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Papers

Impacts of Social Isolation Resulting from the Covid-19 Pandemic on Urban Crime in Belo Horizonte, Minas Gerais - Brazil

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Abstract
The objective of this study is to analyze the impacts of social distancing measures on the behavior of criminality in Belo Horizonte, Minas Gerais – Brazil, especially the one related to property crimes (theft, robbery and extortion). The criminal statistics for the period from March 18 to July 25, 2020 (the period of social distancing decreed by the Municipality of Belo Horizonte) were compared with the 2019 records. The flexibilization of social distancing measures period was also scrutinized, 25th of July to 24th of September. As a parameter of community mobility, data provided by Google® were used. The results indicate a lower number of crimes, with an average reduction of 34% between 2019 and 2020, 36% during the social distancing period; and 25% during the flexibilization of restrictive measures. The temporal distribution of events follows the pattern of the period without social distancing, both by day of the week and by time period. There was also a reduction in community mobility in places of commerce (retail), leisure and parks, concomitant with the reduction in crime. The spatial distribution of events maintains the same spatial pattern of the period without social distancing, being influenced by crime attractors, according to land use and occupation. There was a correlation between the concentration of certain urban equipment and the concentration of crimes in both periods. The influence of social mobility ton places of commerce/leisure and parks corroborates Routine Activities and Crime Pattern theories, as well as the distribution of facilities that make up the urban landscape.

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INTRODUCTION

COVID-19 pandemic started in Wuhan, China, between November and December 2019, quickly spreading among several areas around the world. In Brazil, the first case was confirmed on February 26, 2020 in São Paulo and since then the virus has spread through all Brazilian municipalities, being considered the biggest sanitary tragedy in the country's history.

In response to the challenges imposed by the COVID-19 pandemic, several countries have adopted social distancing measures at different levels and modalities. Decree No. 356, from the Ministry of Health, of March 11, 2020, has disciplined initiatives to be adopted for the virus epidemic combat in the country, with special attention to social distancing and quarantine. The referred norm established that such distancing "[...] aims at separating individuals with or without symptoms, under clinical and laboratorial investigation, so as to avoid the spread of the infection and local transmission" (BRAZIL, 2020a), which should only be adopted by medical prescription. The quarantine, on the other hand, aims at "[...] guaranteeing the maintenance of health services at a certain and determined spot" (BRAZIL, 2020a), is recommended when the occupation of Intensive Cure Unit (ICU) beds reaches 80% of its mobilized capacity in response to COVID-19 (BRAZIL, 2020b).

However, the Full Bench of the Supremo Tribunal Federal (STF), which is the Federal Supreme Court of Brazil unanimously decided on April 15, 2020 that the measures adopted by the Federal Government for facing the epidemic do not rule out the concurrent competence, or the taking of normative and administrative measures by the states, the Distrito Federal, wich is the district of the brazilian capital and the municipalities.

Consequently, Brazilian states used specific terms to refer to social distancing measures. In Minas Gerais, for example, Decree No. 47,886, of March 15, 2020, established "measures to prevent contagion and to face and contingency" of the epidemic, while Decree No. 47,891, of March 20, 2020, recognized the state of public calamity. State regulations listed the segments of the economy that could not function, such as shopping malls, nightclubs and cultural centers, and those that should operate normally, such as waste collection, supermarkets, gas stations and drugstores. Failure to comply with these measures could result in an administrative sanction, such as a fine, or even imprisonment in some cases.

At the municipal level, these regulations also had their own contours. In Belo Horizonte, Minas Gerais - Brazil, Decree No. 17,297, of March 17, 2020 (BELO HORIZONTE, 2020a) declared an abnormal situation, characterized as a Public Health Emergency Situation, due to the need for actions to contain the spread of viral infection, as well as to preserve the health of the population against COVID-19. Since the beginning of the pandemic, the Municipality of Belo Horizonte has amended the decree that determined the closure of non-essential activities several times (Decree nº 17,298, of March 17, 2020) (BELO HORIZONTE, 2020b; 2020c; 2020d), aiming at minimizing the displacement and agglomeration of people in the city, as well as ensuring the gradual reopening of activities (BELO HORIZONTE, 2020l; 2020m; 2020n; 2020o; 2020p).

