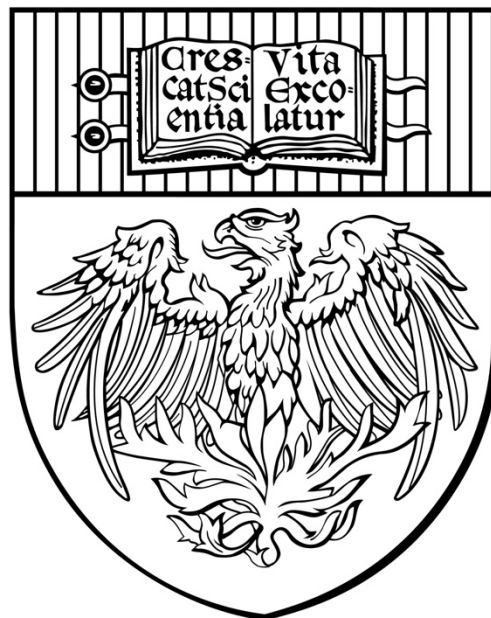


**Isolation and Desperation:
How Stay-At-Home Orders and Mobility Restrictions Impacted Crime in
the United States During the 2020 COVID-19 Crisis**

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Abstract

The COVID-19 pandemic initiated once-in-a-lifetime increases in isolation. State-level policies, enacted with the goal of reducing COVID-19 prevalence, created unprecedented mobility restrictions which caused statistically and economically significant decreases in crime rates. A differences-in-differences analysis of all 50 U.S. states and the District of Columbia reveals isolation reduced the number of violent crimes committed, including homicide, the number of motor vehicle thefts, and the number of burglaries in the United States. The reduction of crimes observed as isolation increases has broad implications for stay-at-home policy decision making and post-pandemic law enforcement resource allocation.

Introduction

On March 13, 2020, President Donald Trump declared the COVID-19 pandemic a national emergency (CDC 2020). Shortly after, city and state governments began to issue an array of emergency orders to slow the spread of the coronavirus in an effort to reduce strain on health systems. A significant portion of these emergency orders included a stay-at-home order, which directed individuals to avoid public spaces. In addition to stay-at-home orders, states issued closure orders for restaurants and bars and banned large gatherings, plunging the country into an unprecedented period of isolation. By March 26, nineteen states had issued stay-at-home orders. Just two weeks later, 43 states had issued stay at home orders, covering 94% of the U.S. population, and 49 had issued either partial or full restaurant closures. At the height of lockdown in the US in mid-April 2020, spatial mobility data accumulated by Google suggests usage of workplaces, retail and recreation, and transit stations had decreased by over 40% from January and February levels (Ritchie 2020). While effective in decreasing COVID-19 transmission, stay-at-home orders introduced mandated isolation that transformed American society, causing a broad range of intended and unintended consequences (Friedson et. al. 2020).¹

The Trump administration's decision to delegate significant portions of the COVID-19 policy response to states created variation at the state-level in the enforceability, reach, and enactment of stay-at-home orders. In some cases like that of Vermont, a single order shut down restaurants, parks, and schools simultaneously. In other states, like New Mexico, three distinct orders were issued to reduce mobility with limited enforcement mechanisms. Additionally, citizens' commitment to social distancing and isolation varied depending on numerous personal and political factors. Labor market conditions in some states necessitated a larger portion of a state's population continue to work as essential workers. Additionally, the politicization of pandemic restrictions led Republican states to reject social distancing as an necessary measure, causing Republican leaning states to have less social distancing than their Democratic neighbors. By manipulating this natural variation in state-policy and political responses, this

¹ I would like to express my gratitude for the support provided to me throughout this process by my Preceptor Jack Wippell and friend Madeleine Wonneberger.

paper hopes to glean insights into the impacts of lockdown orders and social isolation on crime rates during the pandemic using a differences-in-differences approach via fixed effects regression.

While the pandemic raged on, the homicide rate in the United States increased 30%. This is the largest observed year-over-year increase in U.S. homicides since at least the early 20th century and likely ever. A majority of states saw increases in the homicide rate, with eight states observing over 40% increases in 2020 (Gramlich 2020). While there was an unprecedented increase in homicide rates in 2020, larceny and burglary, two major crime categories reported by the FBI, decreased. This inverse response by offenders to isolation, which resulted in an increase violent crimes and a decreasing in some property crimes, is not unexpected. Crime encompasses a diverse and broadly defined range of actions – societal factors that may be criminogenic when considering violent crime could have the opposite effect on property crime. The pandemic presents a unique opportunity to understand how physical interconnectivity impacts criminal behavior in the United States.

Crime has an immense cost in the United States. In 2017, federal, state, and municipal governments in the United States allocated \$305 billion dollars to the law enforcement system, including policing, corrections, prosecution, and other expenses (Buehler 2021). This cost does not include the cost of crime incurred by victims, for which estimates range as high as \$1.95 trillion dollars (Miller et. al 2021). Assessing the efficiency of law enforcement resource allocation requires an understanding of the impacts of various societal factors on crime. Understanding the impact of isolation on criminal behavior during the pandemic will guide policy makers both during and after the pandemic.

While stay-at-home orders currently appear to be a policy of the past, the CDC has not declared an end to the pandemic. Future variants, or potentially future pandemics, may require re-enactment of pandemic era mobility restrictions. Legislating in the pandemic era was based on limited historical writing from the Spanish flu pandemic of 1919 and modern public health and epidemiological research from smaller scale outbreaks. The scale of COVID-19 allows for a new range of research to guide future pandemic policy decisions. Additionally, the isolation that accompanied the pandemic allows for novel analysis of the impact of interpersonal connection directly on crime. Long-term shifts in preferences for

mobility, most notably the large scale shift to remote work, will have lasting impacts on crime outside the pandemic era. The pandemic response, however, was not the only subject of political conversations and legislation in 2020.

The summer of 2020 also saw the largest protest movement in modern history catalyzed by the police murder of George Floyd on May 25 (Buchanan et. al. 2020). This protest movement increased tension between citizens and the police across the nation and similarly increased tension between those who support of racial justice and those opposed. The protests centered on confronting and denouncing police abuses, which contributed to decreases in procedural justice that occurred as COVID-19 changed the scope and scale of police work. Additionally, the Black Lives Matter protests of 2020 may have exerted their own effect on crime, especially burglary and larceny that accompanied protests in some areas. Whether this protest movement shifted crime through sociological changes or changes in policing practices, they certainly increase the relevance of this investigation.

In 2021, 21% of Americans support significant increases to police funding, compared to only 11% in 2020 (Parker and Hurst 2021). This support is in stark relief to the rallying cry of “defund the police” that was chanted by thousands, if not millions, of protesters. While already controversial, the 2020 protests placed policing and law enforcement at the center of a national conversation and made law enforcement resource allocation one of the most hotly contested policy areas in the nation. As funding of law enforcement becomes increasingly controversial, and pressures rise to increase crime-reduction strategies, understanding the drivers of crime in 2020 becomes even more relevant to the analysis of policing in America. The impact of isolation and mobility decreases on criminal behavior should inform transformations to law enforcement agencies in the post-pandemic age.

Effective policing, and efficient resource allocation, requires an understanding of the vast array of drivers of crime. Criminological theory presents conflicting hypotheses on the potential impact of COVID-19 lockdowns on crime. Social strain theory suggests the isolation driven by COVID-19 lockdowns would both decrease acceptance of common cultural goals and increase personal strife financially and socially, therefore increasing the number of crimes committed. Opportunity theory

suggests the decreased mobility brought about by lockdowns would limit interactions between potential offenders and targets, decreasing crime rates. Economic models of crime suggest more isolated individuals with fewer resources in a period of significant financial difficulty may experience an increase in the marginal utility of criminal offenses and drive an increase in crime. Understanding how isolation shifted criminal behavior allows a second-order analysis of drivers of crime that should guide how resources are allocated to prevent and combat crime.

Literature Review

Theoretical Framing

Crime is a unique social problem defined simultaneously by ubiquity and extreme variation. The impetus for this paper is the significant intertemporal variation observed in homicide rates. While the 30% year-over-year increase in murders is newsworthy, less widely reported was the 8.6% increase in robbery in 2020 or the 25% decrease in aggravated assaults since 2010. Large intertemporal variation in crime is common across localities and crime categories. Spatially, crime varies even more significantly. In Yardley, PA there are roughly 28 violent crimes per 10,000 residents. In nearby Kensington, PA, only a 30-minute drive away, there are 328 violent crimes per 10,000 residents. While Becker (1968), Ehrlich (1975), and Levitt (1997) have demystified aspects of this variation, limited existing literature directly addresses the impact of isolation on crime.

Intertemporal variation in crime has been explained by numerous factors. Becker (1968) predicts macroeconomic realities that influence legitimate labor market opportunities will impact crime rates as individuals who fail to find legitimate work turn to illegitimate, criminal sources of income. This association between labor market opportunities and crime, however, has only tenuous empirical connections. Levitt (2004) describes a consistent finding across empirical work; a one-percent increase in the unemployment rate is associated with a one percent increase in property crime. Violent crime, on the other hand, has no statistically significant association with the unemployment rate. Dix-Carneiro et. al.

(2018) find trade liberalization's expansion of labor market opportunities decreased homicide in the short and medium term, but had no effect in the long-run. Policing tactics and prevalence, incarceration rates, drug usage, and the legalization of abortion have been identified as other sources of intertemporal variation in crime by Levitt (2004).

Spatial variation in crime has similarly been explained by a similarly wide array of factors, including policing tactics and prevalence (Corman and Mocan 2005, Fu and Wolpin 2018), social organization and control (Shaw and McKay 1942; Glaeser et. al. 1996; Sampson et. al. 1997), proximity of potential offenders and targets (Cohen and Felson 1979), subcultures of violence (Fischer 1975), and proximity to inequality and social strain (Merton 1938, Agnew 2006). Lockdowns initiated to prevent the spread of COVID-19 had an impact on all of these factors.

Policing in the United States changed significantly during the pandemic. Jennings and Perez (2020) describe the heterogeneous responses to the pandemic from federal, state, and local police departments. In Los Angeles, detectives and other non-patrol personnel were reassigned to more visible public patrols to ensure public order in crowded spaces. Nashville's police department introduced a new system to limit public contact with police in non-emergency and non-violent situations to reduce virus transmission. In Santa Cruz, police were assigned to disperse groups of individuals gathering in public, a new role for police in that locality. Programs to increase connection between police units and the communities they work in were upended as non-essential work was deprioritized in favor of pandemic response. This decrease in contact between community members and police, in addition to sudden changes in technology and practices used by police, have broad potential impacts for procedural justice and policing efficacy as described by Hough et. al. (2010). COVID-19 lockdown policies introduced a new array of responsibilities that fell to police for enforcement, with varied results and responses from departments. Increased stress and mental, and physical health issues that arose from policing during the pandemic described by Stogner et. al (2020) present an unprecedented challenge to policing in the U.S..

