Residential Time Spent and Homicide during the COVID-19 Pandemic

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Abstract: The United States has witnessed a significant upsurge in homicide rates during the COVID-19 pandemic (NCHS, 2021). While multiple theories attempt to account for this increase, our study examines the impact of changes in human mobility resulting from stay-at-home and social distancing measures on variations in homicide incidents. We conducted a fixed-effects Poisson regression analysis using panel data that encompasses the day of the week and week collected from Chicago between February 2020 and July 2021. Our findings indicate that the increased time spent in residential settings due to stay-at-home orders is not a significant factor in explaining the rise in homicide numbers. Instead, our study suggests that the pandemic as a whole and its influence on individual strains provide a more plausible explanation for the increase in homicide incidence.

Keywords: Homicide, COVID-19, stay-at-home orders, routine activity, Chicago.

INTRODUCTION

The COVID-19 pandemic has unprecedentedly changed the nature of daily routines and the formation of social interactions. From the early days of the pandemic in March 2020, local, state, and federal governments had taken a wide range of restrictions to mitigate the spread of the virus. These measures, including social distancing, travel restrictions, and closure of various businesses and recreational and educational facilities, have dramatically limited human mobility and kept most people physically isolated. While individuals followed stay-home orders and reduced in-person interactions, most business and educational activities moved to online platforms. These measures and changes in daily routines have affected the instances of crime and victimization (Griffith, 2020; Bradbury-Jones & Isham, 2020; Mohler *et al*., 2020; Payne *et al*., 2020; Payne *et al*., 2021).

While each type of crime has a unique nature and context, the effect of the pandemic on crime has varied across crime types and locations. While most less severe and instrumental crimes, such as shoplifting, theft, and battery, have decreased during the COVID-19 pandemic (Lopez & Rosenfeld, 2021; Estevez-Soto, 2021; Shayegh & Malpede, 2020), the United States experienced a considerable increase in homicide rates in 2020. According to the National Center for Health Statistics (2021), the homicide rate in the United States increased about 30% in 2020 during the pandemic compared to 2019. The homicide rate increased from 6.0 to 7.8 per 100,000 people, the highest homicide rate since 1995. In parallel with the National Center for Health Statistics numbers, the Federal Bureau of Investigation (2021)'s Uniform Crime Reporting Program recorded about a 22% increase in homicide numbers from 14,548 murders in 2019 to 17,815 murders in 2020. Analyzing homicide rates in 22 US cities, Rosenfeld and Lopez, (2020) identified sharp increases during the Summer of 2020.

What are the dynamics behind the rising homicide rates during the pandemic? This question has garnered attention from the public, practitioners, and researchers. Scholars (e.g., Abt *et al*., 2020) have made arguments that point out the potential effect of increasing strain (e.g., the deteriorating economic conditions, increasing mental health problems, the growing public unrest and protests against police violence in the wake of killing George Floyd), exhaustion in public safety services, and changes in individuals' daily routines. This study aims to examine to what extent changes in human mobility can explain the increasing trend of homicides during the pandemic.

Routine Activities and Crime

There is no doubt that the COVID-19 pandemic unprecedentedly changed urban life and significantly reduced human mobility. To limit the spread of COVID-19, which has proven to be highly contagious and cause severe illnesses, hospitalizations, and deaths, governments have imposed containment policies such as travel bans, curfews, lockdowns, or other less-restrictive policies to mitigate in-person interactions. Stay-at-home orders and lockdowns forced people to

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follow a drastically different daily routine. Some individuals willfully choose to self-isolate themselves and limit their social interactions regardless of the restrictions. Individuals spent more time in residential areas, and their presence in public spaces, workplaces, and transit locations decreased significantly.

The Routine Activity Theory, developed by Lawrence E. Cohen and Marcus Felson in 1979, emphasizes the importance of regular and routine behaviors in understanding crime patterns. Drawing upon the tenets of this theory, the convergence of three key elements, both temporally and spatially, is essential for the commission of a criminal act: a motivated offender, a vulnerable target, and a lack of effective guardianship to deter or thwart criminal activity. The potential for criminal incidents escalates when an offender and potential targets intersect in the absence of capable guardians who can deter or obstruct criminal actions effectively.

Cohen and Felson (1979) used Routine Activity Theory to explain the upsurge in urban crime during the 1960s. Crimes in urban areas persisted despite economic improvements and unemployment rate reductions. They argued that this rise in crime resulted from societal shifts during the post-World War II era. These shifts included changes in social structures and advancements in technology and the economy, which led people to spend more time away from home and their families. As a result, the three essential components for crime convergence were more likely to coincide in both time and space. Messner and Blau (1987) identified a significant correlation between increased time spent outside the home and higher rates of various crimes, including burglary, forcible rape, aggravated assault, robbery, and homicide. Specifically, a surge in outside leisure activities led to an increase in crime rates, while spending more time within households was associated with a decrease in crime rates.

