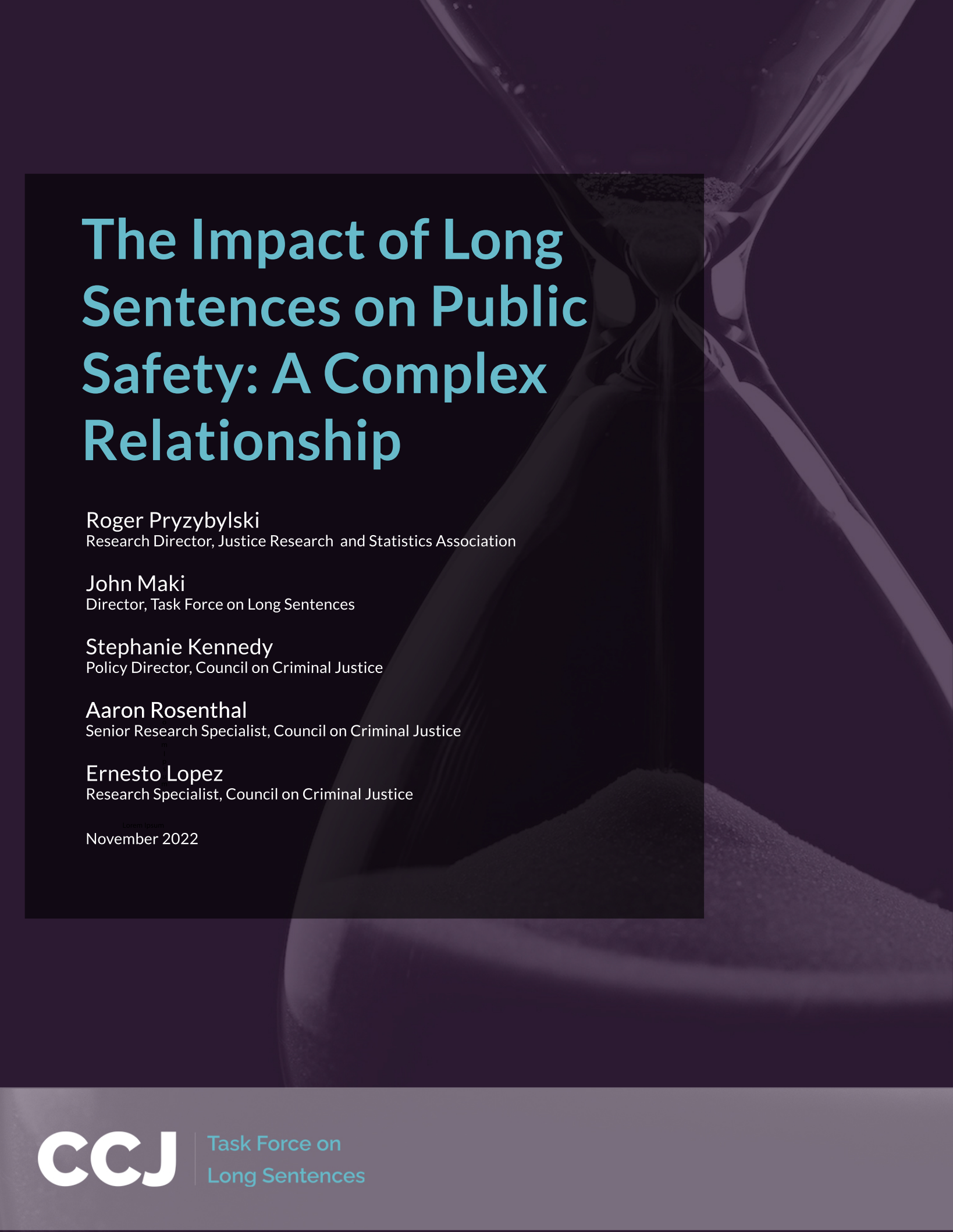


The Impact of Long Sentences on Public Safety: A Complex Relationship

Roger Pryzybylski
Research Director, Justice Research and Statistics Association

John Maki
Director, Task Force on Long Sentences

Stephanie Kennedy
Policy Director, Council on Criminal Justice

Aaron Rosenthal
Senior Research Specialist, Council on Criminal Justice

Ernesto Lopez
Research Specialist, Council on Criminal Justice

November 2022

CCJ | Task Force on Long Sentences

ABOUT THE COUNCIL

The Council on Criminal Justice is a nonpartisan criminal justice think tank and national invitational membership organization. Its mission is to advance understanding of the criminal justice policy choices facing the nation and build consensus for solutions based on facts, evidence, and fundamental principles of justice.

The Council does not take policy positions. As part of its array of activities, the Council conducts research and convenes independent task forces composed of Council members who produce reports with findings and policy recommendations on matters of concern. The findings and conclusions in this research report are those of the authors alone. They were not subject to the approval of the Council's Board of Directors or its Board of Trustees. For more information about the Council, visit counciloncj.org.

ABOUT THE AUTHORS

Roger Przybylski is the research director for the Justice Research and Statistics Association and founder of the RKC Group.

John Maki, J.D., is the director of the Council on Criminal Justice Task Force on Long Sentences.