Social organization and control also changed dramatically as a result of the COVID-19 pandemic and associated stay-at-home policies. Billings et. al. (2019) outlines the impact of peer-effects on criminal

behavior that occur in school settings. Among offenders aged 16-21, which accounted for 11.6% of offenders arrested in 2019, 28% were arrested with a partner. Billings et. al. identify a 23% increase in likelihood of being arrested, with 67% and 41% increase in violent and property crime respectively, for a one standard deviation increase in the number of same school-grade-race-gender students within a one kilometer proximity. Several mechanisms for peer effect's increase in crime rates have been suggested, including difficulty in monitoring high crime communities (Jacobson 2004), community standards and reputational changes (Silverman 2004), knowledge transfer on potential targets (Calvó-Armengol and Zenou 2004), and gang or criminal network creation (Bayer et. al. 2009). COVID-19 era disruptions to community and interpersonal connection that arose from isolation-inducing policy responses had immense impacts on peer-network effects. One example of this impact is the closure of schools to prevent COVID-19 transmission.

School closures were very common across the country. Closures were mandated in 44 states and DC and recommended in the 6 remaining states. Zvidedrite et. al. (2021) find that 50 million public school students were impacted by school closures for at least 8 weeks in 2020. This scale of school closures is unprecedented in U.S. history. Given the high percentage of high-school age students criminals who are arrested with a partner, these school closures present a disruption to criminal social networks that was completely secondary to policy's explicit goal of preventing the spread of disease.

Proximity of potential offenders and targets changed as mobility patterns responded to stay-at-home policies. This proximity is a key aspect of opportunity and lifestyle-routine theory which was proposed by Cohen, Klugel, and Land (1981). Opportunity theory posits the decision to commit a crime is driven by five key aspects of a potential offence: exposure to targets, proximity of potential targets and potential offenders, guardianship of potential targets, attractiveness of potential targets, and the definitional properties of specific crimes (meaning the dynamic between instrumental value and expressiveness provided by a certain crime). Opportunity theory suggests that more instrumental, like larceny-theft and property crimes, crimes are generally more subject to the quality of opportunities while expressive crimes, like homicide and assault, are less subject to changes in opportunities.

COVID-19 lockdowns impacted opportunities available to potential offenders by changing routines and mobility patterns nationally. If opportunity is the dominant mechanism through which lockdowns impact crime, decreases in instrumental crimes such as robbery, burglary, and larceny would be more significant than decreases in expressive crimes such as abuse and homicide. Changes in mobility patterns, in addition to decreasing exposure of potential targets and offenders and increasing guardianship, decreased the value of accumulated knowledge of criminal networks of high-value crime opportunities. This disruption of knowledge of opportunities compounds the disruption to criminal peer networks that occurred as a direct result of isolation. Existing literature is yet to directly address the impact of COVID-19 lockdowns on opportunity theory and peer effects on crime.

Additionally, the existing economics of crime literature focuses heavily on imprisonment as a method of both deterrence and incapacitation of criminals. Levitt (1998) finds that incapacitation through imprisonment plays a significant role in decreasing juvenile crime and rape in the United States. The pandemic led to the release of thousands of incarcerated individuals across the U.S. but this moderate reduction in prison population is unlikely to have had impacts on crime counts in any relevant way. Incarcerated individuals selected for release were specifically chosen because of their history of non-violent crime and low likelihood of recidivism. A number of pre-trial incarcerated individuals were also selected for release from jails across the country (Prison Policy Initiative, 2022).

In addition to releases from prison, the pandemic introduced a wide range of difficulties into the lives of Americans. In addition to economic and financial hardship, Isolation from COVID-19 increased loneliness (Hwang et. al. 2020). Strain theory, first synthesized and presented by Robert Agnew (2006), suggests criminal behavior is driven by negative emotional experiences. A strain can be any event that drives negative emotions including both emotional strains, like loss or the inability to achieve goals and financial strains. Strain theory suggests individuals engage in crime as a method of resolving or limiting strains.

Strain theory has been empirically tested numerous times. Various strains have been shown to have causal impacts on the likelihood an individual will engage in criminal behavior. For example,

parental rejection and familial isolation have been shown to be strongly correlated with juvenile criminal behavior (Agnew, 2001, 2005a). Similarly, abuse and neglect in childhood are shown to have a statistically and sociologically significant impact on criminal behavior (Baron, 2004; Colvin 2000). In adults, unemployment has also been shown to have causal impacts on criminal behavior (Uggen 2000), as have marital problems (Sampson and Laub, 1993). The wide range of negative impacts of the COVID-19 pandemic on individuals and society likely increased strains experienced by individuals.

Existing Evidence and Gap in Literature

While COVID-19 is a recent and ongoing shock to society, several papers have been published addressing the impact of COVID-19 on crime. In general, the recency of COVID-19 policy interventions has prevented a state-level U.S. review of the impacts of lockdowns on crime. Additionally, the recency of relevant data's release have prevented analysis on the relevant mechanisms on changes to crime that arose from COVID-19 and the following policy response. Despite these challenges, significant research has been done to understand initial impacts of COVID-19 on crime.

Existing literature covering the impact of COVID-19 on crime across multiple cities is limited. Ashby (2020) presents the first analysis of the initial impact of COVID-19 on crime through the beginning of May 2020. The author's analysis centered on 16 U.S. cities using city -level law enforcement agency data published for 6 major crimes including serious assaults in public places and residents, residential and non-residential burglary, and theft of and from vehicles. The author finds a range of effects across cities and crime categories, with no clear trend across any criminal category. Ashby utilizes a SARIMA model to assess the change in crime that results from the initial outbreak of COVID-19, and finds a general decrease in the number of crimes committed. However, no result was above the 99% significance threshold Ashby establishes. This high significance threshold was set to combat the significant intertemporal variance that exists naturally in crime reports. The general decrease in crime observed, despite its lack of significance, is mirrored in subsequent literature.

Boman and Gallupe (2020) utilizes emergency services and police calls for services by citizens and interviews with public officials as a method of understanding trends in crime in 2020. The findings of this study suggest that COVID-19 lockdowns have decreased crimes that are less costly to society, mainly property crimes, with unknown effects on more detrimental crimes such as interpersonal violence like domestic abuse and homicide. A significant decrease in calls for service is used as the primary evidence of a reduction of crime in 2020, but the paper suffers from numerous sources of bias within the quantitative analysis. Most significantly, calls for service does not accurately reflect crimes committed or the severity of those crimes as those who are most likely to experience crime have the lowest confidence in the police (Small 2018). Additionally, the impact of the murder of George Floyd and the protests which followed on public perception and use of police cannot be controlled for in the time-series study conducted by Boman and Gallupe. Similar to Ashby, however, findings reflect a decrease in crime that results from the pandemic. While these results focus on general impacts of COVID-19 on crime, other literature has directly addressed the specific question of lockdown policies on crime.

The most prominent analysis of COVID-19 lockdowns on crime has an international scope and focuses on the immediate aftermath of lockdowns. Nivette et. al. (2021) supports the general decrease in crime found by previous literature and points to lockdowns as a major mechanism for this decrease. The interrupted time-series analysis utilizes data from 27 international cities with an to reveal a 37% decline in urban crime associated with lockdown orders. The magnitude of declines varies across crime types, with homicide experiencing the smallest decrease of 14% and robbery and theft showing the largest at 46% and 47% decreases respectively. The results suggest disruptions to routines expressed a more dominant impact on crime than psychological or social strain brought about by isolation. The authors also find COVID-19 lockdowns decreased crime most significantly when they were initially enacted. This finding, however, does not consider the isolation, fear, and confusion that defined the early stages of the pandemic and may be confounding this result. Similar to Ashby (2020) and Boman and Gallupe (2020), Nivette et. al. (2021) focuses on a limited time period of the pandemic, ending analysis in July 2021. As the

pandemic dragged on, social strain from isolation may present a more significant impact in criminal behavior.

In addition to these multi-city analyses, several single-city studies have been published. Yang et. al. (2020) utilizes the Watson U^2 and Seasonal and Trend decomposition using Loess to do a first-of-its-kind assessment of the impact of COVID-19 induced mobility changes on crime. Watson's U^2 test was used to assess whether temporal distributions of crimes committed were statistically different pre and post-COVID-19. While Yang et. al. finds an overall decrease in crimes committed from February to June 2020, the authors found a smaller decrease in Chicago than what was found by Nivette et. al. (2021). Yang and their co-authors address neighborhood level variations in increases in crime, but do not assess mechanisms through which this variation arises.

Similarly, Perez-Vincent et. al. (2021) find significant decreases to crime in Buenos Aires in the immediate aftermath of COVID-19 outbreak. Decreases in property and violent crime were also observed in an anonymous mid-sized city in southern China by Chen et. al. (2021). In addition to decreases in property crime that mirror the results of similar studies, Chen et. al. observe cybercrime and fraud to be more resilient to COVID-19 than physical crimes. A number of other papers have been published addressing the question of the impact of COVID-19 on crime (Abrams 2020; Campedelli et. al. 2020; Leslie and Wilson 2020; Mohler et. al. 2020; Piquero et. al. 2020; Payne et. al. 2020; Payne and Morgan 2020a; Halford et. al. 2020; and Gerell et. al. 2020; Anderson and Hodgkinson 2020), but none have addressed the question of the impact of isolation on criminal behavior. The vast majority of existing literature finds COVID-19 reduced crime rates across all crime types. None have manipulated state-level differences in policy response to understand how lockdown policies and isolation influenced crime rates in the context of the United States.

Data and Methods

Crime Data

Crime data collection faces many challenges. The diverse nature of criminal motivations and outcomes varies the reliability of crime reporting significantly. Certain crimes are better reported than others. A range of factors affects the likelihood a crime is reported, including familial connection, severity, likelihood of return of stolen goods, and likelihood of retribution by perpetrators.²

I will utilize aggregated crime data from FBI's Unified Crime Report system. The National Incident Based Report System, which is a part of UCR, publishes the most accurate national crime reports. Data is provided to the FBI by local, state, city, and university police departments. NIBRS data for 2020 was released on December 6, 2021.

Of crimes reported by NIBRS, this paper will focus on:

1. Violent crime including homicide, rape, robbery, and aggravated assault
2. Homicide including: murder and nonnegligent manslaughter, negligent manslaughter, and justifiable homicide.
3. Aggravated assault³
4. Robbery
5. Property crime including burglary, larceny-theft, and motor vehicle theft
6. Burglary⁴

² While crimes vary in their reporting accuracy, the economics of crime literature recognizes homicide is generally the most accurately reported crime. Worst reported are crimes like rape and domestic abuse.

³ Aggravated assault, as reported to the UCR, includes the intentional infection of an individual with a disease. Whether intentionally spreading COVID-19 qualifies as a crime varies by state, but limited reports of aggravated assault via COVID-19 exist and are likely a negligible increase in assaults reported during the pandemic.

⁴ Burglary is the unlawful entry, forced or unforced, of a building or structure with the intent to commit larceny theft. If larceny-theft occurs after unlawful entry, it is *not* reported as a separate crime. Additionally, hotels, motels, and apartment buildings present challenges to reporting. If multiple units of a single building are burgled by a single individual, the event may either be reported as a single burglary or multiple. Typically, if the residences of multiple individuals are involved, burglaries are reported as multiple distinct crimes, including hotels. The decreased occupancy of hotels that accompanied the pandemic almost certainly decreased these multiple-burglary events.