Laub and Sampson (2003) argue that it is necessary to examine routine activities for a more comprehensive understanding of the link between employment and criminal behavior. They argue that individuals immersed in work are less likely to engage in troublesome activities, stating, "(t)he simple fact is that people who work are kept busy and are less likely to get into trouble" (p. 47). The time committed to work reduces the opportunities for engagement in criminal behaviors. Each additional hour spent at the workplace makes one less hour available for criminal activities outside the workplace (Apel & Horney, 2017). Crime or victimization takes place when the opportunity arises during a daily routine. Regardless of the extent of criminal intent in an average individual, a vulnerable person at a specific time and place may lack readily available assistance and guardianship, increasing the propensity of being an easy target for potential offenders (Lee, 2014).

Routine Activity Theory has also significant potential to offer a theoretical framework for explaining the impact of stay-at-home and lockdown policies on homicide cases in residential areas. Stay-at-home orders and adopting new daily routines within residential areas increased the time spent in person and interactions among household members. As nightclubs, pubs, and dine-in restaurants closed, people modified their drinking habits, moving alcohol consumption from public venues to private residential settings (Organization for Economic Co-operation and Development, 2022). While stay-at-home and lockdown orders increase the chances of motivated offenders and suitable targets converging at a time and place, these measures could also increase guardianship. With more people staying at home, there is the potential for enhanced informal surveillance and community cohesion, serving as a deterrent to potential offenders.

COVID-19 Pandemic and Crime

The COVID-19 pandemic has profoundly impacted every facet of daily life, affecting how people work, study, travel, shop, entertain, and socialize. As fewer individuals ventured to workplaces, retail establishments, and public spaces, and more people confined themselves to their homes, we anticipate that these significant alterations in routine activities have influenced the trends and patterns of homicides in cities.

Owing to the requirements of social distancing, mandatory lockdowns, and the closure of schools and businesses, the reduced time individuals spent outside their residential areas could potentially diminish the likelihood of violent encounters between potential targets and motivated offenders in non-residential settings. Conversely, it may also lead to a reduced presence of capable guardians in public spaces.

In their examination of stay-at-home restrictions on urban crime, Nivette *et al*. (2021) analyzed daily crime counts across 27 cities in 23 countries and observed a noticeable reduction in urban crime associated with

stay-at-home policies. However, significant variations were noted across cities, countries, and crime types. Campedelli *et al*. (2021) delved into the immediate impact of COVID-19 containment measures on crime trends in Los Angeles. Their findings suggest that enforcing interventions and social distancing measures predominantly influences less severe and instrumental crimes, such as shoplifting, theft, and battery. However, they noted no significant variations in more serious crimes, including vehicle theft, burglary, assault with a deadly weapon, intimate partner assault, and homicide. Similarly, Boman and Gallupe (2020) explored the effect of state-level mandatory stay-at-home orders by examining crime rates in the United States during the pre-pandemic year of 2019 and the post-pandemic year of 2020. They identified a decline in crime rates for minor offenses typically associated with peer groups. However, they observed that serious crimes, such as homicide and intimate partner violence (IPV), which typically do not involve co-offenders, either remained steady or increased during the COVID-19 lockdowns. Massenkoff and Chalfin (2022) examined the changes in human routines and mobility during the COVID-19 pandemic. Their findings revealed that social distancing measures and increased time spent indoors elevated the risk of individuals becoming victims of street robbery and assault by 15% and 30%, respectively.

It is important to note that a substantial proportion of homicides are perpetrated by offenders who are not strangers to their victims. According to the 2021 FBI's National Incident-Based Reporting System (NIBRS), a significant majority of homicides involved acquaintances of the victims, accounting for 76% in cases of female victims and 56% in cases of male victims (Bureau of Justice Statistics, 2022). Working, studying, and socializing from home may create situations where victims find themselves confined with potential offenders during strenuous times without external interference or support (Piquero *et al*., 2020). Literature emerging since the onset of the COVID-19 pandemic indicates a surge in domestic violence cases and arrests in its early days. Piquero *et al*. (2020) analyzed domestic violence in Dallas following the implementation of stay-at-home orders. They discovered that the initial two weeks of lockdowns led to a sharp increase in domestic violence calls. This increase can be theorized as a result of stay-at-home orders intensifying negative strain and stress, leading to more time spent with the abuser and a lack of capable guardians. Lockdowns severed external interventions, making it challenging for victims to reach out to programs or trusted individuals for help, reflecting a deficit in capable guardians (Piquero *et al*., 2020). Moreover, lockdowns distanced many individuals from their support systems, forcing them to remain in potentially unsafe environments, further exacerbating stress and strain.

However, in their survey study encompassing 30 countries, Campbell *et al*. (2023) found that the implementation of lockdowns and social distancing policies led to some level of reduction in the instances of intimate partner violence (IPV). Participants reported a decrease in physical and sexual IPV after the imposition of pandemic-related restrictions compared to the period before the restrictions (7.0% vs. 9.2%), underscoring the potential impact of these measures on diminishing IPV cases.

Several studies have reported increased rates of domestic violence in various major U.S. cities and worldwide when stay-at-home and quarantine orders were implemented (Boserup *et al*., 2020). For instance, Portland witnessed a 22% surge in domestic violence arrests, while the NYPD reported a 10% increase in domestic violence reports from March 2019 to March 2020. Similar trends were observed in Jefferson County, Alabama, which reported a 27% increase in domestic violence calls over the same period. International cities also exhibited parallel trends (Boserup *et al*., 2020).

