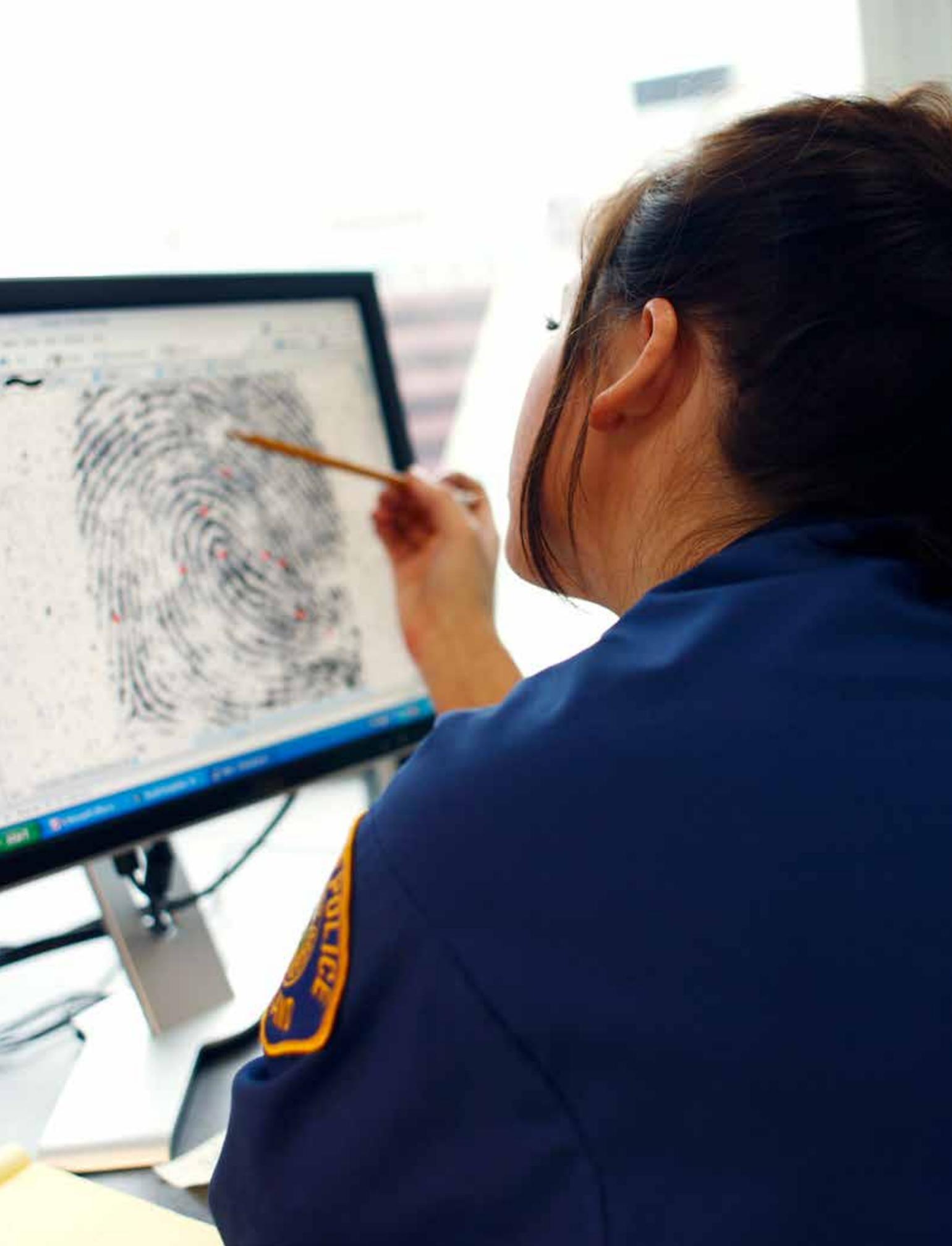
THE HISTORY AND LEGACY OF THE LATENT FINGERPRINT BLACK BOX STUDY

BY **LUCAS ZARWELL** AND **GREGORY DUTTON**

The FBI's black box study on latent prints continues to influence the criminal justice system's understanding of the validity and reliability of forensic testimony.

A forensic scientist's testimony is vital for upholding justice in a court of law. The scientist's conclusions must be based on tested scientific methods with objective outcomes, without regard for whether the results may benefit the defense or the prosecution. Forensic methods are developed, measured, advanced, and evaluated through rigorous research — building a foundation for those conclusions to be evaluated and accepted by a court of law.

Examiner testimony — particularly in the forensic pattern disciplines (e.g., latent fingerprints, firearms, toolmarks, and footwear) — has been under heavy scrutiny in recent years. High-profile misidentifications, admissibility challenges, and blue-ribbon committee reports have heightened criticism about the scientific basis of examiner testimony in these disciplines and the forensic methods on which they are based.

"Black box" studies — those that measure the accuracy of outcomes absent information on how they are reached — can help the field better understand the validity and reliability of these methods. This article explores the basis of the black box design and highlights the history and legacy of one particularly influential study: a 2011 black box study by the FBI that examined the accuracy and reliability of latent fingerprint examiner decisions. This study had an immediate and lasting impact in the courts and continues to help define a path forward for future research. The article concludes with an overview of how the National Institute of Justice (NIJ) is working to support black box and similar studies across a number of forensic disciplines.

A Discipline Under Scrutiny

In 1993, the U.S. Supreme Court established five factors that a trial judge may consider when determining whether to admit scientific testimony in court.[1] Known as the *Daubert* standard, these factors are:

1. Whether the theory or technique in question can be and has been tested.

Misidentification in the Madrid Bombings

On March 11, 2004, attacks directly targeting commuter trains in Madrid, Spain, killed 193 people and injured approximately 2,000 others. On May 6, 2004, the FBI wrongfully arrested and detained Brandon Mayfield based on a latent fingerprint associated with the attacks. An official investigation later found that Mayfield, an American citizen from Washington County, Oregon, had no connection with the case. This led to a public apology from the FBI, internal reviews, and lawsuits to help compensate the wrongfully detained.

Sources: Matthew Harwood, "The Terrifying Surveillance Case of Brandon Mayfield," *Al Jazeera America,* February 8, 2014; and Office of the Inspector General, *A Review of the FBI's Handling of the Brandon Mayfield Case,* Executive Summary, Washington, DC: U.S. Department of Justice, Office of the Inspector General, Oversight and Review Division, January 2006, https://oig.justice.gov/sites/default/files/legacy/special/s0601/exec.pdf.