7. Larceny including: pickpocketing, purse snatching, shoplifting, theft from buildings, theft from coin operated machines, theft from motor vehicles, theft of motor vehicle parts, and other larceny (other thefts).
8. Motor vehicle theft⁵

Formal definitions for each crime category can be found in the appendix.

The period studied is from 2010 to 2020. 2010 was selected as the first year to be included in the data to maximize the amount of data involved while avoiding major shocks of the 2009 financial crisis. The types and causes of strain that were brought about by the 2009 financial crisis may have increased omitted variable bias in the Great Recession were included within the dataset.⁶

Annual per capital crime rates by state are the outcome variable for regressions. Seasonal variation is significant within crime data, often with summer as a high crime season, so annual data was used to eliminate seasonal variation problems. Seasonal variation can occur across different months in response to weather patterns, which leads to the inclusion of monthly fixed effects being less resilient to natural variation than annual fixed effects. The only significant difference between monthly and annual data is the inclusion of pre-covid data within annual datasets as January and February of 2020 in the United States did not see local transmission of COVID. This inclusion will bias results down and does not pose a threat to statistical inference.

⁵ UCR reporting follows the “hierarchy rule” which means that despite multiple crimes being committed during a single event, such as the entry of a garage to steal a motor vehicle, only the most severe crime is reported to UCR. In this example, that would be burglary. Changes to the spatial distribution of motor vehicles during COVID may have led to an increase in the number garage-based motor vehicle thefts. This would artificially decrease the count of motor vehicle thefts.

⁶ State and year effects control for major changes in macroeconomic conditions. Regression analysis was done with varying time-frames included, with limited variation in outcomes.

U.S. Crime Trends from 2010 to 2020, per 100,000

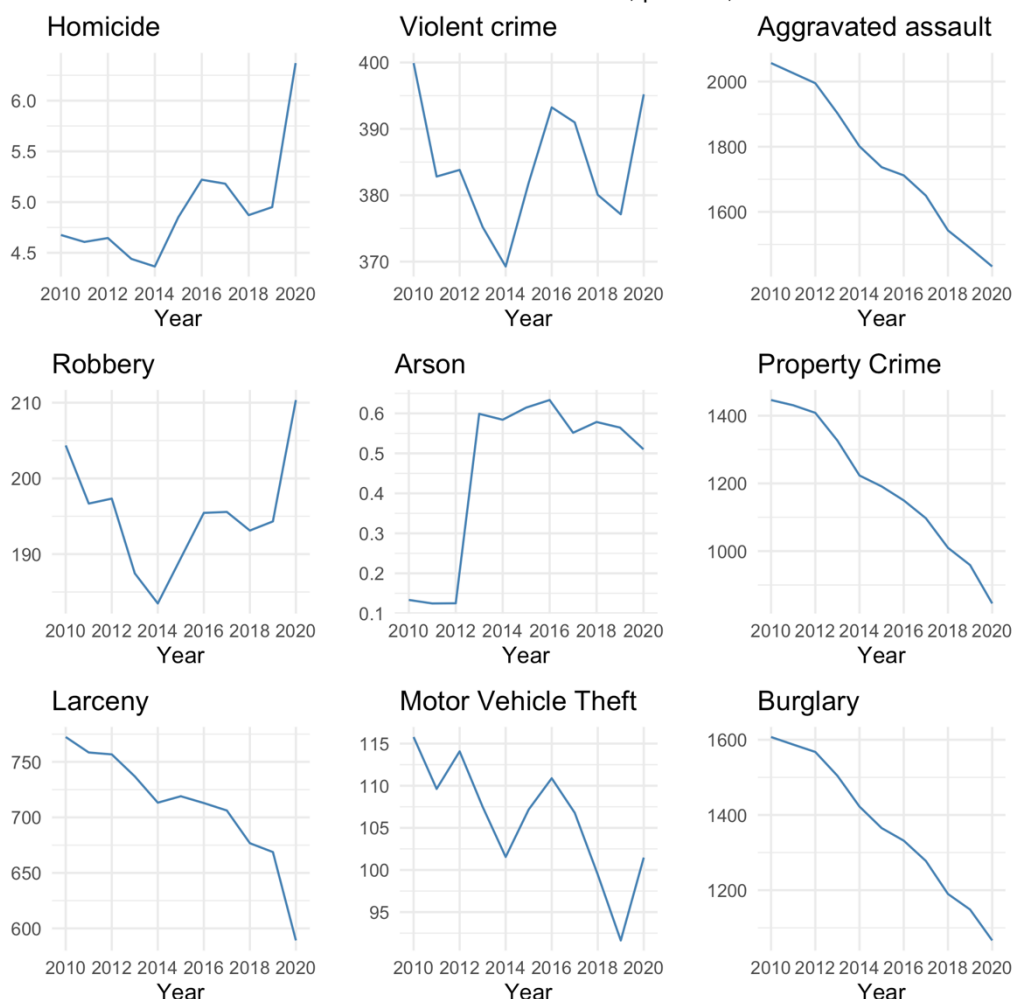


Figure 1: US Crime Trends. Data via the FBI UCR estimated crime rates

The NIBRS collects data from up to 18,623 law enforcement agencies across the country. This data is now published in quarterly reports, and has been collected by the FBI UCR program since 1960. Using data collected directly from agencies, the FBI estimates total crimes committed at the state level. This estimation was done following two methods for 2020. If a locality reported between 3 and 11 months of crime data, the unreported months were estimated using the counts that were reported for that area. If under 3 months of data were reported to the NIBRS program, crime rates for that locality were estimated by using data reported for similar regions. Using this method, the FBI publishes estimated crime rates for each state and the nation as a whole. These estimated rates were the main outcome variable for the regressions that follow.

2020 was a difficult year for law enforcement agencies, which experienced new roles and significant staffing shortages as the pandemic changed American society. Large police departments were more likely to experience decreases to staffing, with the New York Police Department reporting 2,500 employees leaving (Asher 2021).⁷ As a result of these difficulties, 2020 saw relatively low participation in NIBRS reporting with 15,875 law enforcement agencies reporting to the FBI. These agencies cover 53% of the U.S. population.⁸

Table I: Per Capita Crime Rates, 2020

Crime	2020 U.S. Offenses per 100,000
Violent Crime	398.5336
Homicide	6.546598
Robbery	73.93376
Aggravated Assault	279.6812
Property Crime	1958.224
Burglary	314.2227
Larceny	1398.041
Motor Vehicle Theft	245.9603

Figure 2: Per Capita crime incidents per 100,000 residents. Calculated using NIBRS estimated crime incidents for 2020

⁷ Large police departments are most commonly in metropolitan statistical areas with high population density. These areas also skew Democratic. Staff shortages therefore may be correlated with high-isolation states. This could impact reporting non-randomly and skew results to overestimate the impact of isolation.

⁸ The breakdown of which agencies reported to NIBRS or the Summary Reporting System (SRS) is opaque for 2020. In 2019, 16,551 agencies reported data to the FBI which, according to the FBI, covered 96.9% of the U.S. population. FBI documents are unclear as to how a >1,000 agency decrease in reporters is associated with an 44% reduction in population covered.

Isolation Data

Isolation Factor

To understand the impact of covid-related isolation on crime, this paper aggregated 2 measures of isolation, policy and political outcomes and mobility data, into a single isolation factor. This factor is the primary treatment variable for the differences-in-differences design utilized by this paper. The factor features three primary data inputs: Google mobility data, 2020 election results, and state-level policy data.

Google aggregates and publishes anonymized cell-phone mobility data in response to the outbreak of the COVID epidemic. These “Community Mobility Reports” are updated daily and present the change in mobility across various public and private spaces to a baseline of mobility established in the 5-week period between January 3 and February 6 of 2020 (Google, 2020). This data is published for 6 categories of locations: retail and recreation, groceries and pharmacies, parks, transit stations, workplaces, and residential. Included in the isolation factor calculation is residential mobility data at the state level. The average increase in time spent at home was calculated from daily change data reported in the Community Mobility Reports for the period after February 15, 2020. The inclusion of pre-COVID mobility changes mirrors the inclusion of pre-COVID crime data. Again, this inclusion will bias results downward and does not inhibit statistical inference.

State-level data regarding the enactment and repeal of mobility-limiting policies was accessed from the Kaiser Family Foundation. Three major categories of legislation are included in the analysis: stay-at-home orders, restaurant closures, and large gathering bans. Stay-at-home orders are heterogenous category of policies enacted with the goal of restricting movement. In general, state governments enacted stay at home orders to encourage individuals to avoid public and high-transmission spaces. Restaurant closures are straight forward legislation that prohibited in-person dining within a state. Large gathering restrictions are similarly straight-forward pieces of legislation that banned large gatherings, for example

concerts and conventions. The specific guideline on what defined large ranged from 10 to 50 individuals across states. This heterogeneity is not captured in the model.

The heterogeneity of whether states established paths of legal recourse along with mobility restrictions for individuals who violated said restrictions is captured in the model. Huntley et. al. (2022) summarizes which states enacted stay-at-home orders that included methods of enforceable. If legal ramifications existed for citizens who were non-compliant with state actions, a policy was categorized as enforceable. A policy was categorized as unenforceable if state policy actions:

- Were issued as recommendations rather than requirements,
- Delegated policy making to local governments, or
- Did not issue a formal stay-at-home order.⁹

This binary of enforceability of state policy actions does not capture the heterogeneity that existed between states' policy responses in its entirety. Local governments and law enforcement agencies varied in their willingness to enforce stay-at-home and other mobility restrictions. A high profile examples of this heterogeneity can be found in New York City Mayor Bill de Blasio's actions regarding the Hasidic Jewish community of New York (Stack 2020). Capturing this local heterogeneity in state policy enforcement would allow for a more robust analysis of crime data, but would require a significant effort as this data is decentralized.

A final inclusion in the isolation factor was the partisan leanings of a state. Data from the 2020 election was accessed from the Cook Political report and internalized in the factor. The politicized response to the pandemic led commitment to social distancing and isolation to fall, at least in part, along political lines. This effect was so pronounced that Republicans are potentially more likely to die from COVID-19

⁹ CDC review of state policy actions utilized a three tier system for categorizing the severity and enforceability of stay-at-home and lockdown orders. A modified regression was run using an adjusted isolation factor with this heterogeneity included. Results were negligibly different from the two tiered heterogeneity included in the model.

now than their Democratic peers. Additionally, Republican counties were significantly less likely to follow social distancing guidelines (Gao and Radford 2021). Inclusion of political leanings at the state level account for these individual responses which decreased isolation according to political beliefs.