Stephanie Kennedy, Ph.D., is the policy director at the Council on Criminal Justice.

Aaron Rosenthal, Ph.D., is a senior research specialist at the Council on Criminal Justice.

Ernesto Lopez is a research specialist at the Council on Criminal Justice.

ACKNOWLEDGEMENTS

This paper was produced with support from Arnold Ventures, the Ford Foundation, the Southern Company Foundation, and Stand Together Trust, as well as #StartSmall, the John D. and Catherine T. MacArthur Foundation, and other CCJ general operating contributors.

Suggested Citation

Przybylski, R., Maki, J., Kennedy, S., Rosenthal, A., & Lopez, E. (2022). *The Impact of Long Sentences on Public Safety: A Complex Relationship*. Council on Criminal Justice. counciloncj.org/org/impact-of-long-sentences-on-public-safety.

Introduction

Long prison sentences—defined here as sentences of 10 years or more—may be imposed for several reasons, including to punish people engaged in criminal behavior, to prevent individuals from committing additional crimes in the future, and to warn the general public about the consequences of violating the law. This literature review explores empirical evidence on the relationship between sentence length and public safety. It synthesizes the best available research on the incapacitation and deterrent effects of prison sentences and examines whether, and to what extent, prison sentences affect individual criminal behavior and overall crime rates.

The relationship between long prison sentences and public safety is complex. Although long prison sentences may be warranted in individual cases based on one or more of the varied purposes of sentencing, the imposition of such sentences on a large scale offers diminishing returns for public safety. Research consistently shows that a relatively small percentage of individuals are responsible for an outsized share of crime in their communities. But attempts to use long sentences to selectively incapacitate this population have been unable to overcome competing factors like the "replacement effect," where the incarceration of one person leads to another individual taking their place, and the "age-crime curve," the criminological fact that offending typically decreases with age. Since relatively few studies have focused specifically on long prison sentences, this analysis encompasses the broader literature on incarceration and crime. The report concludes with recommendations for future research.

Key Takeaways

+ **Long prison sentences prevent some crime from occurring through an incapacitation effect**, although estimates of the magnitude of the crime-prevention effects are inconsistent and vary by crime type.
+ **The public safety benefits of longer prison sentences diminish during the latter years** because individuals tend to age out of criminal behavior.
+ **Research findings on the specific deterrent effect of long prison sentences are mixed**; the weight of the evidence indicates that long sentences have either no effect on recidivism or slightly increase recidivism when compared to shorter sentences.
+ **When compared to shorter prison sentences, longer sentences produce, at best, a modest general deterrent effect for violent offenses.** Longer sentences may increase drug trafficking offenses and other crimes for which incarcerated people are quickly replaced by new recruits.
+ **A small percentage (5% to 10%) of individuals are responsible for a majority of violent crime and drug trafficking.** Research on the effectiveness of strategies to identify and selectively incarcerate these individuals to decrease crime shows mixed results.
+ **The certainty and swiftness of consequences function as a more effective crime deterrent** than their severity.

GLOSSARY OF TERMS

- **Age-crime curve:** The fact that as most people age, their likelihood of engaging in criminal offending decreases
- **Criminogenic effect:** Producing or tending to produce crime
- **Desistance:** The process of discontinuing criminal behavior
- **General deterrence:** The idea that punishing an individual offender will dissuade others from committing crimes
- **Incapacitation:** The prevention of crimes in the community that might otherwise be committed if an individual was not incarcerated
- **Long sentences:** The Task Force on Long Sentences defines long sentences as prison sentences of 10 years or more. Numerous state and federal statutes use 10 years as either the maximum or minimum allowable term of imprisonment
- **Recidivism:** Rearrest, reconviction and/or reincarceration after release from prison
- **Reentry:** The process of leaving incarceration and reintegrating into the community
- **Rehabilitation:** The act of helping people desist from criminal behavior through therapeutic programs, activities, incentives, substance use treatment, and other services designed to change behavior
- **Replacement effect:** The dynamic that attends criminal enterprises and other forms of group-based crime in which the removal of one individual engaged in criminal offending through incarceration leads to another person taking their place
- **Selective incapacitation:** The identification of and targeted use of incarceration for individuals engaged in chronic or habitual criminal offending
- **Specific deterrence:** The idea that punishing an individual offender will dissuade that individual from committing future crimes

NOTE FROM THE AUTHORS: EMPIRICAL INQUIRY ON INCARCERATION AND CRIME

While there is a rich body of research on the relationship between incarceration and crime, considerably less is known about the effects of prison sentences of 10 years or more on public safety. Given the various ways that long sentences have been used across different time periods, jurisdictions, and individual case circumstances, the findings presented below should be viewed within the following constraints:

- While trustworthy inferences about the general impact of long sentences on public safety can be drawn from available studies, less is known about how longer sentences might affect the applicability of these findings. For example, researchers have not rigorously investigated whether different outcomes might result from a 10-year prison sentence when compared to a 15-, 20-, or 30-year sentence.

- Although much has been learned in recent years about the potential costs and benefits of incarceration—including long prison sentences—quantifying those costs and benefits remains a complex and difficult task. Simply put, little is known about how to effectively minimize the costs and maximize the benefits of a long prison sentence when one is warranted.