2. Whether it has been subjected to peer review and publication.

3. The degree of its known or potential error rate.

4. The existence and maintenance of standards controlling its operation.

5. Whether it has attracted widespread acceptance within a relevant scientific community.

One of the factors — a method's known or potential error rate — has arguably led to a substantial degree of confusion, discussion, and debate. This debate increased in 2004, when an appeals court in *United States v. Mitchell* recommended that, in future cases, prosecutors seek to show the individual error rates of expert witness examiners and not that of the forensic discipline in general.[2] The National Academy of Sciences has since addressed the confusion of practitioner error rates with discipline error rates; however, the scientific community continues to debate how to best define error rates overall.[3]

At about the same time as the *Mitchell* decision, an imbroglio resulting from an identification error involving the FBI's Latent Fingerprint Unit was unfolding. The misidentification — caused by an erroneous fingerprint individualization associated with the 2004 Madrid train bombings (see sidebar, "Misidentification in the Madrid Bombings") — led to a series of FBI corrective actions, including suspension of work, a two-year review of casework,

and the establishment of an international review committee to evaluate the misidentification and make recommendations.[4]

In addition, the FBI Laboratory commissioned an internal review committee to evaluate the scientific basis of latent print examination and recommend research to improve our understanding of the discipline's validity. In 2006, the FBI committee found that the methodology surrounding latent fingerprint examination — like most pattern disciplines — has more subjectivity than other forensic disciplines, for example, chemical analysis of seized drugs. The FBI committee recommended black box testing, a technique to test both examiners and the methods used simultaneously.[5]

Black Box Testing

In his 1963 paper "A General Black Box Theory," physicist and philosopher Mario Bunge articulated a concept applied in software engineering, physics, psychology, and other complex scientific systems.[6] Bunge represented a simplified black box as a notional system where inputs are entered and outputs emerge. Although the specific constitution and structure of the system are not considered, the system's overall behavior is accounted for.

Software validation offers one example of how a black box study can be applied. The tester may not

Exhibit 1. Black Box Testing

Black Box
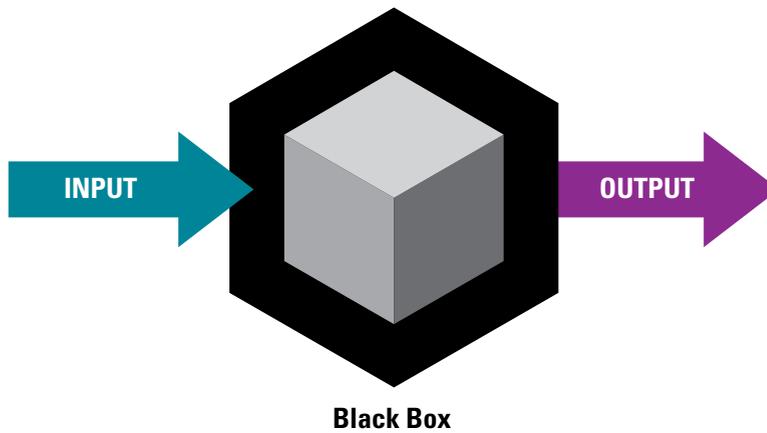
know anything about the application's internal code; however, they have an expectation of a particular result based on the data provided. Another example is predicting consumer behavior. The consumer's thought processes are treated as a black box, and the study determines how they are likely to respond (i.e., will they purchase the item or not) when provided input from different marketing campaigns.

Today, this theory and its encompassing approach are being used to evaluate the reliability of forensic methods, measure their associated error rates, and give courts the information they need to assess the admissibility of the methods in question. A black box study measures the accuracy of examiners' conclusions without considering how they reached those conclusions. In essence, factors such as education, experience, technology, and procedure are all addressed as a single entity that creates a variable output based on input (see exhibit 1).

In 2011 — five years after the FBI committee's recommendation — Noblis (a scientific nonprofit)[7] and the FBI published the results of a black box study to examine the accuracy and reliability of forensic latent fingerprint decisions.[8] The discipline was found to be highly reliable and tilted toward avoiding false incriminations. The study reported a false positive rate of 0.1% and a false negative rate of 7.5%.[9] In other words, out of every 1,000 times examiners determined that two prints came from the

same source, they were wrong only once. But when determining that two prints did *not* come from the same source, they were wrong nearly 8 out of 100 times. The report was introduced in court almost immediately after it was published,[10] and since then it has been well accepted by the scientific community. The report continues to be immensely influential; it has been downloaded more than 70,000 times and is among the top 5% of all research outputs in terms of impact online.[11] The research team went on to publish 15 additional papers delving deeper into aspects of latent print examination.[12]

In its 2016 report *Forensic Science in Criminal Courts: Ensuring Scientific Validity of Feature Comparison Methods,* the President's Council of Advisors on Science and Technology discussed the challenges in assessing the performance of both objective and subjective pattern comparison methods to determine if they are fit for purpose.[13] The council doubled down on the 2006 FBI research committee's conclusion by recommending similar black box studies for other forensic disciplines and cited the 2011 latent print study as an excellent example of how to accomplish this.

Why Was This Study So Effective?

There are several reasons why the FBI's latent print study was so successful. One key factor was the existing knowledge surrounding the science of latent

Today, black box studies are being used to evaluate the reliability of forensic methods, measure their associated error rates, and give courts the information they need to assess the admissibility of the methods in question.

fingerprint examination and its established historical application in the forensic sciences.

Latent print examination is a classic example of a forensic pattern discipline. In latent prints, the pattern being examined is formed by the fine lines that curve, circle, and arch on our fingertips, palms, and footpads. These lines are composed of grooves and friction ridges, which provide the traction that enables us to pick up a paperclip or quickly turn the page of a newspaper. However, they also leave impressions and residues that can be photographed or lifted from the surface of an item at a crime scene. These residues — formed by sweat, oils, and particulates — leave copies of the friction ridge patterns called "latents." Latent print examiners compare the ridge features of latent prints left at a crime scene to those collected under controlled conditions from a known individual. Controlled prints are called "exemplars" and are collected using ink on paper or a digital scanning device.