Social Distancing Index

In addition to developing an isolation factor from the data discussed above, this paper utilizes the Social Distancing Index (SDI) developed by the University of Maryland Transportation Institute and the Center for Advanced Transportation Technology Laboratory. This index is computed using six distinct mobility metrics according to the following equation:

$$SDI = 0.8 \times [\%H + 0.01 \times (100 - \%H) \times (0.1 \times \%AT + 0.2 \times \%WT + 0.4 \times \%NWT + 0.3 \times \%TD)] + 0.2 \% \times \%OCT)$$

Where:

- $\%H$ is the percent of individuals staying home
- $\%AT$ is the percent reduction of all trips compared to a pre-covid benchmark
- $\%WT$ is the percent reduction of work trips
- $\%NWT$ is the percent reduction of non-work trips
- $\%TD$ is the percent reduction in distance traveled
- $\%OCT$ is the percent reduction in out of county trips

This data captures a holistic image of mobility data at the state-level, but does not incorporate state-level policy actions or political leanings into its indexing of social distancing. This lack of policy and political data limits the SDI's usefulness as a reflection of non-mobility related isolation. Decreases in mobility may not correlate directly to decreases in social interaction, as individuals travel for trips that do not include social interaction like to grocery stores or for work.

Non-isolation strain controls

Other sources of strain were included in the regression model to strengthen causal inference by ensuring the parallel trends assumption between observations is not violated. The two sources of strain included are COVID case counts and unemployment data.

COVID case counts were accessed through the New York Times COVID-19 data collection project. These case counts were then summed for the whole of 2020 and normalized for population. COVID case counts are included to represent potential non-isolation strain caused by individual's proximity to sickness and, potentially, death. The number of COVID cases reported in a state was the primary control, and not COVID or excess deaths, as the count of COVID cases is more reflective of individual behavior. Social distancing and isolation were supported by state policy actions explicitly to reduce case counts. Include COVID-case counts as a control, despite this relationship, increases the validity of findings in non-pandemic times.

Cases of COVID-19 are significantly undercounted. The CDC estimates that the true incidence of COVID-19 is almost four times that reported in the New York Times estimate, with only 1 in 4.0 infections being reported and 1 in 3.4 symptomatic infections being reported (CDC, 2021). This underreporting is not accounted for in the model. Testing infrastructure may vary significantly by state and is another potential source of bias in the model.

Pandemic era contractions in the labor market were significant. Unemployment claims reported to the Bureau of Labor Statistics jumped from 3.5% of the U.S. labor force in February 2020 to 14.8% in March 2020 (BLS 2020). Increases in unemployment during COVID-19 were ubiquitous across states, but varied significantly in magnitude. As discussed earlier, the impact of labor market conditions on crime rates has been demonstrated to be statistically significant for crime by a large portion of the economics of crime literature. To control for these effects, state-level unemployment data was gathered

from the Bureau of Labor Statistics. The total unemployment for a state was averaged across years and included as a control.

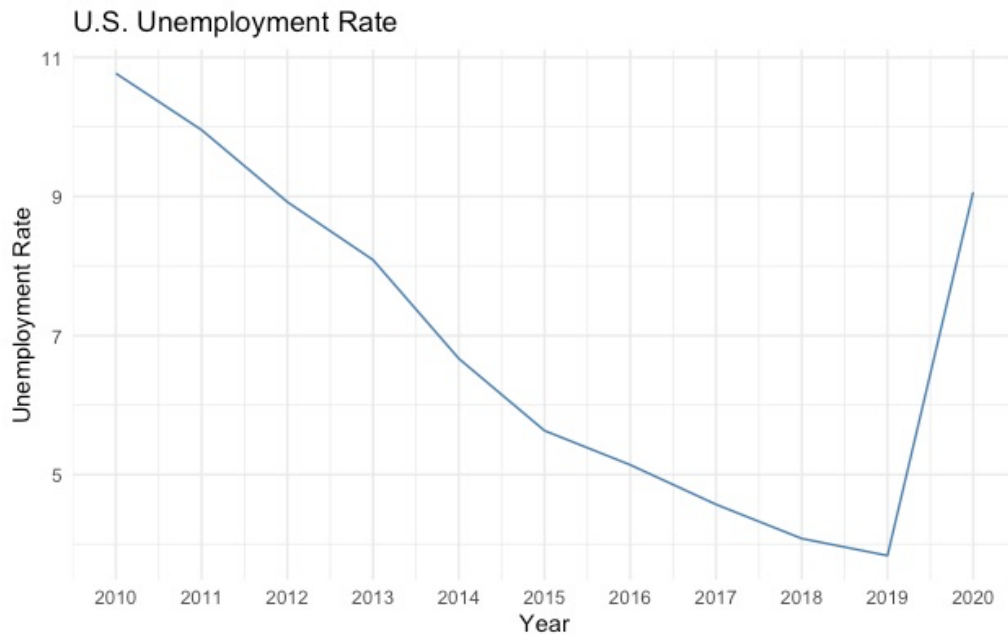


Figure 3: U.S. Unemployment Rate from 2010-2020. Data from the Bureau of Labor Statistics

Applications

Impact of COVID-19 on Isolation

The validity of this differences-in-differences design relies on the pandemic having varied impacts on state level isolation. Increases in isolation did occur as a result of the pandemic. The increase in isolation brought about by COVID-19 in the United States was felt by a broad range of the population. Both state-level policy responses to the pandemic and non-policy social responses lead to unprecedented decreases in community interconnectivity. Mobility data published by Google allows for empirical confirmation of this widely felt phenomenon.



Figure 4: U.S. Mobility Trends in 2020. Data via Google Community Mobility Reports

The figure shows the change in where Americans spent their time. In the immediate aftermath of the outbreak of COVID-19, Americans spent up to 25% more time at home and around 45% less time in retail and recreation settings compared to the baseline period of January 3rd to February 6th, 2020. Following the peak of isolation in April and May, July saw a stabilization of a “new normal” for American mobility. This stable increase in isolation was characterized by a 15% decrease of time spent in retail and recreation settings with around 12% more time spent at home during weekdays.

State-level policy responses to COVID involved mobility restrictions across the nation. In total 43 states and DC implemented stay at home orders. These stay at home orders varied in length from 133 days, implemented by California, to 24 days, implemented by Mississippi. These stay at home orders were enforced differently across the nation and the subject of significant political conversation. Huntley et. al. (2021) categorized state stay at home orders as either enforceable or unenforceable, with 37 states implementing enforceable stay at home orders and 13 either implementing unenforceable stay at home orders or not implementing an order at all.

Model Specifications

To assess the impact of COVID-19 isolation on crime in the United States, this paper utilizes a differences-in-differences analysis of 50 states and the District of Columbia. This analysis took the form of regressing an isolation factor on annual crime counts controlling for state and year fixed effects. The model was specified as follows:

$$Y = \beta_0 + \beta_1 I \times d_{2020} + \beta_2 I + \beta_3 U + \beta_4 C \times d_{2020} + \beta_5 I + \beta_6 C + \beta X^T$$

Where:

- Y is the estimated total number of crimes committed by state as reported by the NIBRS per 100,000 residents
- $I \times d_{2020}$ is an interaction term between the state-specific isolation factor and the dummy variable that is equal to 1 when the year is 2020 and 0 otherwise
- I is the state-specific isolation factor or Social Distancing Index measure
- U is the annualized unemployment rate by state
- C is the total number of confirmed COVID-19 cases by state per capita in 2020
- X^T is the transpose of the vector controlling for state and year fixed effects

This fixed-effects regression allows for a causal inference on the impact of isolation on criminal behavior. The main subject of analysis from these regressions is the interaction term between the isolation factor and the 2020 dummy. This interaction represents the impact of the isolation factor on crime over and above its influence as a representation of state-politics. By controlling for the impact of the isolation factor in non-2020 years, potential bias associated with the political realities of certain states is limited.

The implementation of an interaction term between an endogenous and exogenous variable, the isolation factor being endogenous and the year being exogenous, produces a weak instrument. This follows the method laid out by Bun and Harrison (2019). Despite the potential endogeneity bias, this interaction term allows for interpretation of a result that carries economic and statistical significance. Instrumenting isolation is a difficult task. Number of rainy days per year, school attendance, and Zoom prevalence may be functional as instruments for isolation, but each proved difficult to implement and more flawed than the differences-in-differences analysis presented. Other experimental designs centering on localities that function as one community while existing across state lines similarly presented insurmountable data collection issues, but should be considered in future work.

Unemployment rate at the state-year level was included as a control as it presents another potential strain that could be driving crime rates. Empirical evidence has shown at the individual level job loss increases likelihood of criminal behavior, however these results have not been replicated with significant success in aggregate. Despite this, the drastic change in unemployment rate in 2020 may present a societal strain that influenced crime rates outside of isolate and therefore was controlled for. Unemployment additionally may impact the isolation factor through increasing aggregate proportion of time at home. COVID cases per capita were included to control for non-isolation strain that results from proximity to sickness.

Isolation Factor

The state specific isolation factor was calculated using a range of data sources including cell-phone mobility data aggregated and published by Google, 2020 Biden vote-share published by the Cook Political Report, and state-level lockdown policies as reported by the Kaiser Family Foundation. The factor was calculated according to the following:

$$I = B_{2020} \times \Delta M + (0.7P_h + 0.2P_r + 0.1P_g) \times (1 + D_e)$$

Where

- I is the state-specific isolation factor
- B_{2020} is the 2020 Biden vote share
- ΔM is the state-level annual average increase in the proportion of time spent at home after March 12, 2020 compared to pre-covid levels
- P_h is the proportion of days of 2020 in which a state-level **stay-at-home order** was in effect
- P_r is the proportion of days of 2020 in which a state-level **restaurant closure order** was in effect
- P_g is the proportion of days of 2020 in which a state-level **large-gathering restriction** was in effect
- D_e is a dummy variable equal to 1 if a state's stay-at-home order was categorized as enforceable and 0 if it was not

Because of the politicized response to the COVID-19 pandemic and the inclusion of Biden vote-share, the political realities of a state present a potential confounding effect on this regression. State-level crime-prevention policy is influenced by the political leanings of a state, and these political leanings of states are represented in the isolation factor. The coefficient on the interaction term between the isolation factor and the 2020 dummy variable represents the impact of isolation outside of these potential political confounders.

School closure data was not included in the isolation factor despite school closures' potentially significant impact on peer connection in potential high-crime communities. School closures were relatively uniform across states. Every state either recommended or mandated the closure of public and private schools for the remainder of the 2019-2020 school year after the outbreak of COVID-19, with the exception of Wyoming. The reopening of schools in 2021 is not well documented as every state left the decision making process to individual districts for that school year. School closure policy, however, was closely linked to stay-at-home orders. In some states, such as California, the closure of private schools was enforced via stay-at-home mandate. Some school closure effects on crime, therefore, are captured by

the isolation factor. Distribution of school-age offenders is not even across crimes. School closures should therefore have unevenly distributed effects on crime if peer effects are a significant driver of criminal behavior.

Table II: Offenses by individuals under 18

Crime	Percent of Offenders Under 18
Violent Crime	9.8
Homicide	7.8
Robbery	21.7
Aggravated Assault	7.0
Property Crime	11.1
Larceny	10.3
Motor Vehicle Theft	16.8

Figure 5: School-age offender proportion across studied crime types. This table provides context for the relevance of school closures on peer effects across various crime types. Generally, school-based peer effects are not strongly implicated as a mechanism for crime reductions that arose during COVID-19.