- This report draws from research conducted across approximately five decades, and the focus of empirical inquiry into the nature of crime and crime prevention has shifted throughout that time. For example, in the 1980s and 1990s, research focused on estimating the potential incapacitation and deterrent effects of incarceration. By the early 2000s, however, the emphasis shifted to estimations of the potential negative or criminogenic-that is, crime-producing-effects of incarceration. As a result, the incapacitation and deterrence studies referenced in this report are mostly older than those that draw inferences about the criminogenic impact of long sentences. While these bodies of research address different questions—and can be critiqued for what they choose to ignore—this report assumes that, taken together, their findings are relevant to understanding how long prison sentences affect public safety.

SECTION 1: INCAPACITATION AND REPLACEMENT EFFECTS

Incapacitating people who would otherwise engage in criminal behavior undeniably prevents some number of crimes from occurring. But quantifying the number and types of crimes prevented through incapacitation is difficult, primarily because of the methodological problems inherent in such research. This section examines research that has analyzed whether incarceration in general—and long prison sentences, in particular—reduce crime through an incapacitation effect. It also highlights some of the challenges of implementing and evaluating incapacitation strategies.

The logic of using long sentences to incapacitate people who would otherwise engage in offending is supported by a large body of empirical literature dating to the 1970s. Research has long demonstrated that a small percentage of the offending population—individuals often referred to as "chronic" or "habitual" offenders—commit crimes at a high rate.[1] More recent replications of this finding underscore its strength. For example, a study of gun violence indicated that between 200 and 500 people were responsible for 60% to 70% of all gun crime in Washington, D.C., a city with a population of more than 700,000.[2]

Selective Incapacitation

These findings have been used for decades to support attempts at "selective incapacitation," or identifying individuals already engaged in, or likely to engage in, chronic offending, and incarcerating them to reduce crime.[3] Overall, results from these studies suggest that incapacitating people engaged in violent offending, in particular, offers a 5% to 10% reduction in violent crime.[4]

The empirical evidence on selective incapacitation suggests that long sentences may produce short- and long-term public safety benefits for individuals engaged in violent offending,[5] but may produce the opposite effect for those engaged in drug-related offending or other group-based crimes where an incarcerated individual is quickly replaced by a new recruit.[6] This "replacement effect" occurs––and undermines the overall crime-reducing effects of incapacitation––when there is "demand" for particular criminal activity. The illicit drug business offers the most obvious example: when someone who plays a role in a drug trafficking organization is incarcerated, someone else must take his or her place.

One study[7] found that incarcerating street-level drug dealers fueled their replacement by younger and more violent individuals. Additional research[8] replicated these findings through an examination of the public safety impact of California's three strikes law from 1994, when

the law was implemented, to 1998. This work found short- and long-term decreases in most types of crime, but also found that imprisoning chronic drug offenders had no impact on the drug crime rate. The authors hypothesized that incarcerating chronic drug offenders did not result in an incapacitation effect because "when one drug offender is jailed, there is another (and perhaps more than just one other) ready to take his or her place" (p. 139-140). Additional analyses further indicate that incarcerating people for drug trafficking may result in increased crime rates in general and increased rates of violent crime, specifically, because of organizational destabilization and the need for new recruits to prove themselves.[9]

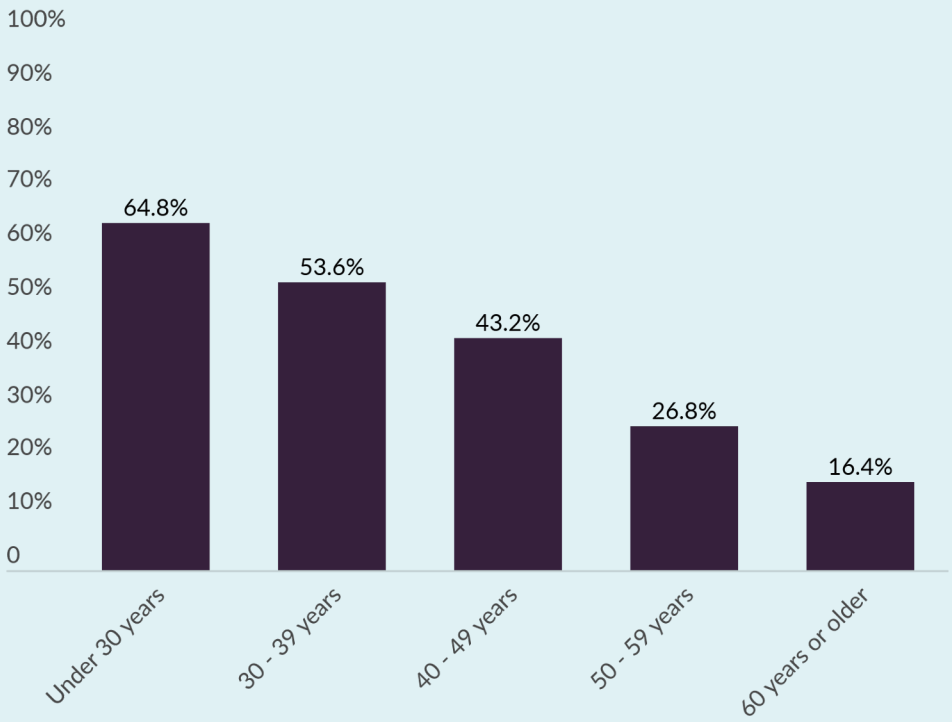
Replacement will also occur in organized theft rings, such as those that steal cars for automobile "chop shops." In these cases, those who are caught will be backfilled by new recruits to keep the business running. Thus, while incapacitating certain individuals can reduce overall crime, locking up people involved in group-based criminal activity is likely to have little or no effect on crime rates due to the replacement effect. Although both types of individuals may deserve criminal justice consequences for their actions, incapacitating group-involved offenders may cause a net increase in crime by drawing additional people into criminal enterprises and lifestyles.