Another way to explain the pandemic's role in the surge of homicide incidents is through Agnew's (1992) General Strain theory. This theory suggests that crime is an outcome of negative strains, which can be categorized into three primary types: the actual or anticipated failure to attain personal goals, the removal of positive influences or stimuli, and the presence of negative influences or stimuli. The COVID-19 pandemic led, for many people, to increased pressure and concerns related to health, job security, and other social pressures and isolation. Many of these challenges fall into at least one of these strain categories (Gibson *et al*., 2001).

As a result of the surge in COVID-19 cases, along with increasing financial hardships, including rising unemployment, limited housing availability, poverty, and delays in social services, Chicago residents have faced additional challenges. Approximately 18% of Chicago residents live below the poverty line (United States Census Bureau, 2019), and the COVID-19 pandemic has exacerbated economic and financial uncertainties for these families. Individuals enduring

these unprecedented hardships, coupled with experiencing negative emotions like anger, frustration, and depression, may resort to violence as a means of coping with their overwhelming strains (Anderson, 2000).

On the other hand, social distancing and lockdown policies forced many people into limited social interaction and isolated environments for an extended period. This confinement can trigger feelings of stress and frustration, potentially increasing emotional tension and leading to violent reactions. Additionally, the financial strain resulting from a lack of productive activities may contribute to increased pressure, further escalating the potential for domestic violence (Mannon, 1997).

Given the upsurge in homicide incidents during the pandemic, it is imperative to examine the extent to which time spent in residential areas accounts for variations in the frequency of homicide incidents in both residential and non-residential settings.

Research Context

On March 13th, 2020, then-President of the United States, Donald Trump, declared a state of emergency concerning the significant public health risk of the COVID-19 pandemic. This date also coincides with the period when Chicago residents started to experience deaths from COVID-19. During the early days of the pandemic, the Illinois governor announced the first COVID-19-related statewide stay-at-home order, effective from March 21st, 2020. To prevent the spread of the disease, residents were asked to stay at their residences unless they were engaged in essential activities, such as going to hospitals, pharmacies, and groceries. Like in most U.S. cities, Chicago residents were not able to go to bars or nightclubs and socialize in public and private group activities. Chicago's public transit system has kept running with precautions to keep social distancing and provide trips to essential workers, such as those who work in medical centers, pharmacies, and grocery stores.

While Chicago residents, like many other U.S. residents, went through strict stay-at-home orders and distanced themselves socially, Chicago experienced a significant increase in homicide numbers in 2020. The total number of homicides increased from 505 to 791 between 2019 and 2020, according to the data from the Chicago Police Department (2021)'s Citizen Law Enforcement Analysis and Reporting (CLEAR) system. Domestic homicide numbers increased by 80% from 31 to 56 between 2019 and 2020 in Chicago. While the momentum cooled down in 2021, the CLEAR system recorded 452 homicides in the first six months of 2021. As the lockdowns, stay-at-home orders, and other social distancing measurements pushed people to go through abrupt changes in daily routines, it is worth examining to what extent changes in time spent in residential places can explain the variation in the homicide rates. Thus, we posit the following hypotheses:

Hypothesis 1: The higher the time spent in residential places, the lower the number of overall homicide incidents.

Hypothesis 2: The higher the time spent in residences, the lower the number of homicides in non-residential areas.

Hypothesis 3: There is an association between the time spent in residences and the frequency of homicide incidents in residential areas.

DATA & METHODOLOGY

We used multiple data sources to examine the research question. We used data from the Chicago Data Portal to obtain information on homicide incidents. The data includes the "willful (non-negligent) killing of one human being by another" (Chicago Police Department, 2022). These "murder and non-negligent manslaughter incidents" are based on reported incidents that occurred in the City of Chicago. The dataset includes detailed information on homicide incidents, including date, time, and location types. Based on the location description from the dataset, we identified homicide incidents that took place in "apartments," "houses," "residential driveways, porches, yards, hallways, stairwells, and garages," and "nursing and retirement homes" as homicides in residential places. So, homicides in non-residential places include those in workplaces, streets, sidewalks, schools, bars, restaurants, nightclubs, and shops.

For the information on daily changes in residential presence, we used county and day-level Google Community Mobility Report,[1] based on the location history of Google users who have turned on the location history setting.[2] Since the City of Chicago is a

[1]https://www.google.com/covid19/mobility/

[2]Individuals who turned on the Location History can turn it off and delete

part of Cook County (Illinois), we used the human mobility information for Cook County as a proxy to measure daily human mobility in residential places for the City of Chicago.

The Google Community Mobility Report analyzes human mobility in residential areas based on recorded percent changes in visits and length of stay at residential places, comparing these metrics to a baseline specific to each day of the week. The baseline for each day is the median value from the 5-week period of January 3 to February 6, 2020, in Cook County, resulting in distinct values representing a 'normal value' for each day of the week. The percentage change in residential mobility is calculated by comparing human mobility with the baseline value for the given day, yielding different percent change values for each day of the week. Notably, the same level of human presence in residential areas on two different weekdays can exhibit varying percentage changes. The study period spans from February 15, 2020, to July 3, 2021. Human mobility information in the Google Community Mobility Report was available since February 15, 2020.