Results

Table III: Estimated treatment effect of isolation on crime, crime counts

Crime	Regressions			
	(1)	(2)	(3)	SDI
Violent Crime	-16.970*** (2.647)	-21.7566*** (3.2949)	-22.80993*** (3.47829)	-9.9584*** (1.3174)
Homicide	0.15617** (0.05798)	-0.25295*** (0.06479)	-0.22699*** (0.06779)	-0.07381** (0.02610)
Robbery	-8.82419*** (1.33658)	-5.0774*** (1.1232)	-6.1273*** (1.1782)	-3.1051*** (0.4427)
Aggravated Assault	-6.8751*** (1.8081)	-14.376 (2.384)	-14.2906 (2.5024)	-6.10593*** (0.95264)
Property Crime	-30.063* (46.84)	-39.394* (16.441)	-33.16 (17.38)	-17.581** (6.648)
Burglary	3.562 (4.376)	-9.604 (5.919)	-9.35782 (6.27255)	-5.0606* (2.4019)
Larceny	-26.571*** (7.851)	-16.341 (10.148)	-10.722 (10.715)	-5.711 (4.108)
Motor Vehicle Theft	-7.055*** (2.815)	-13.4492*** (3.4092)	-13.0839*** (3.6051)	-6.80950*** (1.36777)

Figure 6: Regression outcomes, crime report counts. Standard errors are reported in parenthesis. Statistical significance indicators are as follows, * $p < 0.01$; ** $p < 0.001$, *** $p \sim 0$. Dependent variable is crimes reported per 100,000 residents. All columns include state and year fixed effects dummy variables. Column 1 does not include unemployment or COVID case count controls. Column 2 includes unemployment control but not COVID case count control. Column 3 includes both. Columns 1-3 utilizes the isolation factor as the treatment variable, while column 4 replaces the treatment variable with the University of Maryland Social Distancing Index.

Table IV: Estimated treatment effect of isolation on crime, percent of national per capita crime rates

Crime	Regressions			
	(1)	(2)	(3)	SDI
Violent Crime	-4.26*** (0.66)	-5.46*** (0.83)	-5.72*** (0.87)	-2.50*** (0.33)
Homicide	2.39** (0.89)	-3.86*** (0.99)	-3.47*** (1.04)	-1.13** (0.40)
Robbery	-11.94*** (1.81)	-6.87*** (1.52)	-8.29*** (1.59)	-4.20*** (0.60)
Aggravated Assault	-2.46*** (0.65)	-5.14 (0.85)	-5.11 (0.89)	-2.186*** (0.34)
Property Crime	-1.54* (-0.62)	-2.01* (0.84)	-1.69 (0.89)	-0.90** (0.34)
Burglary	1.13 (1.39)	-3.06 (1.88)	-2.98 (2.00)	-1.61* (0.76)
Larceny	-1.90*** (0.56)	-1.17 (0.73)	-0.77 (0.77)	-0.41 (0.29)
Motor Vehicle Theft	-2.87*** (1.14)	-5.47*** (1.39)	-5.32*** (1.47)	-2.77*** (0.56)

Figure 7: Regression results in percentages. Results are the same as reported in table II but adjusted by national per capita crime rate to contextualize the magnitude of results. Standard errors are also in percent change

Overview

In general, crime decreased as isolation increased between states. Statistical significance varied widely; violent crimes associated with higher levels of statistical significance than property crimes. Motor vehicle theft is the only property crime with statistically significant results across all regressions.¹⁰ Aggravated assault, on the other hand, was the only violent crime without statistically significant results across all regressions. Statistical significance varied across crime types and regressions. Results were only considered statistically significant if they were above a 99% confidence threshold.¹¹ Violent crime, homicide, robbery, and motor vehicle results were robust to changes in the inclusion of controls and changes to the treatment variable.

Regressions utilizing SDI as a treatment variable were more statistically significant than those which used the isolation factor as a treatment variable. SDI regressions also resulted in estimated treatment effects of a smaller magnitude for most crime types. Decreases in mobility captured by the SDI had a statistically and economically significant negative impact on all crime types except for larceny. The only positive treatment effects observed were the coefficients on the isolation factor for homicide and robbery rates in the uncontrolled regression. Of these, only the result for homicide was statistically significant.

The largest magnitude effect was observed for robbery. Also notable is the high magnitude of the effect of isolation on motor vehicle theft. Homicide, which is the most costly crime to victims and the highest in the hierarchy of reporting to the UCR, was associated with a treatment effect of isolation in 2020 between -1.13% and -3.47%.

¹⁰ Unlike the violent crime category, which includes crimes not directly reported on in this paper, the property crime category includes only burglary, larceny-theft, and motor vehicle theft. The statistically significant impacts on property crime overall, therefore, are only representative of the statistically significant results found for larceny and motor vehicle theft, and should not be considered separate from these results.

¹¹ The decision to limit statistical significance to a 99% level was influenced by the work of Ashby (2020).

Discussion

The decrease in violent crimes observed as isolation increases suggests potential offenders responded differently to pandemic era shifts in incentives when considering violent and property crimes. There are several potential mechanisms that explain this difference.

One mechanism may be shifts in the payoff to expressive crimes that occur as isolation increases. Expressive violent crimes, like homicide and aggravated assault, showed strong negative relationships with decreases in mobility reflected in the SDI. Decreases in interpersonal friction that came about as individuals stayed home may have translated into decreases in the payoffs to expressive crimes. In other words, when people interacted less, they wanted to hurt each other less. The value that is derived from committing a property crime, however, is not impacted as significantly by interpersonal friction. Some crimes that are more directly financially motivated, notably larceny, did not decrease as isolation increased, suggesting that interpersonal interaction is less relevant when individuals consider whether to commit property crimes.

While not statistically significant, the addition of the labor market control changed the sign of the estimated treatment effect on burglary, which suggests a lack of legitimate labor market opportunities may exert a positive impact on the number of burglaries committed. The effect of mobility changes reflected in the SDI did have statistically significant outcomes on burglary. As social distancing increased in a state, burglary decreased.¹³ The treatment effect on larceny, however, showed the opposite change as labor market controls were included. More research on the impact of pandemic economic realities is needed to uncover the effect of financial changes on crime.

Financial impacts of the pandemic also may explain weak effects of isolation on property crime. While regressions 2-4 included controls for labor market conditions, the reality of individuals' economic

¹³ In some states, burglary includes forced entry into motor vehicles. While there is no federal standard on whether burglary of motor vehicles should be included in counts of burglary, all published guidance from the UCR program reviewed for this paper does not include mention the inclusion of forcible entry into a motor vehicle in burglary counts. The hierarchy rule has numerous exceptions for motor vehicle theft. Reporting quirks have an ambiguous effect on results, but should be considered nonetheless

perceptions are difficult to control for. Higher levels of isolation may cause increased feelings of pandemic stress. This increased pandemic stress may translate to increased perceptions of economic hardship and drive increases in crimes with financial payoffs. This impact of economic strains on individuals has the opposite effect of decreased opportunities to commit crime that arise as guardianship of potential targets increases with isolation. These economic strains affect payoff perceptions of property crime more directly than violent crime. Decreased opportunity that arises as isolation increases would impact crime in the opposite direction from increased perceptions of economic hardship that are associated with isolation. Other potential relationships between economic strain and isolation are also suggested by the observed treatment effect.

The association between pandemic economic strain and isolation may be directly proportional. Estimated treatment effect of isolation on larceny and robbery decreased in magnitude as labor market controls were included. The isolation factor is correlated with Democratic states, where a more robust social safety net may exist. These social safety nets may bias the results as economic strain becomes less pronounced in states where isolation is more pronounced. Both isolation and reduced economic strain would exert negative pressure on the number of crimes committed. Also relevant in understanding pandemic era economic strain was the unprecedented expansions to the federal social safety net.

Isolation increased the number of homicides committed when controls for unemployment are excluded. This suggests that the impact of isolation-related economic strains had stronger impact on crime than decreases in opportunities associated with COVID-19 lockdowns. Once controls for unemployment are included, the positive association between homicide and isolation disappears. A negative association is observed between isolation and homicides after controlling for labor market conditions, suggesting that similar to other violent crimes, potential offenders are responding to decreased opportunities and interpersonal frictions.

The national increase in homicides that occurred in 2020 is even more concerning given isolation acted as a mitigating factor of homicides. As lockdowns are lifted and isolation decreases, homicides may increase. Pandemic strains outside of isolation may have driven the increase in homicides in 2020, which

would lead the 2020 increase in homicides to be a transient shift in response to a global crisis. However, murders in 2020 peaked during the summer months, which had fewer pandemic restrictions than earlier in the year (Asher 2020). This calls into question whether the pandemic was responsible for the increase in violent crime observed in 2020.

Despite the increase in homicides in 2020, violent crimes reported decreased across the board as isolation increased across states. There are several mechanisms that may be responsible for this effect of isolation. Opportunity theory may explain the decrease in violent crimes. Decreased interactions between potential offenders and potential targets reduces the number of violent crimes being committed. Particularly strong effects are seen for robbery, which involves both an economic and expressive component. This suggests that guardianship of high-value targets, which increased as individuals spent more time at home, reduced individual's expectation of the value of robbery.

Another mechanism that may drive the negative association between isolation and violent crime is peer-effects. Isolation decreased interaction between peers across all demographics during the pandemic. The closure of restaurants and other public greeting spaces in high-isolation states decreased peer connection beyond decreases in mobility. States where individuals found it more difficult to meet saw decreased violent crime.

School closures are a potentially important piece of reduced peer-effects on crime. While school closures varied less than isolation policy at the state-level, the enforcement of stay at home orders was an important aspect of closures of private schools in the early months of the pandemic. Additionally, school closures in the 2020-2021 school year were more common in high-isolation states (Zvidedrite et. al. 2021). Another piece of the peer-effects puzzle may involve masking policies. High-isolation states, which lean toward having Democratic legislatures, were more likely to enact and enforce mask mandates in schools. While students were still engaging with one another on a daily basis even in school, the enforcement of a mask mandate may decrease individual connections and therefore in-school criminal connections. This question requires more in-depth analysis of crime and masking data in schools. Reductions in crime that result from isolation, however, are not closely correlated with the proportion of

offenders who are school age. Peer effects in school, while potentially contributing to some of the decrease observed from isolation, likely do not account for the majority of the observed treatment effects.

Another aspect of increased isolation and severity of stay-at-home orders was decreased access to alcohol for minors and adults in private and public. Alcohol consumption is associated with increased crime rates, especially among minors (Graham and Livingston 2012). Public access to alcohol was severely limited as bars and restaurants were specifically targeted by all 50 states as high-transmission spaces. The shutdown of these public spaces reduced the proximity of potential offenders and targets in very high risk scenarios where alcohol is involved. Some localities, like Chicago, also implemented strict limits on the sale of alcohol for private consumption during the pandemic. These restrictions may be in part responsible for the observed decrease in violent crime associated with increased isolation.

In addition to the mechanisms discussed above, crime reporting difficulties may also be responsible for the observed relationship between violent crime and isolation. Fundamental inaccuracies are a reality of crime data. The results observed for violent crime may be solely due to decreases in reporting of violent crimes. Reporting of domestic abuse and intimate partner violence are specifically vulnerable to increases in time spent at home. Crime may have shifted from public places to private ones, where reporting is more difficult and law enforcement is less likely to be involved. The validity of the result for aggravated assault is particularly questionable because of these reporting difficulties. Increased isolation, instead of decreasing the number of violent crimes being committed, may simply decrease the number of crimes reported.