The Age-Crime Curve

Despite the intuitive appeal of selective incapacitation, implementation of such strategies remains challenging, and research demonstrates they may have less impact on crime than originally anticipated. Additionally, one of the most fundamental problems of using criminal history to identify individuals who engage in chronic offending is that criminal history, by definition, takes time to accumulate. This implicates one of the most robust findings in criminology: the age-crime curve. Research on the role that age plays in criminal offending is definitive: as people grow older, they are less likely to engage in criminal behavior.[10] Criminal offending is more likely among adolescents and young adults and steadily declines throughout the remainder of the life course.

Generally speaking, people released from prison after serving a long sentence are older and, all things being equal, are less likely to recidivate. For example, in an examination of eight-year rearrest rates for more than 25,000 people released from federal prisons across the nation in 2005, the United States Sentencing Commission[11] reported that rearrest declined substantially by age; 65% of individuals younger than age 30, 54% of individuals age 30-39, 43% of individuals age 40-49, 27% of individuals age 50-59, and 16% of those age 60 or older at the time of their release were rearrested. Because of the reduction in criminal behavior that comes with aging for most individuals, it is likely that fewer crimes are prevented by the incapacitation of older individuals serving long sentences, compared to younger individuals.

FIGURE 1: SHARE OF PEOPLE REARRESTED WITHIN EIGHT YEARS OF RELEASE, BY AGE GROUP



Source: United States Sentencing Commission. (2017). The effects of aging on recidivism among federal offenders.

Although there is widespread agreement about the fundamental premise of the age-crime curve, its implication for any *individual* case remains subject to debate. Some scholars have asserted that the age-crime curve is essentially invariant, or the same for all people who commit crime.[12] Others argue that there is substantial variation in the age-crime curve across individuals who engage in criminal behavior.[13] Moffitt suggested that the age-crime curve can best be interpreted as representing two distinct types of individuals, each with their own pathways into and out of criminal behavior. *Life-course persistent offenders*, this research found, are characterized by an early onset of delinquency as well as chronic criminal behavior throughout much of their lives. These individuals are responsible for a disproportionate amount of crime. *Adolescence-limited offenders*, on the other hand, experiment with delinquency during adolescence, but their criminal behavior is "temporary

and situational" and will eventually cease as they effectively grow out of offending behavior.[14]

In sum, the empirical support for long sentences' positive impact on crime reduction is mixed. While some research has shown that the targeted use of long sentences on people actively engaged in crime has led to reductions in violent offending, studies have also identified factors that reduce the incapacitation benefits, like the replacement effect and the age-crime curve.

SECTION 2: THE DETERRENT EFFECTS OF INCARCERATION AND LONG SENTENCES

As a theory, deterrence refers to punishment's influence on discouraging individuals from committing crimes.[15] General deterrence explores how the threat of punishment functions to prevent people from engaging in criminal behavior, thus enhancing public safety.[16] General deterrence is typically measured using overall crime rates in a jurisdiction. Specific deterrence, by contrast, explores how the experience of punishment itself may prevent an individual from continuing to engage in criminal behavior.[17] Specific deterrence is typically measured using recidivism data, the measure of whether the specific individual is rearrested, reconvicted or reincarcerated after release from custody.

Significant methodological challenges complicate scholars' ability to identify a relationship between the threat of punishment and changes in crime rates. Some research has focused on changes in community crime rates after an execution is performed or a key policy change is implemented.[18] This section features rigorous examinations of the threat of incarceration for both justice-involved and non-justice involved individuals and explores whether stiffer sanctions–including long prison sentences–are effective crime-prevention tools.

The Role of Certainty

A foundational principle in criminology and modern criminal justice policy is that the certainty of receiving a punishment is a more powerful crime deterrent than the severity of that punishment or sanction.[19] Certainty of apprehension, however, is difficult to measure for individuals not already engaged in the criminal justice system. Therefore, the studies reviewed below attempt to estimate a deterrent effect for justice-involved individuals. One quasi-experimental evaluation focused on more than 1,000 people enrolled in a behavior-modification program targeting individuals on probation with substance use disorders.[20] Results indicated that the threat of swift, consistent, and *shorter* periods of imprisonment

fostered greater compliance with the conditions of probation. Program participants had fewer probation revocations (9% compared to 31% of probationers in the comparison group of people not enrolled in the behavior-modification program) and spent fewer days in prison (112 days, on average, compared to 303 days for the comparison group).