The imposition of social distancing measures caused several changes in the social life of the communities where they are implemented, as they radically reduce the number of people in circulation; determined telework or home-office work activities; decrease economic activity due to the closure of several production and service establishments, which, in turn, leads to a decrease in wages and an increase in unemployment.

Given this scenario, what is the impact on criminal incidence resulting from the restriction on the displacement of people and the closing of commercial activities and service providers in Belo Horizonte, Minas Gerais - Brazil during the period of social distancing resulting from the COVID-19 Pandemic? In order to answer that question, the objective of this study is to analyze the impacts of social distancing measures on the behavior of property crimes in the city, from the comparison of criminal records between 2019 and 2020.

Criminological studies (BRANTINGHAM; BRANTINGHAM, 1981; 1984, 1984; BURSIK, 1988) have proven the existence of spatial patterns in the commission of crimes. Crimes, offenders and victims follow space-time patterns of their distribution and areas of action. In Belo Horizonte, Minas Gerais – Brazil, the object of the present study, it is no different, given that 48% of its area concentrates 90% of crimes, according to statistics from the Polícia Militar de Minas Gerais (Military Police of Minas Gerais State) (FARIA et al., 2018).

Faria et al. (2018), in a study on the occurrence of crime in Belo Horizonte, Minas Gerais - Brazil and its correlation with the criminal incidence of theft in urban spaces, found that there is a spatial dependence between theft events and some urban facilities,

such as commercial establishments and banking institutions. According to survey data, 72% of theft crimes occurred at a point within 100 meters of some commerce; 95% up to 250 meters; and 99% of the events took place within 500 meters of a commercial establishment.

Nevertheless, we sought to investigate the impacts in terms of space-time distribution of criminal events at the time when health protection measures defined changes in the social pattern of urban life. To this end, a comparative analysis of property crimes in Belo Horizonte, Minas Gerais – Brazil was carried out between 03/18 (beginning of the isolation measures) and 09/24 (two months after the easing of restrictions) in relation to the same period in 2019. The details of the methodological approach can be found in section 3 of the article.

Recent literature suggests the absence of behavioral patterns of the criminal phenomenon during the Pandemic. For example, in South Africa, during the first week of lockdown, there was a 71% decline in the number of homicides, 85% of rapes and 83% of serious assaults, compared to the same week of the previous year (MARUPENG, 2020). In Latin America, street crimes, such as robbery and assault, plummeted when the lockdown emptied the streets and the police imposed emergency measures (SEMPLE; AHMED, 2020). Similar trends could be seen in some US cities, such as San Francisco, where robberies and thefts have dropped by about 50% below pre-pandemic levels (EISNER; NIVETTE, 2020). In Mexico, the daily numbers of homicides remained unchanged at around 80 cases per day (GOBIERNO DE MEXICO, 2020).

It is observed that in places where there was a decline in crime rates, these were not linear. The effects resulting from the reduction of opportunities for committing crimes are usually quickly noticed, at the same pace with which economic activities and the displacement of people are reduced. In addition, compliance with social distancing measures tends to be greater in the early stages, when citizens are largely supportive of emergency measures. As the time of confinement passes, the tensions resulting from isolation, such as stress, depression, anger, hunger, or the loss of a job accumulate, and this tension tends to explode at a later stage. Added to this is the fact that as time progresses, the citizens' belief in the need for social restrictions decreases, also reducing support for emergency measures, which inevitably leads to the informal easing of lockdown restrictions (EISNER; NIVETTE, 2020).

The importance of this study lies in the fact of understanding the criminal phenomenon, which has a "normalized" behavior in terms of distribution in time and space, in a period of exceptionality. Crime data based on citywide crime occurrence data, together with large amounts of data on daily displacements, provide a unique opportunity to learn more about how the criminal phenomenon is intertwined with daily routines, although the data is only available for a small fraction of the population.

For scholars interested in causal inference, emergency measures such as the COVID-19 Pandemic offer a unique opportunity to test and improve complex causal models at fine degrees of space and time resolution (NAGIN; SAMPSON, 2019). In particular, operationally, one can use these data from before, during and after blocking, as well as comparative analyzes in different blocking regimes, to generate agent-based models, simulations that integrate large amounts of information to model complex causal chains and predict trends related to the manifestation of urban violence (EISNER; NIVETTE, 2020).