Isolation does not exert the same negative pressures on the reporting of property crimes as it does on violent crime. This change may explain, in part, why property crime results suffered from a lack of statistical significance. Pandemic era shifts may have increased the reporting of property crimes for several reasons. First, the likelihood an individual reports a crime is increased by the magnitude of damages incurred by a victim. As individuals feel poorer, a larger range property crimes meets the equilibrium threshold for reporting crimes. Second, increased guardianship of homes may lead to more rapid discovery of crimes being committed. The faster a crime is reported, the more likely a victim is to

recover stolen goods. Accordingly, the expected benefit of reporting crimes increases. These positive pressures on reporting associated with isolation may bias the effect of isolation on property crime up, leading to lower magnitude effects and lower statistical significance.

The only significant result observed for property crime totals and burglary came from the regressions on SDI, which tracks exclusively mobility decreases that arose from COVID and not policy responses. This suggests that policy responses were weakly correlated with changes to criminal behavior, while responses to changes in mobility were more robust. While the treatment effects on violent crime associated with the isolation factor were statistically significant, estimated treatment effects of SDI on crime are more statistically significant than regressions using the isolation factor for every crime category. The more statistically significant results for SDI suggest that criminals respond more directly to their lived experience rather than government efforts to increase isolation.

Regressions did not produce robust treatment effects on larceny. As potentially the most directly economically motivated crime, existing literature suggest larceny would be the most responsive crime category to changes in opportunity. A significant amount of theft occurs between individuals in public spaces, and increased isolation contributed to a separation of potential offenders and targets. Isolation, however, did not have robust effects on the number of larcenies reported. Existing literature finds limited shifting of crime when opportunities are reduced (Felson and Clarke 1998). This limited shifting as opportunities decrease makes the lack of a strong impact on larceny even more surprising. The scale of disruption to opportunity during the pandemic may have produced previously unobserved behavioral changes in offenders. One potential mechanism that suggests the shifting of opportunity does occur as isolation increases is the effect of observable victim prevention described by Ayers and Levitt (1998). When potential offenders are made aware of attempts to prevent crime, through preventions like signs indicating the presence of a security system or individuals leaving lights on at home, crime is not reduced in aggregate. Instead, offenders shift crime to targets without observable victim prevention.

Potential shifts in crime that occurred in response to changes in opportunities would effect more than simply larceny. Similar to larceny, burglaries reported did not have a robust estimated treatment

effect of isolation except for the SDI regression. Burglary, which is the unlawful entry of a structure to commit a felony or theft, would be expected to respond strongly to increased guardianship of targets. More specific analysis of the spatial distribution of larceny burglary could reveal whether property crimes were shifted away from private residences, where guardianship increased significantly, to public locations such as restaurants or offices, where guardianship decreased significantly.

Opportunity theory is strongly supported by the statistically significant and large estimated treatment effect on motor vehicle theft. Existing data suggest the majority of car thefts occur on the street outside a victim's home - home driveways as the second most common geography for theft (Keister 2007). The increase in guardianship of these spaces that co-occur with increases in isolation, therefore, is a likely mechanism for the reduction in thefts observed as isolation increases. Unlike robbery and larceny, in which high value targets have a fixed distribution in both public and private spaces, motor vehicles are not fixed in place. The distribution of motor vehicles across spaces shifted to high guardianship spaces as individuals drove less and spent more time at home.

Other factors in addition to reduced opportunity likely contributed to the significant result observed for motor vehicle theft. Motor vehicle thefts may have decreased as a result of decreased peer-effects on crime. Additionally, similar to other property crimes, motor vehicle theft may have been better reported during 2020. Individuals staying home would have observed motor vehicle theft sooner after the offense. Not only were individuals potentially more likely to report car thefts, but fewer cars on the road may have also made enforcement and repossession of stolen vehicles more effective for police departments across the US.

Policy Recommendations

Pandemic Policy Responses

The reduction in crimes reported associated with lockdown policies is a silver lining of policies that are otherwise deeply disruptive. Stay-at-home orders, emergency declarations, and lockdown orders

were broad reaching responses to a once-in-a-generation emergency which proved to be effective in their primary goal of reducing COVID cases. The unintended consequences of the massive disruption to society that accompanied these policies are still being uncovered. Reducing crime is one of many potential impacts of lockdowns that are beginning to be described.

One of the most significant impacts of pandemic era mobility restrictions, in addition to reducing COVID burden, was the significant decrease to economic activity that accompanied stay-at-home orders. Limited access to legitimate labor market opportunities played a role in the crime landscape of the U.S. in 2020. Economic hardship increases the likelihood an individual will turn to crime. Mitigating this increase in crime were emergency increases in the social safety net. Eviction moratoriums, public coverage of COVID healthcare, expansion of the child tax credit, and, most notably, direct cash transfers all reduced the economic strain associated with pandemic restrictions. In addition to having positive impacts on quality of life and the U.S. economy, these expansions reduced the impact of economic strain and likely reduced the number of crimes being committed. Time series analysis and regression discontinuity analysis could reveal the impact of these policies on crime directly, and help guide future crime-reduction policy efforts. If decreases in economic hardship were responsible for sizeable decreases in crime rates, direct cash transfers and an expanded social safety net could significantly reduce crime rates in the long run.

Economic strain is just one of many influences on crime that shifted during the pandemic. The statistically significant and large reduction in motor vehicle theft observed shows opportunities to commit crime shifted, and in some cases decreased, as isolation increased. If the goal of policing is to reduce crime rates, policing efforts should follow where crime shifts during lockdowns. Further research is needed to confirm the shift in where property crime is occurring. However, shifts in target locations associated with opportunity changes explain the treatment effects observed. Policing should shift to cover offices, restaurants, and other unguarded targets that arise when individuals stay home and pandemic restrictions are enacted.

While results for violent crime had higher statistical significance than those for property crime, data reporting issues must be resolved to understand the true impact of isolation on crime. For example, despite the lack of sufficient national data on IPV and domestic abuse, there is expansive evidence that these crimes increased significantly during the pandemic period as a result of isolation. State governments should assess their crime reporting systems to better allow for the safe and secure reporting of IPV and abuse. Text-to-911 services provide a discrete way to contact authorities in times of emergency. Because of the escalatory effect contacting police can have in IPV situations, calling authorities or any third party can be dangerous to victims. This danger was exacerbated by pandemic isolation, as finding privacy in abusive relationships became significantly more difficult. By expanding access to and awareness of text-to-911 services, state and local governments can provide a safer method for victims to report and seeking help for IPV and domestic abuse both during high-isolation periods and after.

In addition to reporting difficulties that come from increased isolation, the pandemic also reduced the connection between communities and law enforcement which decreased reporting of crime. Procedural justice was damaged by the cancellation of numerous community policing initiatives and the significant protest movement that occurred during lockdowns. The harm to procedural justice compounds crime reporting difficulties that arise with isolation. Procedural justice efforts, including building community-police connections and increasing community accountability of police departments, would counteract crime reporting difficulties that arise during lockdowns. Ensuring law enforcement agencies return to pre-pandemic commitments to community accountability and connection must be a key focus of state legislatures.

As the nation begins to exit the pandemic period, mobility is increasing. As isolation declines, so will guardianship of potential targets of property crime. To combat this decrease, state governments should consider increasing prevalence and access to various forms of unobservable victim prevention. While observable victim prevention have been shown to shift crime to unprotected sites, unobservable victim prevent can have strong effects in decreasing crime across all targets. The strong impact of guardianship in reducing motor vehicle theft supports the effectiveness of unobservable victim

prevention. Local governments in high property crime regions should consider subsidizing or promoting unobservable victim preventions for potential targets. Ayers and Levitt (1998) find LoJack, an anti-car theft tracking device which cannot be observed by potential thieves, had a significant impact in reducing car theft. Similar unobservable victim prevention tactics could increase guardianship of targets as individuals spend less time at home.

Future analysis

The wide range of policy levers utilized to reduce COVID-19 caseloads and associated economic stress present a unique opportunity to researchers who can manipulate these changes to better understand drivers of crime both during and after the pandemic.

In addition to the spatial analysis on the locations where property crime is occurring suggested previously, spatial analysis may confirm the decrease in crimes committed in bars and drinking establishments that were shut down by lockdown policies. Alcohol induced crimes committed in public spaces are a negative externality which the public incurs for the benefit of businesses which sell alcohol. Mandating increases private security forces would address this externality and shift the cost of law enforcement to private establishments while reducing burdens on the court and prison systems.

Testing of peer effects on crime can also be carried out using COVID-19 policy impacts. Pandemic era school closures provide the unique potential to investigate the impact of peer effects on crime. An investigation of school closures in late 2020 – the beginning of the 2020-2021 school year – could manipulate variation between school districts in single communities and reveal more specific impacts of peer effects on crime. If these effects play a significant role, direct interventions in high-crime communities may disrupt these peer effects directly. Initiatives like the Harlem Children’s Zone were started explicitly to reduce crime and change community subcultures that may support crime. While effective in some places, these are costly interventions which provide wrap around services. If peer effects do not play a significant role in driving crime, a more effective intervention may be direct cash transfers.

Effective resource allocation requires an understanding of the impact of direct cash transfers. The unprecedented allocation of resources to individuals across the country during the pandemic similarly presents an opportunity to understand the impact of cash transfers, both in the form of checks to every individual and the child tax credit expansion, on crime rates.

Limitations

The pandemic strained law enforcement resources significantly as the scope of police work was expanded; pandemic era reductions in police force size and capacity had impacts on crime which are partially controlled for with year fixed effects but should be addressed specifically. Across the country, police departments faced difficulties in staffing. The public facing nature of police work exposed police officers to COVID-19. A significant number of officers eventually contracted the disease. Additionally, officers chose to leave law enforcement both through early retirement or switching careers. These decreases in police staffing are likely correlated with political leanings of states and therefore with lockdown policy decisions in addition to being correlated with crime rates. The confounding effect of police staff reductions should be addressed directly in future empirical work.

More significantly, police work changed during the pandemic. The enforceability, or lack thereof, of lockdown policies is reflected in a state's isolation factor. Police departments in states with enforceable lockdown policies were, in some cases, directly responsible for enforcing these policies. By shifting police resources away from traditional policing, isolation-related changes to law enforcement resource allocation potentially confound the estimated treatment effects.

Like most quantitative studies of crime, this paper suffers from structural difficulties in crime reporting. Persistent lack of trust in law enforcement and anti-reporting culture leave a significant portion of crimes unreported. Crimes where victims incur lower costs are more likely to go unreported, meaning larceny may suffer significantly from these structural difficulties. The distribution of reporting difficulties across crimes is not random, leaving the validity of comparisons between crime categories negatively

impacted by these reporting errors. Most significantly impacted by these reporting difficulties, however, is aggravated assault.