Other, more recent studies using DNA registries show that individuals are less likely to reoffend when they know their genetic data is already stored, reaffirming the importance of certainty of apprehension for the specific deterrent effect.[21] Unfortunately, the DNA-related findings may not be readily applicable to individuals engaging in crimes that typically result in long sentences, as more than half (52%) of serious violent crime goes unreported to law enforcement agencies.[22]

Deterrence and Recidivism

Empirical evidence from the body of research that does focus on longer prison sentences has yielded mixed results, with some analyses identifying a positive general deterrent effect (preventing community crime) but the majority indicating marginal effects at best, or no effects when compared to shorter sentences.[23] To illustrate, one examination of the deterrent effects of California's 1994 three strikes law, which mandated a sentence of 25 years to life for people convicted of a third strikable offense,[24] found that arrest rates among individuals with two previous strikes dropped by 17% to 20%. This finding, however, stands in contrast to a review of literature exploring the deterrent effects of similar, high-profile legal sanctions that threatened long prison sentences, which reported no consistent positive deterrent effects from the implementation and widespread publicity of three strikes laws.[25]

Researching the impact of specific deterrence–or the impact of criminal justice sanctions such as long-term incarceration–poses several conceptual and methodological challenges. In particular, it is difficult to disentangle the complex web of factors that might lead an individual to either desist from crime or to reoffend after release from incarceration.[26] Some studies demonstrate a positive or negative specific deterrent effect of the incarceration experience, but taken together, data indicate that post-conviction imprisonment has little impact on recidivism.[27]

Additionally, meta-analyses of the specific deterrent effect of longer prison sentences on recidivism underscore the criminogenic potential of increased sentence length and time served. For example, one meta-analysis[28] looked at 50 studies (more than 90% of which were conducted in the United States) involving more than 300,000 imprisoned individuals to estimate how the incarceration experience affected recidivism. The authors identified a subsample of 23 studies conducted on more than 68,000 individuals and completed

additional analyses using length of incarceration as a predictor of post-release recidivism. After controlling for a variety of risk factors associated with recidivism, the researchers concluded that people who spent longer in prison (defined as an average sentence length of 30 months) had a slightly higher recidivism rate when compared to those who served an average of 13 months (29% versus 26%).

This finding was replicated in a subsequent meta-analysis of 117 studies involving more than 440,000 incarcerated individuals.[29] The authors found that when compared to individuals with sentence lengths of 12 or fewer months, those serving 13 to 24 months and more than 24 months had modest increases in recidivism after controlling for risk factors associated with recidivism, including age, race, gender, and risk level. Because of the nature of the analysis, data on recidivism rates among individuals in each of the three sentence length categories were not provided.

Nearly half a dozen recent studies, however, report no relationship between longer sentence length and recidivism.[30] One[31] used propensity score matching to examine data on more than 90,000 individuals released from Florida prisons and found inconclusive recidivism reduction results when examining length of sentence and time served (average time served = 24 months; range of time served = 1-106 months). The authors found that longer periods of incarceration (from 25 to 60 months) initially increased recidivism. but at the one-year post-release mark, recidivism began to decrease, with no effects detected at two years post-release.

Two notable exceptions to the null or inverse relationship between long prison sentences and recidivism, however, are reports recently published by the United States Sentencing Commission. For these 2020 publications, the authors conducted several analyses of recidivism rates among more than 25,000 people released from federal prisons in 2005, controlling for gender, age at time of release, race, and criminal history. Results indicated that individuals serving a prison sentence of 10 years or more were 29% to 45% less likely to recidivate than those serving shorter sentences.[32] This finding was replicated in a 2022 report on more than 22,000 people released from federal prison in 2010.[33] This analysis found that the odds of recidivism were 29% lower for individuals with sentences of 10 years or more when compared to a matched group of people who received shorter sentences.

Estimates of the specific deterrent effects of long sentences are further complicated by the tendency for individuals to “age out” of criminal behavior, as noted above. Moreover, spending 10 or more years in prison creates a host of reentry challenges for people returning home from incarceration, limiting the ability of scholars to confidently identify the precise

mechanisms that may contribute either to continued offending behavior or to desistence from crime for this group.

FUTURE RESEARCH DIRECTIONS

While research on the impact of long sentences on public safety has produced several policy-relevant findings, three pressing needs for future research stand out.

1. Research focused on people serving non-life prison sentences of 10 years or more is needed to test the sensitivity of broader conclusions about the public safety effects of incarceration at various sentence-length thresholds (e.g., 10, 15, 20, or 30 years).
2. While there is clear evidence that the certainty of apprehension is a greater deterrent than the threat of severe punishment, there is a gap in understanding of people's perception of sanction regimes and the threat (and experience) of incarceration in adolescence and adulthood, especially as it relates to engagement in serious violent crime.
3. More broadly, criminal justice policymaking would benefit from more rigorous research on how correctional and community-based programs can more effectively rehabilitate participants and decrease recidivism.