The pandemic coincided with the killing of George Floyd and the following peaceful and violent protests all over the country as a reaction to many police killings of unarmed African American people. During these protests, many cities, including Chicago, experienced increased violent confrontations (Cassell, 2020). Between May 29 and June 4, Chicago witnessed a spike in violence, resulting in 44 fatalities and 157 individuals sustaining gunshot injuries, as indicated by data from police and medical examiner records. On a single day, May 31, 2020, Chicago experienced 19 homicides. Concurrently, approximately 2,100 businesses suffered damage or were ransacked during the unrest. As law enforcement grappled to control the protests, specific street gangs, including Latin King Members, intervened, providing protection to particular neighborhoods such as the Southwest Side and Far Southeast Side. This circumstance led to several drive-by shootings from rivals of the Latin King members (Chicago Tribune, 2021).

The notable increase in homicides and shootings during this period cannot be solely attributed to the protests themselves; instead, it was exacerbated by an insufficient police presence and response to the incidents, resulting in a decline in proactive policing. The inadequate police guardianship, coupled with an escalation in looting incidents, led to more violent and deadly confrontations between rival gangs (Cassell, 2020).

To control the potential confounding effect of these protests on the relationship between human mobility and homicides, we used the frequency of violent protests that took place in the City of Chicago. We included information from the Armed Conflict Location & Event Data Project (ACLED), which provides incident-level information about violent protests related to Black Lives Matter and COVID-19. We transformed the incident-level information into day-level aggregate data and combined it with our master data on homicides and residential mobility in the City of Chicago.

The COVID-19 pandemic has brought numerous unprecedented challenges and strains for people and changes in their daily routines. Experiencing the pandemic could correlate with the outcome variable (daily frequency of homicides) and our explanatory variable (time spent in residential areas). We generated a dichotomous variable to distinguish the pandemic from the pre-pandemic period to control our model and minimize the threat of confounding factors. We take March 13, 2020, as the beginning day of the pandemic when then-President Trump declared a state of emergency for the United States. This date also overlaps with the period when Chicago residents started to experience deaths from COVID-19 (Senese, 2021).

We used the fixed-effect Poisson regression model, given that we were modeling a count variable (homicide numbers) while considering the potential correlation of certain aspects related to weekdays with the impact of residential time spent and homicide numbers. The Poisson model is suitable for dependent variables measured at the count level, with a minimum value of 0. This makes it well-suited for distributions with a mean or most typical value close to 0. Additionally, the Poisson model is inherently rightly skewed, making it suitable for counts of infrequent homicide occurrences (Lord *et al*., 2013). We assumed the existence of a correlation between the error term for each day and predictor variables. We compared the human mobility value for each day of the week with the baseline human mobility value for the same day.

Location History data directly from their timeline.

Panel data was generated, covering the days of the week (Sunday to Saturday) and weeks (Week1 to Week76). By incorporating day and week-fixed effects, we could assess the net impact of changes in residential mobility on homicides in both residential and non-residential areas. This modeling approach aids in interpreting findings, as estimations are made within specific days and across time (week) effects. To address potential correlations between errors and weekdays, we clustered standard errors at the day of the week. Furthermore, we included daily lagged variables for the dependent variables in the models to control for any potential serial correlation between the error terms of the dependent variable. Using panel data enabled us to control for regression models with fixed effects for the day of the week, week, and year, addressing unobserved heterogeneity over time. As part of our robustness check, we aggregated the data at the weekly level and conducted a Poisson regression analysis to examine homicide numbers.

An alternative to the Poisson model could be the negative binomial model, which is suitable for count-level data that displays overdispersion, where the variance of the dependent variable is larger than the mean. This model introduces an extra parameter compared to the Poisson model to address overdispersion. However, estimating additional parameters in situations with limited data can lead to overparameterization, potentially resulting in unstable or inefficient parameter estimates. While the negative binomial model may be more intricate to interpret than simpler models like the Poisson model, its usefulness depends on the presence of overdispersion. Without overdispersion, there may be no advantage in using the negative binomial model over the Poisson model (Cameron & Trivedi, 2013; Hilbe, 2014).

RESULTS

Chicago experienced a 57% increase in homicide numbers between 2019 and 2020, resulting in 286 more homicide incidents (as shown in Table **1**). When

Table 1: Tabulation of Homicides by Month and Year in Chicago

Month	Years			
	2019	**2020**	**2021**	**Total**
1	23	36	54	113
	20.35	31.86	47.79	100.00
2	25	38	38	101
	24.75	37.62	37.62	100.00
3	36	29	45	110
	32.73	26.36	40.91	100.00
4	60	62	54	176
	34.09	35.23	30.68	100.00
5	55	86	66	207
	26.57	41.55	31.88	100.00
6	52	94	85	231
	22.51	40.69	36.80	100.00
7	44	111	110	265
	16.60	41.89	41.51	100.00
8	51	67		118
	43.22	56.78		100.00
9	51	82		133
	38.35	61.65		100.00
10	40	68		108
	37.04	62.96		100.00
11	34	63		97
	35.05	64.95		100.00
12	34	55		89
	38.20	61.80		100.00
Total	**505**	**791**	**452**	**1748**
	28.89	**45.25**	**25.86**	**100.00**

Note: The first row has *frequencies,* and the second row has *row percentages.*

we compare the first seven months of data for the year 2021 with the same period of the year 2020, we observe that the frequency of homicides in 2021 is close to that of 2020, with only four homicides less. Homicides in residential places make up about 14% of all homicide incidents committed in Chicago during the study period.