Interpersonal violence and domestic abuse of a high severity are reported by the NIBRS as aggravated assault.¹⁴ The pandemic not only increased rates of IPV, but also significantly complicated the crime reporting process. Victims of IPV often report their offense by either leaving their living situation or going to an emergency room where they are treated for broken bones or other physical harms incurred through IPV. Increased isolation made leaving a living situation more difficult. As offenders spent increasing amounts of time at home, finding opportunities to leave an unsafe living situation decreased for victims of IPV. Additionally, going to a hospital for treatment became more costly, as emergency rooms were overrun by COVID cases and fear of disease made ERs more dangerous for individuals. The lack of reporting of IPV that almost certainly accompanied increases in isolation compound the results of this paper for aggravated assault and by extension violent crime as a whole.

Another significant limitation facing the quantitative analysis in this paper is reliance on the FBI's estimation process. As only 53% of the population is included in direct NIBRS reports, the method of the FBI's estimation plays a significant role in determining results. The distribution of covered populations is not random, and therefore may present a confounding effect on regression outcomes. The methodology of this estimation is opaque, and it may involve the use of out-of-state data in estimating certain localities. Because this paper utilizes a state-level differences-in-differences approach to estimating the effect of isolation, cross-state estimation by the FBI would significantly impact the validity of results.

Estimating the effect of isolation is also made more difficult by the rapid development of online communication platforms that occurred during the pandemic. When physical mobility and in-person connections were significantly reduced as a result of stay-at-home orders, interpersonal relationships

¹⁴ Reporting standards for domestic abuse vary by locality. Any assault, including domestic abuse and IPV, which includes a weapon is reported almost universally as aggravated assault. If a domestic abuse case is not severe enough, it will likely be reported as a simple assault.

shifted online. Access to high-speed internet and technological resources is not distributed evenly across states. Lack of broadband access is a major issue in rural areas that prevented the shift to online interpersonal relationships. Inequalities that determine who is able to access online communication platforms were not considered in the model and should be taken into account in future studies of pandemic isolation.

Conclusion

Isolation caused decreases in violent crime and motor vehicle theft in 2020. While lockdown policies increased this effect in some cases, reductions in crime were associated with decreases in mobility regardless of state-level intervention. This decrease in crime is an unexpected benefit, and one of the many unintended consequences, of policies that are otherwise a last resort. Lockdowns and COVID-19 restrictions are becoming increasingly unpopular as the pandemic drags on; the repeal of almost every state-level COVID-19 restriction followed the increasing public outcry against pandemic restrictions. Accordingly, the current political landscape is deeply unfriendly to enacting additional lockdowns. As the pandemic continues to develop, these leanings may change. Understanding the broad impacts of lockdown policies will help guide legislatures today should they have to re-consider lifting pandemic restrictions and will contribute to making data-based decisions during the next pandemic. While crime is a relatively small aspect of the considerations that will define the discussion of lockdowns going forward, the negative impact on violent crime should nonetheless be considered and understood fully by decision makers.

The COVID-19 pandemic transformed American society, and societies across the globe, to a point of near unrecognizability. Crime was not insulated from these changes. Increased isolation decreased crime through a variety of mechanisms likely including shifting opportunities, reducing interpersonal frictions, and decreasing access to alcohol. Property crimes did not show robust responses to changes in isolation and state-level policy, except for motor vehicle theft, which strongly suggests a

shifting in targets occurred for other property crimes during the pandemic. The unprecedented policies that defined the pandemic era, including lockdowns, cash transfers, school closures, and emergency orders present a unique opportunity to crime researchers. Manipulating this broad range of policy changes can allow for holistic analyses of a range of hypothesized criminogenic factors. Isolation is only one of them.

Appendix

Crime definitions:

Arson—To unlawfully and intentionally damage, or attempt to damage, any real or personal property by fire or incendiary device.

Aggravated Assault—An unlawful attack by one person upon another wherein the offender uses a weapon or displays it in a threatening manner, or the victim suffers obvious severe or aggravated bodily injury involving apparent broken bones, loss of teeth, possible internal injury, severe laceration, or loss of consciousness. This also includes assault with disease (as in cases when the offender is aware that he/she is infected with a deadly disease and deliberately attempts to inflict the disease by biting, spitting, etc.).

Burglary (breaking or entering) —The unlawful entry of a structure to commit a felony or a theft. Attempted forcible entry is included.

Homicide Offenses—The killing of one human being by another.

Murder and Nonnegligent Manslaughter—The willful (nonnegligent) killing of one human being by another.

Negligent Manslaughter—The killing of another person through negligence.

Justifiable Homicide—The killing of a perpetrator of a serious criminal offense by a peace officer in the line of duty, or the killing, during the commission of a serious criminal offense, of the perpetrator by a private individual.

Larceny/Theft Offenses—The unlawful taking, carrying, leading, or riding away of property from the possession, or constructive possession, of another person.

Pocket-picking—The theft of articles from another person's physical possession by stealth where the victim usually does not become immediately aware of the theft.

Purse-snatching—The grabbing or snatching of a purse, handbag, etc., from the physical possession of another person.

Shoplifting—The theft, by someone other than an employee of the victim, of goods or merchandise exposed for sale.

Theft From Building—A theft from within a building which is either open to the general public or where the offender has legal access.

Theft From Coin-Operated Machine or Device—A theft from a machine or device which is operated or activated by the use of coins.

Theft From Motor Vehicle—(Except Theft of Motor Vehicle Parts or Accessories) The theft of articles from a motor vehicle, whether locked or unlocked.

Theft of Motor Vehicle Parts or Accessories—The theft of any part or accessory affixed to the interior or exterior of a motor vehicle in a manner which would make the item an attachment of the vehicle, or necessary for its operation.

All Other Larceny—All thefts which do not fit any of the definitions of the specific subcategories of Larceny/Theft listed above.

Robbery—The taking, or attempting to take, anything of value under confrontational circumstances from the control, custody, or care of another person by force or threat of force or violence and/or by putting the victim in fear of immediate harm.

Bibliography

- Abrams, David S. “COVID and Crime: An Early Empirical Look.” *SSRN Electronic Journal*, 2020. <https://doi.org/10.2139/ssrn.3674032>.
- Andresen, Martin A., and Tarah Hodgkinson. “Somehow I Always End up Alone: COVID-19, Social Isolation and Crime in Queensland, Australia.” *Crime Science* 9, no. 1 (December 2020): 25. <https://doi.org/10.1186/s40163-020-00135-4>.
- Andrew I. Friedson, Drew McNichols, Joseph J. Sabia, and Dhaval Dave. “Shelter-In-Place Orders and Public Health: Evidence From California During the COVID-19 Pandemic.” *Journal of Policy Analysis and Management* 40, no. 1 (2021): 258–83.
- Antoni Calvo-Armengoi, and Yves Zenou. “Decisions: The Role of Social Structure in Facilitating Delinquent Behavior.” *International Economics Review* 45, no. 3 (August 2004): 939–58.
- Asher, Jeff. “Murder Rose by Almost 30% in 2020. It’s Rising at a Slower Rate in 2021.” *The New York Times*, September 22, 2021. <https://www.nytimes.com/2021/09/22/upshot/murder-rise-2020.html>.
- Ayres, I., and S. D. Levitt. “Measuring Positive Externalities from Unobservable Victim Precaution: An Empirical Analysis of Lojack.” *The Quarterly Journal of Economics* 113, no. 1 (February 1, 1998): 43–77. <https://doi.org/10.1162/003355398555522>.
- Bayer, Patrick, Stephen L. Ross, and Giorgio Topa. “Place of Work and Place of Residence: Informal Hiring Networks and Labor Market Outcomes.” *Journal of Political Economy* 116, no. 6 (December 2008): 1150–96. <https://doi.org/10.1086/595975>.
- Becker, Gary S. *Crime and Punishment: An Economic Approach*. Human Behavior and Social Institutions 3. New York: National Bureau of Economic Research : distributed by Columbia University Press, 1974.
- Billings, Stephen B., David J. Deming, and Stephen L. Ross. “Partners in Crime.” *American Economic Journal: Applied Economics* 11, no. 1 (January 1, 2019): 126–50. <https://doi.org/10.1257/app.20170249>.
- Bun, Maurice J. G., and Teresa D. Harrison. “OLS and IV Estimation of Regression Models Including Endogenous Interaction Terms.” *Econometric Reviews* 38, no. 7 (August 9, 2019): 814–27. <https://doi.org/10.1080/07474938.2018.1427486>.
- Campedelli, Gian Maria, Alberto Aziani, and Serena Favarin. “Exploring the Immediate Effects of COVID-19 Containment Policies on Crime: An Empirical Analysis of the Short-Term Aftermath in Los Angeles.” *American Journal of Criminal Justice* 46, no. 5 (October 2021): 704–27. <https://doi.org/10.1007/s12103-020-09578-6>.
- Chen, Peng, Justin Kurland, Alex R. Piquero, and Herve Borrión. “Measuring the Impact of the COVID-19 Lockdown on Crime in a Medium-Sized City in China.” *Journal of Experimental Criminology*, November 9, 2021. <https://doi.org/10.1007/s11292-021-09486-7>.
- Christopher Uggen. “Work as a Turning Point in the Life of Criminals: A Duration Model of Age, Employment, and Recidivism.”