Endnotes

[1] Chaiken, J. M., Chaiken, M. R., & Peterson, J. E. (1982). *Varieties of criminal behavior: Summary and policy implications* (NCJ 85966). Santa Monica, CA: Rand.; English, K., & Mande, M. (1992). *Measuring crime rates of prisoners* (NCJ 142430). Washington, D.C.: U.S. Department of Justice, Office of Justice Programs. https://www.ojp.gov/pdffiles1/Digitization/142430NCJRS.pdf; Mande, M. J., & English, K. (1988). Individual Crime Rates of Colorado Prisoners: Final Report, 1988. *Denver: Colorado Division of Criminal Justice, Research Unit*.; Miller, S. J., Dinitz, S., & Conrad, J. P. (1982). *Careers of the violent: The dangerous offender and criminal justice*. Lexington, MA: Lexington Books.; Piper, E. S. (1985). Violent recidivism and chronicity in the 1958 Philadelphia cohort. *Journal of Quantitative Criminology*, *1*(4), 319-344. https://link.springer.com/content/pdf/10.1007/BF01064185.pdf; Wolfgang, M. E., Figlio, R. M., & Sellin, T. (1987). *Delinquency in a birth cohort*. Chicago, IL: University of Chicago Press.

[2] National Institute for Criminal Justice Reform. (2021). *Gun Violence Problem Analysis Summary Report*. https://cjcc.dc.gov/sites/default/files/dc/sites/cjcc/release_content/attachments/DC%20Gun%20Violence%20Problem%20Analysis%20Summary%20Report.pdf

[3] Blumstein, A. (2002). Youth, guns, and violent crime. *The Future of Children, 12*(2), 39–53. https://www.jstor.org/stable/1602737; Cohen, J., & Canela-Cacho, J. A. (1994). Incarceration and violent crime, 1965-1988. In A. J. Reiss, Jr. & J. A. Roth (Eds.), *Understanding and Preventing Violence:* Volume Four Consequences and Control, pp. 296-388). Washington, D.C.: National Academy Press. https://nap.nationalacademies.org/read/4422/chapter/6; Greenwood, P. W., & Abrahamse, A. F. (1982). *Selective incapacitation*. Santa Monica, CA: Rand.; Grogger, J. (2000). An Economic Model of Recent Trends in Violence. In A. Blumstein & J. Wallman (Eds.), *The Crime Drop in America* (pp. 266–287). Cambridge University Press. https://doi.org/10.1017/CBO9780511616167.009; MacKenzie, D.L. (2006). *What works in corrections? Reducing the criminal activities of offenders and delinquents*. Cambridge, UK: Cambridge Press.; Ramirez, J. R., & Crano, W. D. (2003). Deterrence and incapacitation: An interrupted time-series analysis of California's three-strikes law. *Journal of Applied Social Psychology*, *33*(1), 110-144. https://doi.org/10.1111/j.1559-1816.2003.tb02076.x; Spelman, W. (1994). *Criminal incapacitation*. New York, NY: Plenum.; Spelman, W. (2000). What recent studies do (and don't) tell us about imprisonment and crime. *Crime & Justice, 27*, 419-494. https://doi.org/10.1086/652204

[4] Cohen, J., & Canela-Cacho, J. A. (1994). Incarceration and violent crime, 1965-1988. In A. J. Reiss, Jr. & J. A. Roth (Eds.), *Understanding and Preventing Violence:* Volume Four Consequences and Control, pp. 296-388). Washington, D.C.: National Academy Press. https://nap.nationalacademies.org/read/4422/chapter/6; Ramirez, J. R., & Crano, W. D. (2003). Deterrence and incapacitation: An interrupted time-series analysis of California's three-strikes law. *Journal of Applied Social Psychology*, *33*(1), 110-144. https://doi.org/10.1111/j.1559-1816.2003.tb02076.x

[5] Cohen, J., & Canela-Cacho, J. A. (1994). Incarceration and violent crime, 1965-1988. In A. J. Reiss, Jr. & J. A. Roth (Eds.), *Understanding and Preventing Violence:* Volume Four Consequences and Control, pp. 296-388). Washington, D.C.: National Academy Press. https://nap.nationalacademies.org/read/4422/chapter/6; Ramirez, J. R., & Crano, W. D. (2003). Deterrence and incapacitation: An interrupted time-series analysis of California's

three-strikes law. *Journal of Applied Social Psychology*, *33*(1), 110-144. https://doi.org/10.1111/j.1559-1816.2003.tb02076.x

[6] Blumstein, A. (2002). Youth, guns, and violent crime. *The Future of Children, 12*(2), 39–53. https://www.jstor.org/stable/1602737; Grogger, J. (2000). An Economic Model of Recent Trends in Violence. In A. Blumstein & J. Wallman (Eds.), *The Crime Drop in America* (pp. 266–287). Cambridge University Press. https://doi.org/10.1017/CBO9780511616167.009; Spelman, W. (1994). *Criminal incapacitation.* New York, NY: Plenum.