Today, the principal process used to examine latent prints is analysis, comparison, evaluation, and verification (ACE-V).[14] An examiner's subjective decisions are involved in the ACE component of the method, which involves:

1. Analyzing whether the quality of a latent print is good enough to be compared to an exemplar.

2. Comparing features of the latent print to the exemplar.

3. Evaluating the strength of that comparison.

The verification portion of the process involves a second examiner's independent analysis of the matched pair of prints.

ACE-V as typically implemented can yield four outcomes: no value (unsuitable for comparison), identification (originating from the same source), exclusion (originating from different sources), or inconclusive.[15] The verification step may be optional for exclusion or inconclusive decisions. For example, the Noblis/FBI latent print study applied the ACE portion of the process but did not include verification. This was a significant decision because excluding the verification step contributed to the upper bound for error rates reported by the study.[16] Nevertheless, the researchers were able to compare the conclusions of pairs of examiners to infer that verification likely could have prevented most errors.

There were a number of factors that made the study successful; other disciplines can and have adopted these factors. First, the FBI partnered with outside, independent researchers to design and perform the study. Noblis is a nonprofit science and technology organization with acumen in research and analysis. Together, the FBI and Noblis were a productive team — the FBI brought world-renowned expertise in latent print examination and forensic science research, and Noblis brought a reputation for objective analysis.

The relative size and scale of the study were also important. The FBI has a reputation for leadership and high-quality practices and training, and it actively contributes to practitioner professional groups and meetings. The agency also had an extensive and transparent response to the 2004 Madrid misidentification, along with plans for future research. This reputation and approach helped broker trust from the forensic science community. As a result, more than 169 latent print examiners — from federal, state, and local agencies, as well as private practice — volunteered to be part of the study.[17] The scale of the study design was also large enough to produce statistically valid results. Each examiner

compared approximately 100 print pairs out of a pool of 744 pairs, for a total of 17,121 individual decisions.[18]

In addition, the study was double-blind, open set, and randomized. Scientifically, these design elements are important because they mitigate potential bias. As a double-blind study, participants did not know the ground truth (the true match or nonmatch relationships) of the samples they received, and the researchers were unaware of the examiners' identities, organizational affiliations, and decisions. The open set of 100 fingerprint comparisons from a pool of 744 pairs[19] further strengthened the study by ensuring that not every print in an examiner's set had a corresponding mate. This prevented participants from using a process of elimination to determine matches. Finally, the randomized design varied the proportion of known matches and nonmatches across participants.

Lastly, the study design included a diverse range of quality and complexity. The study designers had latent print experts select pairs from a much larger pool of images that included broad ranges of print quality and comparison difficulty.[20] They intentionally included challenging comparisons, so that the error rates measured would represent an upper limit for the errors encountered in real casework.

Impact on the Courts

The major impact of black box research has been in the courts. Following publication, the results of the FBI latent print black box study were almost immediately applied in an opinion to deny a motion to exclude FBI latent print evidence.[21] The case involved a bombing at the Edward J. Schwartz federal courthouse in San Diego. Donny Love, Sr., with the help of his accomplices, masterminded the construction and placement of several explosive devices, one of which was used to bomb the federal courthouse. Although no one was injured or killed, the explosion blew out the doors to the federal courthouse and sent shrapnel and nails flying over a block away and at least six stories into the air.[22]

In the motion, Love argued that latent fingerprint analysis was insufficiently reliable for admission under Federal Rule of Evidence 702 and the Supreme Court's previous opinions in *Daubert v. Merrell Dow Pharmaceuticals* (1993) and *Kumho Tire Company v. Carmichael* (1999). Therefore, Love argued, the analyst's testimony about the latent prints she analyzed for this case was also insufficiently reliable for admission.

The FBI latent print study results were entered into the record supporting latent print examination and cited explicitly in the opinion when considering the method's reliability under factor 3 of the *Daubert* standard (known or potential error rates). In the opinion, which led to the denial of the motion to exclude and an eventual guilty verdict, the judge stated, "All of the relevant evidence in the record before the court suggests that the ACE-V methodology results in very few false positives — which is to say, very few cases in which an examiner identifies a latent print as matching a known print even though different individuals made the two prints."[23] The judge continued, "Most significantly, the May 2011 study of the performance of 169 fingerprint examiners revealed a total of six false positives among 4,083 comparisons of non-matching fingerprints for 'an overall false-positive rate of 0.1%.'"[24]

Other important rulings followed. *United States v. McCluskey* (2013) involved the double murder of Gary and Linda Hass, who had been shot and burned inside their travel trailer in August 2010.[25] The individuals charged with the crime — now both convicted — had left their fingerprints on a piece of plastic wrapper inside a pickup truck they stole from the murdered couple.[26] At trial, the defense issued a motion to exclude fingerprint evidence and requested a *Daubert* hearing. One basis for the defense argument was the 2009 National Research Council report that stated, "There is no systematic, controlled validation study that purports to estimate the accuracy of latent print individualization."[27] In response, the court's opinion cited the FBI latent print study extensively to demonstrate *Daubert* factor 1 (the theory can be tested) and factor 3 (known or potential error rates). The opinion stated, "While the Brandon Mayfield case,

along with other weaknesses in fingerprint testing, may provide fertile ground for cross-examination of the Government's fingerprint identification expert, it alone does not outweigh the testing that has been conducted in this area."[28]

Three years later, in *United States v. Fell* (2016),[29] an individual who was sentenced to death in 2006 for carjacking and death resulting from kidnapping and carjacking was seeking dismissal of the prior conviction based on the unreliability of fingerprint evidence. His fingerprints had been found in the car used in the kidnapping. The judicial opinion on the *Daubert* challenge to admit the fingerprint evidence cited the error rates determined in the FBI's latent print study, as well as subsequent research supporting examiner accuracy. This included studies exploring the repeatability and reproducibility of examiner conclusions and measuring how much information an examiner needs to make an identification.[30]

The Study's Legacy

The FBI's latent print black box study — with its robust design and transparent results — has spawned additional research in latent prints that explores the reproducibility and repeatability of examiner decisions, assesses quality and clarifying information, and explores interexaminer decisions.[31]

This landmark study has also influenced research in other forensic pattern disciplines, including palm prints, bloodstain patterns, firearms, handwriting, footwear, and, most recently, tire tread and digital evidence.[32] Black box studies in these disciplines present different challenges from latent prints. For example, firearms examiners face a variety of makes and models of firearms that mark casings and bullets differently. This leads to diverse class and subclass characteristics in addition to individualizing features.[33] Within some disciplines, such as bloodstain pattern analysis, a range of practices and terminology currently exist; community consensus and uniform standards may be needed.