- American Sociological Review* 67 (2000): 529–46.
- Claude S. Fischer. “Toward a Subcultural Theory of Urbanism.” *American Journal of Sociology* 80, no. 6 (May 1975): 1319–41.
- Cohen, Lawrence E., and Marcus Felson. “Social Change and Crime Rate Trends: A Routine Activity Approach.” *American Sociological Review* 44, no. 4 (August 1979): 588. <https://doi.org/10.2307/2094589>.
- Corman, Hope, and Naci Mocan. “Carrots, Sticks, and Broken Windows.” *The Journal of Law and Economics* 48, no. 1 (April 2005): 235–66. <https://doi.org/10.1086/425594>.
- Dan Silverman. “Street Crime and Street Culture.” *International Economics Review* 45, no. 3 (August 2004): 761–86.
- David J. Spencer CDC Museum. “COVID-19 Timeline,” August 4, 2021. <https://www.cdc.gov/museum/timeline/covid19.html>.
- Dix-Carneiro, Rafael, Rodrigo R. Soares, and Gabriel Ulyssea. “Economic Shocks and Crime: Evidence from the Brazilian Trade Liberalization.” *American Economic Journal: Applied Economics* 10, no. 4 (October 1, 2018): 158–95. <https://doi.org/10.1257/app.20170080>.
- Ehrlich, Isaac. “The Deterrent Effect of Capital Punishment: A Question of Life and Death.” Cambridge, MA: National Bureau of Economic Research, November 1973. <https://doi.org/10.3386/w0018>.
- Emily D. Buehler. “Justice Expenditures and Employment in the United States, 2017.” U.S. Department of Justice, Bureau of Justice Statistics, July 2021.
- “Estimated COVID-19 Burden.” Centers for Disease Control and Prevention, November 16, 2021. <https://www.cdc.gov/coronavirus/2019-ncov/cases-updates/burden.html>.
- Felson, Marcus, and Ronald Clarke. “Opportunity Makes the Thief: Practical Theory for Crime Prevention.” Policing and Reducing Crime. Research Development Statistics, 1998.
- Fola Akinnibi, Sarah Holder, and Christopher Cannon. “Cities Say They Want to Defund the Police. Their Budgets Say Otherwise.” *Bloomberg CityLab*, January 12, 2021.
- Fu, Chao, and Kenneth I Wolpin. “Structural Estimation of a Becker-Ehrlich Equilibrium Model of Crime: Allocating Police Across Cities to Reduce Crime.” *The Review of Economic Studies* 85, no. 4 (October 1, 2018): 2097–2138. <https://doi.org/10.1093/restud/rdx068>.
- Gao, Jingjing, and Benjamin J. Radford. “Death by Political Party: The Relationship between COVID-19 Deaths and Political Party Affiliation in the United States.” *World Medical & Health Policy* 13, no. 2 (June 2021): 224–49. <https://doi.org/10.1002/wmh3.435>.
- Gerell, Manne, Johan Kardell, and Johanna Kindgren. “Minor Covid-19 Association with Crime in Sweden.” *Crime Science* 9, no. 1 (December 2020): 19. <https://doi.org/10.1186/s40163-020-00128-3>.
- Glaeser, E. L., B. Sacerdote, and J. A. Scheinkman. “Crime and Social Interactions.” *The Quarterly Journal of Economics* 111, no. 2 (May 1, 1996): 507–48. <https://doi.org/10.2307/2946686>.
- Graham, Kathryn, and Michael Livingston. “The Relationship between Alcohol and Violence: Population, Contextual and Individual Research Approaches: Editorial.” *Drug and Alcohol Review* 30, no. 5 (September 2011): 453–57. <https://doi.org/10.1111/j.1465-3362.2011.00340.x>.
- Halford, Eric, Anthony Dixon, Graham Farrell, Nick Malleson, and Nick Tilley. “Crime and Coronavirus: Social Distancing, Lockdown and the Mobility Elasticity of Crime.” Preprint. SocArXiv, May 12, 2020. <https://doi.org/10.31235/osf.io/4qzca>.
- Hannah Ritchie. “Google Mobility Trends: How Has the Pandemic Changed the Movement of People around the World?” *Our World in Data* (blog), June 2, 2020. <https://ourworldindata.org/covid-mobility-trends>.
- Hough, M., J. Jackson, B. Bradford, A. Myhill, and P. Quinton. “Procedural Justice, Trust, and Institutional Legitimacy.” *Policing* 4, no. 3 (August 1, 2010): 203–10. <https://doi.org/10.1093/police/paq027>.
- Hwang, Tzung-Jeng, Kiran Rabheru, Carmelle Peisah, William Reichman, and Manabu Ikeda. “Loneliness and Social Isolation during

- the COVID-19 Pandemic.” *International Psychogeriatrics* 32, no. 10 (October 2020): 1217–20.
<https://doi.org/10.1017/S1041610220000988>.
- Jennings, Wesley G., and Nicholas M. Perez. “The Immediate Impact of COVID-19 on Law Enforcement in the United States.” *American Journal of Criminal Justice* 45, no. 4 (August 2020): 690–701.
<https://doi.org/10.1007/s12103-020-09536-2>.
- John H Boman and Owen Gallupe. “Has COVID-19 Changed Crime? Crime Rates in the United States during the Pandemic.” *American Journal of Criminal Justice*, July 8, 2020.
- Keister, Todd. “Thefts of and from Cars on Residential Streets and Driveways.” Police Research Series. ASU Center for Problem-Oriented Policing, 2007.
<https://popcenter.asu.edu/content/thefts-and-cars-residential-streets-driveways-0>.
- Kim Parker and Kiley Hurst. “Growing Share of Americans Say They Want More Spending on Police in Their Area.” *Pew Research Center* (blog), October 26, 2021.
<https://www.pewresearch.org/fact-tank/2021/10/26/growing-share-of-americans-say-they-want-more-spending-on-police-in-their-area/>.
- Larry Buchanan, Quoc Trung Bui, and Jugal K. Patel. “Black Lives Matter May Be the Largest Movement in U.S. History.” *The New York Times*, July 3, 2020.
<https://www.nytimes.com/interactive/2020/07/03/us/george-floyd-protests-crowd-size.html>.
- Lawrence E. Cohen, James R. Kluegel, and Kenneth C. Land. “Social Inequality and Predatory Criminal Victimization: An Exposition and Test of a Formal Theory.” *American Sociological Review* 46 (October 1981): 505–24.
- Leslie, Emily, and Riley Wilson. “Sheltering in Place and Domestic Violence: Evidence from Calls for Service during COVID-19.” *SSRN Electronic Journal*, 2020.
<https://doi.org/10.2139/ssrn.3600646>.
- Levitt, Steven D. “Using Electoral Cycles in Police Hiring to Estimate the Effects of Police on Crime.” *American Economic Review* 87, no. 3 (June 1997): 270–90.
- Levitt, Steven D. “Why Do Increased Arrest Rates Appear To Reduce Crime: Deterrence, Incapacitation, Or Measurement Error?” *Economic Inquiry* 36, no. 3 (July 1998): 353–72. <https://doi.org/10.1111/j.1465-7295.1998.tb01720.x>.
- Mario L. Small. “Understanding When People Will Report Crimes to the Police.” *Proceedings of the National Academy of Sciences of the United States of America* 115, no. 32 (July 19, 2018): 8057–59.
- Mark Colvin. *Crime & Coercion*. New York: St. Martin’s Press, 2000.
- Matthey P.J. Ashby. “Initial Evidence on the Relationship between the Coronavirus Pandemic and Crime in the United States.” *Crime Science* 9, no. 6 (May 18, 2020).
- Merton, Robert K. “Science and the Social Order.” *Philosophy of Science* 5, no. 3 (July 1938): 321–37. <https://doi.org/10.1086/286513>.
- Miller, Ted R., Mark A. Cohen, David I. Swedler, Bina Ali, and Delia V. Hendrie. “Incidence and Costs of Personal and Property Crimes in the USA, 2017.” *Journal of Benefit-Cost Analysis* 12, no. 1 (2021): 24–54.
<https://doi.org/10.1017/bca.2020.36>.
- Mirelle Jacobson. “Baby Booms and Drug Busts: Trends in Youth Drug Use in the United States, 1975-2000.” *The Quarterly Journal of Economics* 119, no. 4 (November 2004): 1481–1512.
- Mohler, George, Andrea L. Bertozzi, Jeremy Carter, Martin B. Short, Daniel Sledge, George E. Tita, Craig D. Uchida, and P. Jeffrey Brantingham. “Impact of Social Distancing during COVID-19 Pandemic on Crime in Los Angeles and Indianapolis.” *Journal of Criminal Justice* 68 (May 2020): 101692.
<https://doi.org/10.1016/j.jcrimjus.2020.101692>.
- Nivette et. al. “A Global Analysis of the Impact of COVID-19 Stay-at-Home Restrictions on Crime.” *Nature Human Behaviour* 5 (June 2, 2021): 868–77.
- Payne, Jason L., Anthony Morgan, and Alex R. Piquero. “COVID-19 and Social Distancing Measures in Queensland, Australia, Are Associated with Short-Term Decreases in Recorded Violent Crime.” *Journal of Experimental Criminology* 18, no. 1 (March 2022): 89–113.
<https://doi.org/10.1007/s11292-020-09441-y>.

- Payne, Jason, and Anthony Morgan. "COVID-19 and Violent Crime: A Comparison of Recorded Offence Rates and Dynamic Forecasts (ARIMA) for March 2020 in Queensland, Australia." *Center for Open Science*, 2020.
<https://doi.org/10.31219/osf.io/g4kh7>.
- Perez-Vincent, Santiago M., Ernesto Scharngrodsky, and Mauricio García Mejía. "Crime under Lockdown: The Impact of COVID-19 on Citizen Security in the City of Buenos Aires." *Criminology & Public Policy* 20, no. 3 (August 2021): 463–92.
<https://doi.org/10.1111/1745-9133.12555>.
- Piquero, Alex R., Jordan R. Riddell, Stephen A. Bishopp, Chelsey Narvey, Joan A. Reid, and Nicole Leeper Piquero. "Staying Home, Staying Safe? A Short-Term Analysis of COVID-19 on Dallas Domestic Violence." *American Journal of Criminal Justice* 45, no. 4 (August 2020): 601–35.
<https://doi.org/10.1007/s12103-020-09531-7>.
- Robert Agnew. "Building on the Foundation of General Strain Theory: Specifying the Types of Strain Most Likely to Lead to Crime and Delinquency." *Journal of Research in Crime and Delinquency* 36 (2001): 319–61.
- . *Juvenile Delinquency: Causes and Controls*. Los Angeles: Roxbury, 2005.
- . *Pressured into Crime*. Los Angeles, CA: Roxbury, 2006.
- Robert J Sampson and John H. Laub. *Crime in the Making*. Cambridge, MA: Harvard University Press, 1993.
- Sampson, Robert J., Stephen W. Raudenbush, and Felton Earls. "Neighborhoods and Violent Crime: A Multilevel Study of Collective Efficacy." *Science* 277, no. 5328 (August 15, 1997): 918–24.
<https://doi.org/10.1126/science.277.5328.918>.
- Shaw, C.R. and McKay, H.D. *Juvenile Delinquency and Urban Areas*. University of Chicago Press, 1942.
- Stack, Liam. "2,500 Mourners Jam a Hasidic Funeral, Creating a Flash Point for de Blasio." *The New York Times*, April 29, 2020.
<https://www.nytimes.com/2020/04/29/nyregion/coronavirus-jews-hasidic-de-blasio.html>.
- Stephen W. Baron. "General Strain Theory, Street Youth and Crime: A Test of Agnew's Revised Theory." *Criminology* 35 (2004): 409–34.
- Steven D. Levitt. "Understanding Why Crime Fell in the 1990s: Four Factors That Explain the Decline and Six That Do Not." *The Journal of Economic Perspectives* 18, no. 1 (2004): 163–90.
- Stogner, John, Bryan Lee Miller, and Kyle McLean. "Police Stress, Mental Health, and Resiliency during the COVID-19 Pandemic." *American Journal of Criminal Justice* 45, no. 4 (August 2020): 718–30.
<https://doi.org/10.1007/s12103-020-09548-y>.
- "The Most Significant Criminal Justice Policy Changes from the COVID-19 Pandemic." COVID-19 Responses. Prison Policy Initiative, April 1, 2022.
<https://www.prisonpolicy.org/virus/virusresponse.html>.
- Yang et. al. "The Impact of COVID-19 on Crime: A Spatial Temporal Analysis of Chicago." *International Journal of Geo-Information* 10, no. 3 (March 10, 2021).
- Zviedrite, Nicole, Jeffrey D. Hodis, Ferdous Jahan, Hongjiang Gao, and Amra Uzicanin. "COVID-19-Associated School Closures and Related Efforts to Sustain Education and Subsidized Meal Programs, United States, February 18–June 30, 2020." Edited by Sze Yan Liu. *PLOS ONE* 16, no. 9 (September 14, 2021): e0248925.
<https://doi.org/10.1371/journal.pone.0248925>.