The month-by-month comparison between 2019 and 2020 shows that even before the pandemic, the homicide numbers in January and February 2020 were about 50% higher over the same period in 2019. However, compared to March 2019, Chicago experienced a 19% reduction in homicide numbers in March 2020, when the pandemic kicked in.

The numbers for April and May show a 29% increase between 2019 and 2020. For the Summer season, June through August, we observe an 85.2% increase in homicide numbers compared to the previous year. This increase happened during the social unrest and nationwide protests in the aftermath of the killing of George Floyd in May 2020. For the rest of 2020, from September through December, homicide numbers were 30% higher than in 2019.

Following the COVID-19 restrictions and the stay-home order (as illustrated in Figure **1**), we observed that human mobility in residential places increased by 25%. During the 18-month period (from Feb 2020 to July 2021), the percent change in residential mobility varies between -4% and 30%. The figure shows that people spend relatively less time in residential areas during summer days compared to winter days. There is heterogeneity in residential mobility across the duration of the pandemic and stay-at-home orders. People spent less time in their residences as the restrictions were relaxed and the weather got warmer. To capture the nuanced differences in routine activity, it is critical to calculate human mobility at the day level without aggregating residential mobility to a month level or a binary variable (pre- vs. post-pandemic).

Table **2** reports the results of the fixed effect Poisson Regression models for three outcomes: homicides in general, homicides in non-residential places, and homicides in residential places. The table reports the incident rate ratios and represents each model's exponentiated form of the regression coefficients. An incident rate ratio less than 1 is interpreted as a negative impact of the variable on the dependent variable, while an incident rate ratio greater than 1 is interpreted as a positive effect on the predictor variable.

The first model examines the frequency of homicides in general and suggests a statistically significant and negative relationship between time spent at home and daily homicide incidents, supporting Hypothesis 1. In specific, a one percentage point increase from the baseline value of time spent in residential places decreases the daily count of homicides by 4%.

The second model examines the frequency of homicides in non-residential places. The finding suggests a statistically significant and negative relationship between the time spent in residences and homicide incidents in non-residential places, supporting Hypothesis 2. In specific, a one percentage point

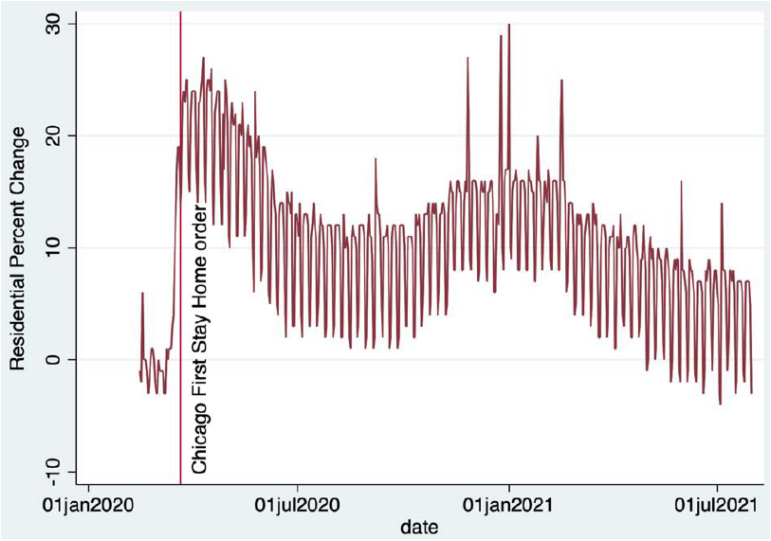

Figure 1: Percentage change in residential mobility change compared to the baseline value.

Table 2: Fixed Effect Poisson Regression Results at Day Level

	Homicides		
	General	**Non-Residential Places**	**Residential Places**
Presence in residence	.96***	.967***	.915***
	(.007)	(.008)	(.023)
Violent Protests	1.97***	2.089***	1.51
	(.357)	(.365)	(.367)
Pandemic	3.293***	2.943***	6.713***
	(.746)	(.738)	(3.94)
L. General	1.04*		
	(.018)		
L. Non-residential		1.065***	
		(.016)	
L. Residential			.703*
			(.111)
Observations	524	524	524
Day Fixed Effect	YES	YES	YES
Week Fixed Effect	YES	YES	YES
Year Fixed Effect	YES	YES	YES

Odds ratios and Standard errors (in parentheses).
***p<.005, **p<.01, *p<.05.

increase in time spent at home from the baseline value decreases the daily count of homicides in non-residential places by 3.3%.