Even with these challenges, court decisions demonstrate the continued importance of black box studies. For example, in a motion to exclude ballistic evidence from a felony firearm possession case, the court in *United States v. Shipp* (2019)[34] cited a 2014 firearms black box study.[35] The court relied on the study's assessment that it most closely followed conditions that might be encountered in casework. The court noted, however, that the study demonstrated that a firearms toolmark examiner may "incorrectly conclude that a recovered piece of ballistics evidence matches a test fire once out of every 46 examinations" and "when compared to the error rates of other branches of forensic science — as rare as 1 in 10 billion for single source or simple mixture DNA comparisons … — this error rate cautions against the reliability of the [method]."[36] As a result, the court did not exclude the evidence but rather concluded that the examiner "will be permitted to testify only that the toolmarks on the recovered bullet fragment and shell casing are consistent with having been fired from the recovered firearm."[37] Thus, the recovered firearm could not be excluded as a source, but the examiner would not be allowed to specifically associate the evidence to that individual firearm.

Black box studies of examiner conclusions have been and will continue to be important to our understanding of the validity and reliability of forensic testimony, especially in the pattern comparison disciplines. Further studies — modeled on the FBI latent print study design and involving relevant practitioner communities — will provide value to courts considering *Daubert* challenges to admissibility. NIJ continues to support black box and similar studies across a number of forensic disciplines.[38] Explore the projects below for more information:

- "A Black Box Study of the Accuracy and Reproducibility of Tire Evidence Examiners' Conclusions," award number 2020-DQ-BX-0026.

- "Inter-Laboratory Variation in Interpretation of DNA Mixtures," award number 2020-R2-CX-0049.

- "Black Box and White Box Forensic Examiner Evaluations — Understanding the Details," award number DJO-NIJ-19-RO-0010.

- "Black Box Evaluation of Bloodstain Pattern Analysis Conclusions," award number 2018-DU-BX-0214.

- "Firearm Forensics Black-Box Studies for Examiners and Algorithms Using Measured 3D Surface Topographies," award number 2017-IJ-CX-0024.

- "Testing the Accuracy and Reliability of Palmar Friction Ridge Comparisons: A Black Box Study," award number 2017-DN-BX-0170.

- "Kinematic Validation of FDE Determinations About Writership in Questioned Handprinting and Handwriting," award number 2017-DN-BX-0148.

- "Understanding the Expert Decision-Making Process in Forensic Footwear Examinations: Accuracy, Decision Rules, Predictive Value, and the Conditional Probability of an Outcome," award number 2016-DN-BX-0152.

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NCJ 304621

A NEW VIEW OF JAILS: EXPLORING COMPLEXITY IN JAILS-BASED RESEARCH

BY **REENA CHAKRABORTY**
The future of jails-based research lies in challenging traditional mental models of jails and building on system and complexity science.

It's time to rethink the way we view jails.

Jails — whether city, county, or regional — are integral to the local public safety and justice system. Their mission is to safely detain individuals with a diverse set of risks and needs at various phases of the criminal justice process — from arrest through adjudication, as well as post-adjudication.

In 2020, the 3,500 jails in the United States[1] processed more than 8.7 million intakes[2] and a similar number of releases; fewer than 4%, only 346,461 individuals, were admitted to state and federal prisons.[3] Although some individuals in jail exit to face charges in other jurisdictions, most, even if charged with serious offenses, reenter the community at release — many with the charges dismissed.[4] Jails hold most individuals for less than a year, with an expected length of stay of 28 days.[5]

"Mental models" are deeply held internal images of how the world works — images that limit us to familiar ways of thinking and acting. Often, we are not consciously aware of our mental models or the effects they have on our behavior.[6] Traditional mental models of jails include people, materials, and energy (especially emotional energy) and their flows. These traditional models inspire practices like audits, chain of custody, and accountability, as well as jail spaces designed to reduce stress and introduce normalcy. They do not lend themselves well to the dynamic environment of jails, where the needs of and risks posed by individuals detained can change significantly in a very short period.

In March 2020, the National Institute of Justice (NIJ) convened a virtual meeting of researchers and practitioners to explore the possibilities that arise from rethinking our view of jails. Participants discussed complementing traditional mental models by viewing jails as complex adaptive systems through the lens of complexity science, in which perception, cognition,

> Complexity-informed mental models of jails and their operations provide fodder for fresh inquiry and approaches to enhance how we understand jails and the practices within them.

and action continually interact and affect processes and outcomes. This article briefly introduces these concepts of complexity science relevant to jails and suggests areas for further research to help address persistent challenges in the field.

Human Complex Adaptive Systems

For the purposes of this discussion, a "system" is a functionally related group of interacting, interrelated, or interdependent elements contained by a boundary and separated from its "surroundings." A "complex system" is a highly interconnected system with many parts or agents that behave in ways that are hard to model and predict. The flow of material, energy, and information between different agents and levels is critical. Irreversible transitions occur between states, and new, unexpected, and unpredictable behaviors arise from relatively simple interactions between agents of complex systems. "Complex adaptive systems" modulate their behavior — or "adapt" — in response to feedback from their surroundings regarding system outputs or outcomes. Let us assert that jails are human complex adaptive systems (HCAS). The following discussion supports this assertion.

In their paper "Transitions From Prison to Community: Understanding Individual Pathways," Christy Visher and Jeremy Travis proposed a model to explain the reasons for and the dimensions of an individual's success or failure in reentry. This model consists of a system, the components of which are an individual accused of criminal activity, the local public safety and justice system and its agencies (including the

jail, the individual's family, the neighborhood, and other institutions of state), and all the human agents within each of them. The components of this system may interact on multiple levels, such as between organizations or components, or between individuals within the components. Visher and Travis established that the well-being of this system irreversibly and progressively deteriorates each time the individual comes into contact with the local public safety and justice system, including jails.[7] This system and its agents exhibit complexity — specifically, each interaction between the individual and the local public safety and justice system and its agencies, which includes jail, results in irreversible changes to both the individual and the system because their behavior is interconnected, interrelated, and co-evolves. This is true for individuals who are detained in jail and for the jail itself. The researchers adopted an individual-centric perspective of the system; however, a jail-centric view of the system leads to similar insights.