[7] Blumstein, A. (2002). Youth, guns, and violent crime. *The Future of Children, 12*(2), 39–53. https://www.jstor.org/stable/1602737

[8] Ramirez, J. R., & Crano, W. D. (2003). Deterrence and incapacitation: An interrupted time-series analysis of California's three-strikes law. *Journal of Applied Social Psychology*, *33*(1), 110-144. https://doi.org/10.1111/j.1559-1816.2003.tb02076.x

[9] Blumstein, A. (2002). Youth, guns, and violent crime. *The Future of Children, 12*(2), 39–53. https://www.jstor.org/stable/1602737; Grogger, J. (2000). An Economic Model of Recent Trends in Violence. In A. Blumstein & J. Wallman (Eds.), *The Crime Drop in America* (pp. 266–287). Cambridge University Press. https://doi.org/10.1017/CBO9780511616167.009; Spelman, W. (1994). *Criminal incapacitation.* New York, NY: Plenum.

[10] Blumstein, A., & Nakamura, K. (2009). Redemption in the presence of widespread criminal background checks. *Criminology*, *47*(2), 327-360. https://doi.org/10.1111/j.1745-9125.2009.00155.x; Bushway, S. D., Nieuwbeerta, P., & Blokland, A. (2011). The predictive value of criminal background checks: Do age and criminal history affect time to redemption. *Criminology*, *49*(1), 27-60. https://doi.org/10.1111/j.1745-9125.2010.00217.x; Loeber, R., & Farrington, D. (2014). Age-crime curve. In G. Bruinsma & D. Weisburd (Eds.), *Encyclopedia of Criminology and Criminal Justice* (pp. 12–18). New York, NY: Springer.

[11] United States Sentencing Commission. (2017). *The effects of aging on recidivism among federal offenders.* https://www.ussc.gov/sites/default/files/pdf/research-and-publications/research-publications/2017/20171207_Recidivism-Age.pdf

[12] Hirschi, T., & Gottfredson, M. (1983). Age and the explanation of crime. *American Journal of Sociology*, *89*(3), 552-584. https://doi.org/10.1086/227905

[13] Farrington, D. P. (1986). Age and crime. *Crime & Justice, 7*, 189-250. https://doi.org/10.1086/449114

[14] Moffitt, T. E. (1993). Adolescence-limited and life-course-persistent antisocial behavior: A developmental taxonomy. *Psychological Review, 100*, 674-701. https://doi.org/10.1037/0033-295X.100.4.674

[15] Zimring, F. E., Hawkins, G., & Vorenberg, J. (1973). *Deterrence: The legal threat in crime control.* Chicago, IL: University of Chicago Press.

[16] Apel, R., & Nagin, D. S. (2011). General deterrence: A review of recent evidence. In J. Wilson & J. Petersilia (Eds.), *Crime and Public Policy* (pp. 411-436). New York, NY: Oxford University Press.; Nagin, D. S., Cullen, F. T., & Jonson, C. L. (2009). Imprisonment and reoffending. *Crime and Justice*, *38*(1), 115–200.

[17] Apel, R., & Nagin, D. S. (2011). General deterrence: A review of recent evidence. In J. Wilson & J. Petersilia (Eds.), *Crime and Public Policy* (pp. 411-436). New York, NY: Oxford University Press.; Nagin, D. S., Cullen, F. T., & Jonson, C. L. (2009). Imprisonment and reoffending. *Crime and Justice*, *38*(1), 115–200.

[18] Nagin, D. S. (2013). Deterrence in the twenty-first century. *Crime & Justice*, *42*(1), 199-263. https://doi.org//10.1086/670398; National Research Council. (2012). *Deterrence and the Death Penalty*. https://doi.org/10.17226/13363

[19] Beccaria, C. (2007). *On Crimes and Punishments.* (A. Thomas and J. Parzen, Trans.). Toronto: University of Toronto Press. (Orig. work published 1764); Bentham, J. (1988). *The principles of morals and legislation.* Amherst, NY: Prometheus Books. (Orig. work published 1789)

[20] Hawken, A., & Kleiman, M. (2009). Managing drug involved probationers with swift and certain sanctions: Evaluating Hawaii's HOPE (Document No. 229023). Washington, D.C.: National Institute of Justice. https://www.ojp.gov/pdffiles1/nij/grants/229023.pdf

[21] Anker, A. S. T., Doleac, J. L., & Landersø, R. (2021). The effects of DNA databases on the deterrence and detection of offenders. *American Economic Journal: Applied Economics*, *13*(4), 194-225. https://doi.org/10.1257/app.20190207; Doleac, J. L. (2017). The effects of DNA databases on crime. *American Economic Journal: Applied Economics*, *9*(1), 165-201. https://doi.org/10.1257/app.20150043

[22] Langton, L., Berzofsky, M., Krebs, C., & Smiley-McDonald, H. (2012). *Victimizations not reported to the police, 2006-2010* (NCJ 238536). Washington, D.C.: Bureau of Justice Statistics. https://www.ojp.gov/ncjrs/virtual-library/abstracts/victimizations-not-reported-police-2006-2010