The third model, examining the association between time spent and homicide in residential places, suggests a statistically significant relationship. We found that when people spend more time in their residential places, the frequency of homicides in residential places goes down. In specific, a one percentage point increase in time spent at home decreases the daily counts of homicides in residential places by 8.5%. Our robustness check with month-level Poisson regression analysis (Table **3**) provides similar findings that suggest

Table 3: Poisson Regression Results at Month Level

	Homicides		
	General	**Non-residential**	**Residential**
Residential Presence	.985*	.987*	.957*
	(.007)	(.007)	(.019)
Violent Protests	1.258***	1.319***	.928
	(.052)	(.054)	(.204)
Pandemic	1.753*	1.658*	3.858*
	(.22)	(.232)	(.643)
L. General	1.024***		
	(.004)		
L. Non-residential		1.027***	
		(.005)	
L. Residential			1.026
			(.047)
Observations	76	76	76

Odds Ratios and Standard errors (in parentheses).
***p<.005, **p<.01, *p<.05.

a significant and negative association between time spent in residential places and the frequency of homicides.

DISCUSSION

Stay-at-home orders and lockdown policies have brought about significant changes in the routine of daily lives, resulting in an increased number of people staying indoors and decreased interactions with those outside the home. Our findings overall suggest that spending more time in residential places is associated with a lower number of incidences of homicides in residential and non-residential areas. Lockdown policies disassociated suitable targets and potential offenders in space and time, reducing the chances of homicide incidents outside of residential areas. On the other hand, spending more time in residential places did not increase the risk of homicides in residential areas. The increased interaction of suitable targets and motivated offenders in residential areas during social distancing policies might be offset by the increased guardianship resulting from more people being in a home setting, thereby reducing the opportunity for violent confrontations during the pandemic.

Then, if spending more time in residential places is associated with a lower number of homicides, how can we explain the significant increase in homicide incidents during the pandemic in 2020 and 2021 in the United States and the City of Chicago, in particular?

Our research suggests that increased time spent in residential places itself did not lead to an increase in homicides in Chicago. However, the pandemic era, as a whole, had a significant impact on homicide rates. The pandemic variable, which distinguishes between the pre-pandemic and pandemic periods, is strongly associated with the frequency of residential and non-residential homicides.

One way to explain the pandemic's role in the surge of homicide incidents can be found through the perspective of Agnew's (1992) General Strain theory. For many individuals, the COVID-19 pandemic engendered substantial pressure, spanning concerns from health and job security to social stresses. The abrupt disruptions in people's daily routines, coupled with the economic, social, and health-related ramifications of the pandemic, have introduced heightened uncertainties and elevated the levels of strain experienced by individuals. The fear and anxiety stemming from adverse economic consequences, coupled with the surge in unemployment rates, have significantly exacerbated the prevalence of mental health issues. These conditions encompass anxiety, depression, trauma, and substance use disorders. Individuals might resort to violence as a coping mechanism to deal with the strains associated with these challenges.

Another potential source of strain during the early days of the pandemic was the public outcry and unrest against police violence in the wake of the killing of George Floyd by a Minneapolis police officer. There have been several protests all over the country during the 2020 Summer; some of them turned out to be violent riots and lootings in many cities, including the city of Chicago. A 2020 Gallup Survey conducted in the aftermath of the killing of George Floyd revealed that public trust in American police dipped down to its lowest level since 1993 (Jones, 2021). Only 19% of African Americans reported confidence in the police, and 88% demanded major reforms.

The pandemic has brought a range of unprecedented difficulties for police officers and their day-to-day duties. Police officers are among the occupations with a high risk of COVID-19 exposure when they maintain their services in the communities. Being exposed to a range of COVID-19 -related health problems, the size of law enforcement forces and their operational and organizational capacities were significantly reduced. The COVID-19 infections and illnesses have affected absenteeism and the number of police officers on duty. For example, in the early days of the pandemic (March 30, 2020), about 6% of the CPD officers were on sick leave. Fewer staff were on duty due to quarantine measures. Following social distancing guidelines, police officers minimized face-to-face interaction and maintained physical distancing during their duties (Jennings & Perez, 2020). To mitigate the circumstances that can jeopardize public health conditions, police departments reduced the number of custodial arrests and use of force cases (Chung *et al*., 2020).

While dealing with the direct impact of COVID-19 on police officers, the pandemic has brought new public responsibilities and duties for police departments. Police departments had the responsibility to enforce COVID-19 related regulations and have adjusted their service to enforce stay-at-home orders, business closures, and social distancing measures. These unplanned additional responsibilities and unprecedented health concerns have added

tremendous pressures and stressors over police officers, which might negatively affect proactive and preventive law enforcement activities. These other responsibilities, along with the fewer police officers on duty, exhausted police departments' resources and undermined proactive policing activities, especially in high-crime-risk areas (Abt *et al*., 2020). Police departments overwhelmed with additional responsibilities delayed their crime prevention efforts and enforcement of lower-level offenses. For example, the Chicago Police Department reduced traffic and pedestrian stops and limited the number of arrests unless there was a "clear and present danger of imminent physical harm" (Smith, 2020).

Our study is not without caveats. Google Community Mobility Reports (CMRs) data have specific constraints that necessitate careful consideration during interpretation and utilization. Since the Google CMRs provide human mobility information at the county and day level, we could not analyze the effect of human mobility in smaller time frames and geographical units, such as neighborhoods and street blocks. Google's mobility data predominantly originates from users who have activated location history on their devices, introducing a potential bias that may not accurately reflect the diversity of the entire population. This sampling bias poses a risk of underrepresenting certain demographic segments, including older adults or individuals with limited technology access.