Visher and Travis' system is also adaptive, meaning that responses are modulated by behavior outcomes.[8] Complex adaptive systems[9] modify behavior based on rules and information feedback from system outputs. They have many dimensions and levels, and high variability. Materials, energy, and information are interchanged or flow across them. Phenomena must be studied on affected levels.[10] Where interactions exist, interrelated complex adaptive system agents must be considered — they cannot be viewed in isolation.

Human beings and the organizations they create (family, community, social networks, formal and organization structures) are all examples of HCAS. Local public safety and justice systems and their agencies (including jails) and the remaining components of the system — individuals, families, neighborhoods, and state — are HCAS. Jails are thus HCAS.

HCAS have been called "information flow structures" — interactions between perception, cognition, and action affect the processes and outcomes.[11] Information involves a broad spectrum of signals and formats, including sounds, tactile clues,

Exhibit 1. Cognition Challenges in Jails and Safety Outcomes
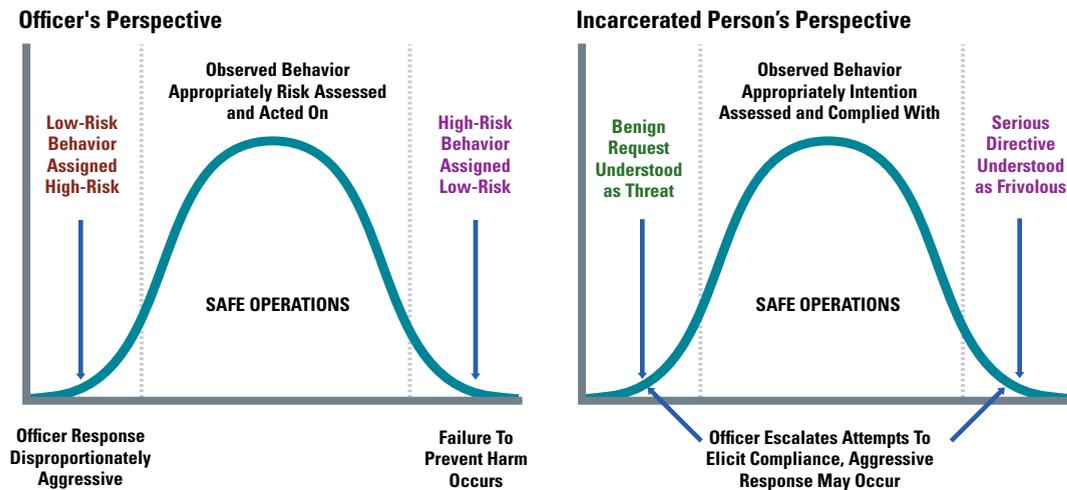
Note: Viewed through a complexity-informed lens, it becomes clear that persistent safety-related challenges in jails often have a strong cognition-related component, from the perspectives of both officers and those incarcerated.

odors, and visual observations. If we apply this to jails, we see refined mental models in which a human sensor network of officers provides safety. Sensors are replaced on each shift, seven days a week. During shift transitions, however, there is often little meaningful exchange of safety-related information and little transition time. Some individuals in jail and other nefarious agents also operate human sensor networks that challenge the safety sensors and search for weaknesses that can be exploited. This constitutes a significant shift in how safety in jails is understood to be provided and challenged. Safety depends not only on an individual officer's perceptions but also on the quality and effectiveness of the shared understanding of the overall officer sensor network. These mental models offer fresh perspectives on safety challenges in jails and can lead to new insights and ways to improve safety.

Cognition failures ignite systemic failures in HCAS. These occur when people fail to understand the meaning of the signals they receive, often repeatedly over an extended period. This contributes to successive failures in communication, coordination, and control — which then cause systemic failure.[12] HCAS fail when agents engage in outmoded behaviors, work at cross purposes, or deplete resources needed to respond to threats.[13] Resilience has been defined as a system's ability to anticipate and adapt to the potential for surprise and failure,[14] for example, when confronted by novel threats that exploit vulnerabilities. Resilience engineering[15] offers tools and techniques to strengthen the ability of HCAS to successfully respond to such threats. It considers errors and tolerance in nontraditional ways.[16]

This work suggests fresh ways to view jails, the role of information sources and flows in jails, and the roles and cognition challenges of those who interact with them (see exhibit 1). It also suggests a complementary set of tools that could help empower jail practitioners to address persistent safety-related challenges. These tools could be used in conjunction with tools derived from high reliability organization theory, including identifying and adopting best and evidence-based practices, engaging in sentinel events reviews as a continuous learning practice, engaging in continuous organizational learning to foster resilience, and adopting Incident Command Systems appropriately.[17]

Addressing Safety Challenges

Cognition science has advanced considerably. Key developments include understanding trauma