[23] Doob, A. N., & Webster, C. M. (2003). Sentence severity and crime: Accepting the null hypothesis. *Crime & Justice*, *30*, 143-195. https://www.journals.uchicago.edu/doi/abs/10.1086/652230; Kessler, D., & Levitt, S. D. (1999). Using sentence enhancements to distinguish between deterrence and incapacitation. *The Journal of Law & Economics*, *42*(S1), 343-364. https://www.journals.uchicago.edu/doi/abs/10.1086/467428; McDowall, D., Loftin, C., & Wiersema, B. (1995). Easing concealed firearms laws: Effects on homicide in three states. *Journal of Criminal Law & Criminology*, *86*, 193. https://heinonline.org/HOL/LandingPage?handle=hein.journals/jclc86&div=18&id=&page=; Nagin, D. S. (2013). Deterrence in the twenty-first century. *Crime & Justice*, *42*(1), 199-263. https://doi.org//10.1086/670398; Tonry, M. (2008). Learning from the limitations of deterrence research. *Crime & Justice*, *37*(1), 279-311. https://www.journals.uchicago.edu/doi/abs/10.1086/524825; Tonry, M. (2009). The mostly unintended effects of mandatory penalties: Two centuries of consistent findings. *Crime & Justice*, *38*(1), 65-114. https://www.journals.uchicago.edu/doi/abs/10.1086/599368; Webster, C. M., & Doob, A. N. (2012). Searching for Sasquatch: Deterrence of crime through sentence severity. In J. Petersilia & K. Reitz (Eds.), *The Oxford handbook of sentencing and corrections* (pp. 173–195). Oxford University Press.

[24] Helland, E., & Tabarrok, A. (2007). Does three strikes deter? A nonparametric estimation. *Journal of Human Resources*, *42*(2), 309-330. https://doi.org/10.3368/jhr.XLII.2.309

[25] Webster, C. M., & Doob, A. N. (2012). Searching for Sasquatch: Deterrence of crime through sentence severity. In J. Petersilia & K. Reitz (Eds.), *The Oxford handbook of sentencing and corrections* (pp. 173–195). Oxford University Press.

[26] Loeffler, C. E., & Nagin, D. S. (2022). The impact of incarceration on recidivism. *Annual Review of Criminology*, *5*, 133-152. https://www.annualreviews.org/doi/abs/10.1146/annurev-criminol-030920-112506; Nagin, D. S., Cullen, F. T., & Jonson, C. L. (2009). Imprisonment and reoffending. *Crime and Justice*, *38*(1), 115–200.; Zimring, F. E., Hawkins, G., & Vorenberg, J. (1973). *Deterrence: The legal threat in crime control*. Chicago, IL: University of Chicago Press.

[27] Loeffler, C. E., & Nagin, D. S. (2022). The impact of incarceration on recidivism. *Annual Review of Criminology*, *5*, 133-152. https://www.annualreviews.org/doi/abs/10.1146/annurev-criminol-030920-112506

[28] Gendreau, P., Cullen, F. T., & Goggin, C. (1999). *The effects of prison sentences on recidivism* (pp. 4-5). Ottawa: Solicitor General Canada. http://madgic.library.carleton.ca/deposit/govt/ca_fed/publicsafety_prisonsentences_1999.pdf

[29] Smith, P., Gendreau, P., & Goggin, C. (2002). *The effects of prison sentences and intermediate sanctions on recidivism: General effects and individual differences*. Ottawa: Solicitor General Canada. https://www.publicsafety.gc.ca/cnt/rsrcs/pblctns/ffcts-prsn-sntncs/index-en.aspx

[30] Green, D. P., & Winik, D. (2010). Using random judge assignments to estimate the effects of incarceration and probation on recidivism among drug offenders. *Criminology*, *48*(2), 357-387. https://doi.org/10.1111/j.1745-9125.2010.00189.x; Harding, D. J., Morenoff, J. D., Nguyen, A. P., & Bushway, S. D. (2017). Short-and long-term effects of imprisonment on future felony convictions and prison admissions. *Proceedings of the National Academy of Sciences*, *114*(42), 11103-11108. https://doi.org/10.1073/pnas.1701544114; Loughran, T. A., Mulvey, E. P., Schubert, C. A., Fagan, J., Piquero, A. R., & Losoya, S. H. (2009). Estimating a dose-response relationship between length of stay and future recidivism in serious juvenile offenders. *Criminology*, *47*(3), 699-740. https://doi.org/10.1111/j.1745-9125.2009.00165.x; Mears, D. P., Cochran, J. C., Bales, W. D., & Bhati, A. S. (2016). Recidivism and time served in prison. *The Journal of Criminal Law & Criminology*, 83-124. https://www.jstor.org/stable/26402868; Rhodes, W., Gaes, G. G., Kling, R., & Cutler, C. (2018). Relationship between prison length of stay and recidivism: A study using regression discontinuity and instrumental variables with multiple break points. *Criminology & Public Policy*, *17*(3), 731-769. https://doi.org/10.1111/1745-9133.12382

[31] Mears, D. P., Cochran, J. C., Bales, W. D., & Bhati, A. S. (2016). Recidivism and time served in prison. *The Journal of Criminal Law & Criminology*, 83-124. https://www.jstor.org/stable/26402868

[32] United States Sentencing Commission. (2020). *Length of incarceration and recidivism.* https://www.ussc.gov/research/research-reports/length-incarceration-and-recidivism

[33] United States Sentencing Commission. (2022). *Length of incarceration and recidivism.* https://www.ussc.gov/research/research-reports/length-incarceration-and-recidivism-2022