We lacked some details on victim and offender relationships and spatial aspects. If further data were available, we could explore different mechanisms behind the increasing number of homicide incidents. For example, distinguishing nighttime from daytime in the analysis would provide a more nuanced analysis of routine activities.

Overall, examining human mobility can help to a better understanding of homicide risks and use our limited resources more effectively by focusing on social services and strategic deployment of police officers during the crisis. While spending more time in residences reduces the incidences of homicides in residential and non-residential places, to curb the increasing trend of homicide numbers, researchers and policymakers should focus on the overall impact of the pandemic that increases individual strains, hinders public safety measures, and deteriorates police and community relations, which may ultimately lead to an increase in homicide incidences.

REFERENCES

Abt, T., Rosenfeld, R., & Lopez, E. (2020). COVID-19 and homicide: final report to Arnold Ventures. Arnold Ventures

Agnew, R. (1992). Foundation for a general strain theory of crime and delinquency. Criminology, 30(1), 47-88. https://doi.org/10.1111/j.1745-9125.1992.tb01093.x

Anderson, E. (2000). Code of the street: Decency, violence, and the moral life of the inner city. WW Norton & Company.

Apel, R., & Horney, J. (2017). How and why does work matter? Employment conditions, routine activities, and crime among adult male offenders. Criminology, 55(2), 307-343. https://doi.org/10.1111/1745-9125.12134

Boman, J. H., & Gallupe, O. (2020). Has COVID-19 changed crime? Crime rates in the United States during the pandemic. American journal of criminal justice, 45, 537-545. https://doi.org/10.1007/s12103-020-09551-3

Boserup, B., McKenney, M., & Elkbuli, A. (2020). Alarming trends in US domestic violence during the COVID-19 pandemic. The American journal of emergency medicine, 38(12), 2753-2755. https://doi.org/10.1016/j.ajem.2020.04.077

Bradbury-Jones, C., & Isham, L. (2020). The pandemic paradox: The consequences of COVID-19 on domestic violence. Journal of clinical nursing. https://doi.org/10.1111/jocn.15296

Bureau of Justice Statistics. (2022). Female Murder Victims and Victim-Offender Relationship, 2021 (Report No. NCJ 305613). U.S. Department of Justice. https://bjs.ojp.gov/female-murder-victims-and-victim-offender-relationship-2021

Cameron, A. C., & Trivedi, P. K. (2013). Regression analysis of count data (Vol. 53). Cambridge University Press. https://doi.org/10.1017/CBO9781139013567

Campedelli, G. M., Aziani, A., & Favarin, S. (2021). 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(5), 704-727. https://doi.org/10.1007/s12103-020-09578-6

Cassell, P. G. (2020). Explaining the recent homicide spikes in US cities: The "Minneapolis Effect" and the decline in proactive policing. Federal Sentencing Reporter, 33(1-2), 83-127. https://doi.org/10.1525/fsr.2020.33.1-2.83

Chicago Police Department (2021) Citizen Law Enforcement Analysis and Reporting Map (CLEARmap) Application. Retrieved from: https://data.cityofchicago.org/Public-Safety/Homicides/iyvd-p5ga

Chicago Tribune. (2021, June 2). Looting and unrest in Chicago in 2020: Damage, fallout and community response after the killing of George Floyd by police. https://www.chicagotribune.com/investigations/ct-chicago-2020-looting-unrest-damage-george-floyd-police-killing-20210602-olbvgmfylna3jarumzonp5zkqe-htmlstory.html

Chung, E., Pearl, B., & Hunter, L. (2020, April 14) Policing During the Pandemic. American Progress. Retrieved from: https://www.americanprogress.org/article/policing-coronavirus-pandemic/

Cohen, L. E., & Felson, M. (1979). Social change and crime rate trends: A routine activity approach. American sociological review, 588-608. https://doi.org/10.2307/2094589

Estévez-Soto, P. R. (2021). Crime and COVID-19: Effect of changes in routine activities in Mexico City. Crime Science, 10(1), 1-17. https://doi.org/10.1186/s40163-021-00151-y

Federal Bureau of Investigation (2021) Uniform Crime Reporting Program. U.S. Department of Justice. Retrieved from:https://crime-data-explorer.app.cloud.gov/pages/explorer/crime/shr

Hilbe, J. M. (2014). Modeling count data. Cambridge University Press. https://doi.org/10.1017/CBO9781139236065

Jennings, W. G., & Perez, N. M. (2020). The immediate impact of COVID-19 on law enforcement in the United States. American journal of criminal justice, 45, 690-701. https://doi.org/10.1007/s12103-020-09536-2

Jones J. M. (2021) In U.S., Black Confidence in Police Recovers from 2020 Low. Gallup Survey. Retrieved from: https://news.gallup.com/poll/352304/black-confidence-police-recovers-2020-low.aspx

Gibson, C. L., Swatt, M. L., & Jolicoeur, J. R. (2001). Assessing the generality of general strain theory: The relationship among occupational stress experienced by male police officers and domestic forms of violence. Journal of Crime and Justice, 24(2), 29-57. https://doi.org/10.1080/0735648X.2001.9721133