Exhibit 2. Cynefin — A Domain-Specific Response Framework
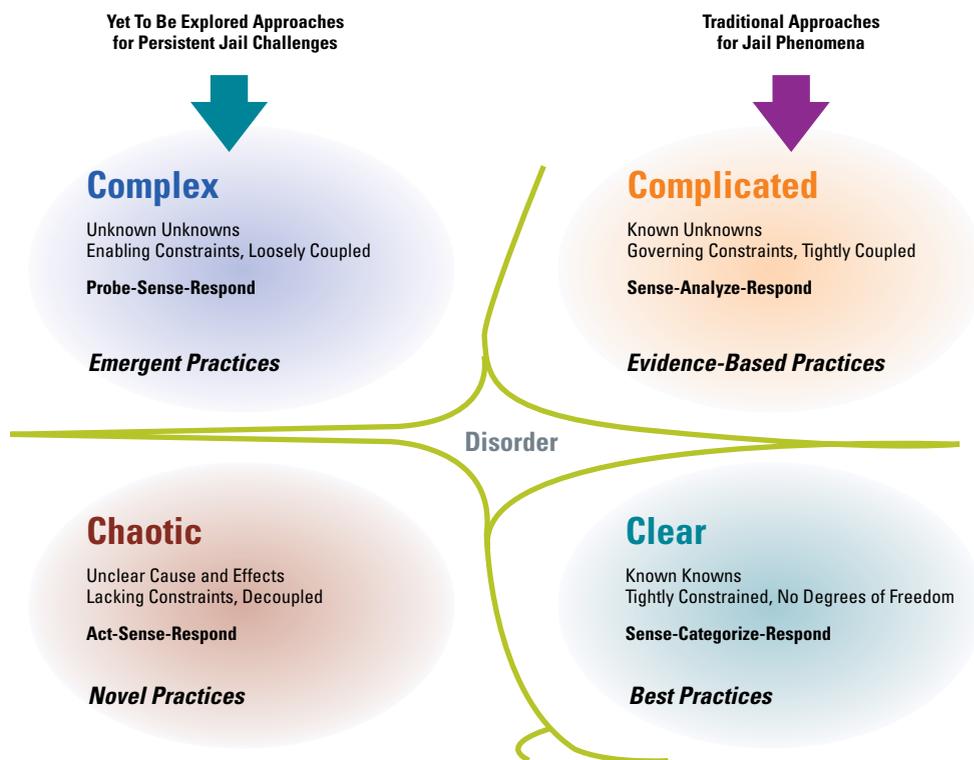
Source: Based on David J. Snowden and Mary E. Boone, "A Leader's Framework for Decision Making," *Harvard Business Review,* November 2007, https://hbr.org/2007/11/a-leaders-framework-for-decision-making.

and its impact on perception, cognition, and action (behavior),[18] as well as the transmission of intergenerational or historical trauma-adapted behavior and its impact.[19] The science of transformative processes, including addiction and recovery, has evolved,[20] as has the science of cognition and learning[21] and of cognition as it affects human complexity sciences.[22] However, cognition in a jail context — particularly the impact of cognitive impairments on safety — merits study.

In 2007, David Snowden and Mary Boone published a paper describing the Cynefin framework, which offers practitioners a practical way to implement domain-specific strategies to respond to challenges.[23] The Cynefin framework illustrates how information flows affect practices (see exhibit 2). It has five domains characterized by constraints, the nature of unknowns,

and cause and effect relationships. Effectiveness requires distinct practices and response strategies.

In the Cynefin framework, best practices are effective in the "clear" domain, where there are no degrees of freedom and knowns are known. Evidence-based practices are effective in the "complicated" domain, where tightly coupled governing constraints prevail and unknowns are known. Emergent practices are effective in the "complex" domain, with its loosely coupled enabling constraints and unknown unknowns. Novel practices are required in the "chaotic" domain, with completely unfamiliar events, lacking constraints and unclear cause and effect relationships. In the final domain, "disorder," uncontrolled information flows prevail and effectiveness requires action to exit to any other domain. Domain-specific effective practices build progressively on each other. Established

knowledge is retained, and new insights from exploring the complex and chaotic domains augment identified best and evidence-based practices.

Traditional mental models of jails emphasize best practices and evidence-based practices, which are associated with the clear and complicated domains. The complex and chaotic domains — and the impact of associated emergent and novel practices — are yet to be acknowledged, studied, and understood in jails. This is important because a jail's ability to consistently implement best practices and evidence-based practices is often confounded by co-evolving and ever-emerging challenges in providing safety. Many of these challenges originate in the complex or chaotic domains. When faced with a novel situation, or an emerging threat or vulnerability, jails must and do respond often from the domain of a novel practice or an emerging practice. These practices and outcomes are often shared with peer jails and are successively refined — consider, for example, the evolution of the understanding of COVID transmission and infection-control practices in jails. Practice evolves from the chaotic domain to the complex domain to the complicated domain — and finally to the clear domain. Knowledge practitioners' acceptance of practices evolves in the opposite order. As jails address problems in the complex and chaotic domains by seeking, testing, and building the capacity to generate and deploy effective novel and emergent practices, they may be able to more consistently and successfully address safety challenges.

Moving Forward

Information flows — neglected to date for jails — are integral to HCAS. Transmitters and receivers in diverse and dynamic forms influence jail safety and interpersonal dynamics. Researchers must identify and characterize these dynamics in jails. Practitioners must understand these dynamics beyond intuitively. As mental models of jails evolve to include information flows, so too will the design, execution, and outcomes of "basic research" and practice (for example, developing appropriate emergent and novel practices). Complexity-informed mental models of jails and

their operations provide fodder for fresh inquiry and approaches to enhance how we understand jails and the practices within them. Researchers must study jail processes, practices, and dynamics for various agents across many levels — individuals, networks, and systems.

Researchers must also study jails in the context of the local community and its institutions to evolve understanding; improve processes, practices, and policies; and achieve better individual, family, and community outcomes. At the most macroscopic level, a systems science perspective recognizes that jails respond to the needs and governing dynamics of the local public safety and justice system. Researchers should study factors upstream and downstream of the jail that affect its use and ability to meet desired public safety outcomes. In applying a local public safety and justice system lens, it may be insightful to study calls for service data, neighborhood law enforcement strategies, arraignment practices, and release outcomes, along with jail use. Researchers, practitioners, and policymakers could then understand jails in a more meaningful context.

Localities need guidance on how to assess their existing service capacity and level of need in each reentry area and identify gaps. Planning guidelines would help them make informed decisions about investments, implementation times, and public safety impact for various strategies. Characterizing systemwide practices could help communities make more efficient and cost-effective decisions and achieve desired public safety and justice outcomes. This will support rigorous, sound, locality-specific efforts to address detention needs based on their operating reality. Such research is critical to achieving jail operations that meet community needs given resource limitations and desired reentry outcomes.

Researchers must ask how localities can best support community integration of individuals released from jail and allay collateral consequences of jail stays while "preventatively detained." Robust and reliable information regarding the paths by which individuals arrive at jail and their reentry experiences after exit is

desperately needed and sorely lacking. Researchers must fill this void.

Opportunities exist for jails researchers to apply a complexity-informed lens to inspire fresh inquiry; expand understanding of jails and jail-based processes, interactions, and phenomena; and develop and test new insights into persistent challenges. The way forward for jails research builds on system and complexity science. Researchers must incorporate relevant insights into theories regarding jails and people incarcerated. Practitioners must operationalize these insights to strengthen practice and improve outcomes.

About the Author

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NCJ 304620

COURTROOM COMMUNITIES: CRIMINAL CASE PROCESSING AND SENTENCING REFORM

BY **NANCY MERRITT**
The important and influential role of the courtroom community must be considered when developing and implementing future criminal justice reforms.

Movies and television have long portrayed criminal trials and sentencing as adversarial courtroom battles fought between the prosecution and defense in a drama-fueled quest for justice. In reality, the vast majority of criminal cases involve negotiated pleas with the final sentence determined through compromise rather than battle. These negotiations generally take place outside the courtroom and involve individuals who are skilled at working cooperatively using a combination of written and unwritten rules to move cases quickly and efficiently through the system. Working in tandem with law and formal policy, the unofficial rules are developed collaboratively and evolve over time, changing in response to legal reforms and external influences.

The entity within the court system responsible for implementing formal rules of operation — and developing informal rules — is often referred to as the "courtroom community." Researchers James Eisenstein and Herbert Jacob formally articulated the concept of a courtroom community in their 1977 publication *Felony Justice: An Organizational Analysis of Criminal Courts*.[1] They later expanded the framework through a series of courtroom studies completed in collaboration with Roy Flemming and Peter Nardulli, wherein they developed and articulated a multifaceted theory of courtroom interaction to better understand the realities of felony case processing and differences across jurisdictions.[2]

Based on a theory of organizational dynamics, the courtroom community framework has been used to provide a better understanding of felony court decision-making, processing, and outcomes.[3] In recent years, the concept has been used to analyze the implementation of sentencing guidelines, mandatory minimums, and "get tough" sentencing policies in an effort to better understand how court adaptation affects the final outcome of legal and policy changes in the court system.[4] The framework provides valuable insight into the factors underlying differences in reform implementation and outcomes across jurisdictions subject to the same sentencing policies and laws.

> # The courtroom workgroup, which includes all individuals who routinely play a part in the workings of the court and case processing, is the core of the courtroom community.

This article explores the courtroom community framework — its members, its goals, and its role in court operations and sentencing outcomes. Drawing from research on courtroom culture, the article highlights the critical need to consider the courtroom community when developing and implementing future criminal justice reforms. (See sidebar, "NIJ-Funded Research on the Courtroom Community.")

The Courtroom Community, Plea Negotiations, and Going Rates

Under the Sixth Amendment to the United States Constitution, individuals facing felony charges are guaranteed the right to representation in court — regardless of their ability to pay. In order to uphold this protection, all states and the federal government offer a system of publicly funded defense, created to serve indigent individuals charged with a crime. However, in a system where the majority of those charged with a crime require this service, jurisdictions may not have the resources necessary to conduct extensive investigations or devote substantial attorney time to trial preparation. As a result, an estimated 90% to 95% of both federal and state court cases are resolved through plea bargaining.[5] Although it has been argued that the reliance on plea negotiations undermines an individual's Sixth Amendment rights,[6] the practice reduces overall court costs and uncertainty, thus fulfilling one of the primary goals of the courtroom community.

The courtroom community has four shared internal goals: reduction of uncertainty with respect to case outcomes, expeditious handling of cases, maintenance of group cohesion, and doing justice.[7]

Of these, the most critical goal is the reduction of uncertainty, as this minimizes the expenditure of court resources.[8] This goal is one of the primary reasons that felony case processing in action differs so dramatically from court operation as portrayed in the media. Instead of an adversarial process in which the primary goal is justice, felony sentencing is focused on reducing uncertainty and increasing expediency through the use of negotiated pleas. By offering individuals pre-negotiated sentences in exchange for a guilty plea, uncertainty — in terms of the case outcome and resources expended — is reduced for all parties. This system allows overburdened court systems to process most cases via plea negotiation rather than trial.

Under courtroom community theory, each courtroom establishes what are termed "going rates" for sentencing in routine case types to help streamline the plea process. Going rates are established by informal negotiation and agreement among courtroom actors and are applied differently depending on the strengths and weaknesses of each case. The majority of felony cases naturally fall into one of a number of standard categories in terms of the factors most frequently used to determine sentences: offense type, prior record, aggravating or mitigating circumstances, and strength of evidence. Over time, each court develops an informal sentencing "shorthand" — it assigns like sentences to like cases through the application of both formal and informal rules, thereby establishing a unique set of informal going rates based on case characteristics and what is deemed acceptable within that particular court system. This mechanism allows the courtroom actors to move the majority of cases through the system expeditiously, reserving limited trial-related resources for those cases that do not fit the norm or that present unusual legal challenges.

By their nature, criminal trial outcomes are uncertain. Although it is true that an individual could avoid all criminal penalty if found not guilty, should they be found guilty, the final penalty is unknown — and would likely exceed the sanction offered in a plea agreement. Similarly, courtroom actors face an

NIJ-Funded Research on the Courtroom Community

NIJ recognizes the important role the courtroom community plays in criminal justice proceedings. Over the years, NIJ has supported various research to help the field better understand this role and how courtroom culture may affect the implementation of criminal justice reforms. This research includes the following studies:

- "Craft of Justice: Politics and Work in Criminal Court Communities," award number 79-NI-AX-0062

- "The Contextual Significance of Courtroom Workgroup Racial Diversity to Criminal Case Outcomes," award number 2006-IJ-CX-0009

- "Courtroom Workgroups and Sentencing: The Effects of Similarity, Proximity, and Stability," award number 97-CE-VX-0001

- "Legal Change and Sentencing Norms in Federal Court: An Examination of the Impact of the Booker, Gall, and Kimbrough Decisions," award number 2010-IJ-CX-0010

uncertain outcome when cases go to trial rather than being determined via negotiation. Thus, there is a clear incentive for individuals charged with a crime to accept a guilty plea — which comes with a predetermined sentence agreed upon by both the prosecution and defense. At the same time, the courtroom actors benefit from the plea process because the prosecution is assured a win, and the defense is spared the risk of an unknown outcome and expenditure of limited resources.

The Courtroom Workgroup

The courtroom workgroup, which includes all individuals who routinely play a part in the workings of the court and case processing, is the core of the courtroom community. However, the courtroom triad — a subset of the workgroup consisting of the judge, prosecutor, and defense — is most instrumental in determining going rates for felony cases.