Griffith, A. K. (2020). Parental burnout and child maltreatment during the COVID-19 pandemic. Journal of family violence, 1-7. https://doi.org/10.1007/s10896-020-00172-2

Laub, J. H., & Sampson, R. J. (2003). Shared beginnings, divergent lives: Delinquent boys to age 70. Harvard University Press. https://doi.org/10.4159/9780674039971

Lee, J. (2014). Routine activities and crime. The Encyclopedia of Criminology and Criminal Justice, 1-5. https://doi.org/10.1002/9781118517383.wbeccj235

Lopez, E., & Rosenfeld, R. (2021). Crime, quarantine, and the US coronavirus pandemic. Criminology & Public Policy. https://doi.org/10.1111/1745-9133.12557

Lord, D., Park, B. J., & Levine, N. (2013). Poisson regression modeling. CrimeStat IV: A spatial statistics program for the analysis of crime incident locations.

Mannon, J. M. (1997). Domestic and intimate violence: An application of routine activities theory. Aggression and Violent Behavior, 2(1), 9-24. https://doi.org/10.1016/S1359-1789(96)00023-7

Massenkoff, M., & Chalfin, A. (2022). Activity-adjusted crime rates show that public safety worsened in 2020. Proceedings of the National Academy of Sciences, 119(46), e2208598119. https://doi.org/10.1073/pnas.2208598119

Messner, S. F., & Blau, J. R. (1987). Routine leisure activities and rates of crime: A macro-level analysis. Social forces, 65(4), 1035-1052. https://doi.org/10.2307/2579022

Mohler, G., Bertozzi, A. L., Carter, J., Short, M. B., Sledge, D., Tita, G. E., & Brantingham, P. J. (2020). Impact of social distancing during COVID-19 pandemic on crime in Los Angeles and Indianapolis. Journal of Criminal Justice, 68, 101692. https://doi.org/10.1016/j.jcrimjus.2020.101692

National Center for Health Statistics (2021) National Vital Statistics System:Quarterly Provisional Estimates. U.S. Department of Health & Human Services. Retrieved from: https://www.cdc.gov/nchs/nvss/vsrr/mortality-dashboard.htm

Nivette, A. E., Zahnow, R., Aguilar, R., Ahven, A., Amram, S., Ariel, B., ... & Eisner, M. P. (2021). A global analysis of the impact of COVID-19 stay-at-home restrictions on crime. Nature Human Behaviour, 1-10. https://doi.org/10.1038/s41562-021-01139-z

Organization for Economic Co-operation and Development (2022) The effect of COVID-19 on alcohol consumption, and policy responses to prevent harmful alcohol consumption. OECD Policy Responses to Coronavirus (COVI-19) Retrieved from: https://www.oecd.org/coronavirus/policy-responses/the-effect-of-covid-19-on-alcohol-consumption-and-policy-responses-to-prevent-harmful-alcohol-consumption-53890024/

Payne, J. L., Morgan, A. & Piquero, A. R. (2020) COVID-19 and social distancing measures in Queensland, Australia, are associated with short-term decreases in recorded violent crime. J. Exp. Criminol. https://doi.org/10.1007/s11292-020-09441-y

Payne, J. L., Morgan, A., & Piquero, A. R. (2021). Exploring regional variability in the short-term impact of COVID-19 on property crime in Queensland, Australia. Crime Science, 10(1), 1-20. https://doi.org/10.1186/s40163-020-00136-3

Piquero, A. R., Riddell, J. R., Bishopp, S. A., Narvey, C., Reid, J. A., & Piquero, N. L. (2020). Staying home, staying safe? A short-term analysis of COVID-19 on Dallas domestic violence. American Journal of Criminal Justice, 45(4), 601-635. https://doi.org/10.1007/s12103-020-09531-7

Rengert, G. F. (2004). Journey to Crime (From Punishment, Places and Perpetrators: Developments in Criminology and Criminal Justice Research, P 169-181, 2004, Gerben Bruinsma, Henk Elffers, *et al*., eds.--See NCJ-206450).

Rosenfeld, R., & Lopez, E. (2020). Pandemic, social unrest, and crime in US cities. Council on Criminal Justice. https://doi.org/10.1525/fsr.2020.33.1-2.72

Senese, K. (2021, Mar 11). 'March 12, 2020: The day the devastating effects of the COVID crisis were first seen in Cook County. Chicago Sun Times. Retrieved from: https://chicago.suntimes.com/coronavirus/2021/3/11/22314785/covid-19-coronavirus-pandemic-anniversary-john-laplante-charles-dungill-medical-examiner-cook-county

Shayegh, S. & Malpede, M. (2020) Staying home saves lives, really! https://doi.org/10.2139/ssrn.3567394

Smith, P. (2020, March 25). Chicago Police are Reducing stops during COVID-19. Activists want even fewer. NPR Retrieved from: https://www.npr.org/local/309/2020/03/25/821358187/chicago-police-are-reducing-stops-during-c-o-v-i-d-19-activists-want-even-fewer

United States Census Bureau (2019) Quickfacts. Retrieved from: https://www.census.gov/quickfacts/fact/table/chicagocityillinois/PST120219

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