The actors within the triad have significantly different roles and levels of influence over court proceedings. Although the judge is commonly considered to be the most powerful actor in the court system, the prosecutor wields the greatest power over case

outcomes in a system reliant on processing cases via plea agreement. The role of the judge, who is often described as an administrator rather than a decision-maker, is limited to overseeing court activities and ensuring compliance with applicable laws and formal policy.

Importantly, the prosecutor determines the initial type and number of charges for each case. This is true for both trials and plea agreements. In so doing, the prosecutor establishes the upper limits of penalty possibilities — the starting point of negotiation. To ensure the best possible negotiating position for their office, the prosecutor generally brings the most serious supportable charges against the individual, even when lesser charges are an option. This makes a negotiated plea more attractive to the defense, which knows that the prosecutor can use their discretion to lower the charges and associated penalty if the individual accepts a plea rather than a trial.

Although individuals who are unfamiliar with the system may hesitate to accept a predetermined penalty at the court's going rate, defense attorneys — who regularly interact with the other members of the courtroom workgroup — understand that it is generally in the individual's best interest to

do so in order to avoid the "trial penalty" that may be imposed should the plea not be accepted.[9] A trial penalty is essentially the imposition of a harsher sentence at trial than would have been received had the individual accepted a guilty plea. According to the National Association of Criminal Defense Lawyers, on average, an individual charged with a crime who goes to trial receives a sentence that is three times longer than the one they would have received if they had accepted a guilty plea.[10] This increased punishment can be achieved via legal manipulation and tools available to both the prosecutor and the judge. For example, the prosecutor might refuse to stipulate to relevant conduct and offense-specific behavior that may have otherwise reduced punishment, or they might include affiliated charges at trial that would not have been attached under a plea agreement. A judge — depending on the jurisdiction — could consider "obstruction" or deny "acceptance of responsibility" during the sentencing phase, resulting in increased sentence length. This trial penalty, though legal,[11] is an informal and discretionary mechanism — available to both the prosecutor and the presiding judge — that can be used to encourage a guilty plea.

In addition to reducing uncertainty, plea-driven court processes also undermine transparency — an important tenet of criminal trials in the United States. When the determination of guilt or innocence shifts from a public forum to a closed-door negotiation, the process is hidden from public scrutiny and oversight. At the same time, the reliance on pleas arguably reduces the system's responsibility for the punishment, while normalizing the circumvention of the rights of individuals charged with a crime.[12]

Local Legal Culture

Local legal culture refers to the larger environment in which the courtroom workgroup operates. This includes formal laws, policies, and structures; the informal norms and attitudes that govern court operation; and the external agencies and individuals that influence the activities and behaviors of the workgroup. In translating formal policy and law into practice, the courtroom workgroup must be attentive to law enforcement, legislative bodies, appellate courts, prison officials, the media, and political organizations, as well as the voting public. Numerous factors affect the manner and degree to which these external forces influence workgroup operation, including whether judges are elected or appointed, judicial term length, court size, perceived community values, local government structure, and state or federal sentencing statutes and policies.

Due to the evolving nature of sentencing legislation and courtroom policy, the methods by which the courtroom workgroup processes criminal cases are interpretive and dynamic. However, because the courtroom community operates within the larger legal culture, it must also be performative.[13] Not only must the workgroup ensure that cases are managed efficiently and in compliance with governing laws, but its members must also be viewed as responsive to the perceived interests of the community and sponsoring organizations. Prosecutors answer to their electorate and political party — particularly if they aspire to higher office — and judges must be responsive to voters or their appointing bodies.

Local influence over the courtroom workgroup and variation in jurisdictional characteristics mean that there is no single state or federal policy that can prescribe how courts operate. Although much of the courtroom community's activity is closed to the public, the imposition of sentencing reforms — such as structured sentencing, policy guidelines, or mandatory minimum statutes — and the reforms' ultimate impact, shed light on just how much the courtroom community affects court operations and sentencing outcomes from one jurisdiction to the next.

Sentencing Reform

The U.S. criminal justice system is constantly evolving and subject to ongoing reform efforts. Reform initiatives have varied widely over the last century and include a move away from indeterminate sentencing toward structured sentencing, widespread adoption of get tough era mandatory minimum

statutes, and attempts at prosecutorial and plea-bargaining guidelines. Although the majority of these reforms alter sentencing practices and penalties to some degree, the results rarely meet the stated expectations of either the politicians who promoted them or the public at large. It has been argued that what were often described as the "unexpected consequences" of mandatory minimum penalties during the get tough era were, instead, the result of policies and laws that were written and implemented without an understanding or consideration of courtroom community dynamics. Conversely, the reforms could be characterized as very sophisticated mechanisms designed to work with existing courtroom dynamics — but with different end goals than publicly stated. Both prosecutors and legislators have acknowledged that mandatory minimum laws provide prosecutors with an advantage during plea negotiations, with one senator opposing their modification on the grounds that they have achieved their "intended goal" of pressuring individuals charged with a crime to cooperate with law enforcement.[14]

The criminal justice system's ability to adapt to sentencing reforms has been widely reported in the literature.[15] This adaptation usually takes the form of selective enforcement of new laws and policies, meaning that the system actors charged with implementing these reforms use their discretion to determine which of the eligible cases will be subject to the new laws and which will not. This is usually accomplished via prosecutorial charging policies — either formal or informal. Research examining the impact of sentencing reform and modification shows that the courtroom community adapts to mandated changes to reflect existing norms and the local legal culture. This holds true in jurisdictions adopting sentencing guidelines, mandatory minimum penalties, and plea or prosecutorial guidelines.[16]

Although a reform may be imposed at the state or national level, it is always implemented at the local level. Consequently, it is inevitable that reforms will be implemented with variation in sentencing patterns, sanctions, and resource requirements across sites.

Conclusion

The past 50 years of courtroom community and sentencing reform research makes it clear that reform does not occur in a vacuum. Instead, it is an evolving process affected both directly and indirectly by individuals, organizations, and systems operating within the sphere of the local courtroom. These entities — members of the courtroom community — have a vested interest in local court operation and will implement external change in a way that best serves that court. Although it may not be possible, or desirable, to institute reforms that are impervious to local manipulation, the importance and role of the courtroom community must be considered in order to craft effective policies and legislation.

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NCJ 304622

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