CRIME FROM THE VIEWPOINT OF THE ENVIRONMENT, OPPORTUNITIES AND DECISION-MAKING

Theoretical constructions that emphasize the importance of the "environment" for understanding the distribution of the criminal phenomenon in the urban landscape have adherence to the interpretation of the effects of restrictive measures of displacement and social isolation on property crimes in Belo Horizonte, Minas Gerais - Brazil. Among the approaches, the routine activities theory and the crime pattern theory stand out.

According to the theory of routine activities, crime is the result of the convergence of three elements in time and space: the presence of a probable or motivated offender; the availability of potential targets; and the absence of guardians capable of preventing the criminal act (COHEN; FELSON, 1979). According to theory, a probable offender includes anyone with an inclination to commit a crime (FELSON, 1994). On the other hand, a potential target encompasses any person or good that arouses the action of a criminal, which includes the real value (monetary and/or symbolic) of the target and the offenders' wish for it, its visibility to offenders or their informants, access to it, the ease for escaping the place and the portability or mobility of objects sought by offenders (FELSON, 1994).

Felson and Clarke (1998) introduced the acronym VIVA to clarify the four elements that

influence the risk of a target becoming a victim of a crime. They are value, inertia, visibility and access. Value refers to what the target is worth to the offender - high-value items are more attractive. Inertia refers to a target's ability to be taken - those that can be taken more easily are more attractive. Visibility refers to how easily targets are seen by attackers - targets that are more visible are more vulnerable. Access refers to the ease with which targets can be accessed by offenders - more accessible items are more vulnerable. Each of these elements can lead to a crime rate increase without any change in the offenders' population.

The routine activity theory points to factors unique to the lifestyles of potential offenders and victims and how these are affected by larger social processes. The importance of victim lifestyles is also indicated by the lifestyle/exposure theory, which was developed by Hinderlang, Gottfredson and Garofalo (1978).

The exposure/lifestyle model suggests that such lifestyles encompass the diversities arising from demographic factors (age, income, marital status, gender, etc.) that influence people's daily routines and, therefore, their vulnerability to criminal victimization (KENNEDY; FORDE, 1990). The variety of lifestyles explains the non-uniform distribution of victimization in time and space (GAROFALO, 1987). Specifically, lifestyles influence people's exposure to places with different levels of victimization risks.

The crime pattern theory is focused on the criminal event, which is a product of the intersection between law, offender motivation and target characteristics arranged in an environmental setting at a particular point in time and space (BRANTINGHAM; BRANTINGHAM, 1993).

Brantingham and Brantingham (1993) developed the crime pattern theory in order to describe the processes by which a criminal event occurs. It starts with a person acting or behaving in some way, including participating in legitimate acts or behavior. With the emergence of some event/fact, the desire to commit a criminal act is awakened. The initiating fact/event drives the offender's search, which can be minimal or broader, depending on factors such as how well the offender knows the area. This search, depending on the assessment of available targets, may result in a criminal event.

Paulsen and Robinson (2004, p. 108) describe how this process can happen. Suppose a person (potential offender) walks through the community and notices that no one is at home in the entire area. In this case, a triggering event occurs when the potential offender realizes that there are no cars parked on the sidewalks of any of the houses in the neighborhood. This initiating event leads the potential offender to perform a quick search through the various houses for signs of easy access and signs that there are valuable and easily transportable goods inside the residences. When the potential criminal agent finds a "good" target, then he commits the crime.

There are three main concepts present in the crime pattern theory, they are: nodes, paths and borders. Nodes refer to the places where people go and where they come from (destination and origin), for example: home, work, shops, etc. Paths comprise the main paths traveled between nodes, such as streets and sidewalks used in the paths, etc. The borders or limits are the circumscriptions of the areas occupied by people in the development of their activities (neighborhood, community, city, etc.).

According to Brantingham and Brantingham (1993, p. 268), the criminal event process rests on a general scenario formed by routine activities and on a model that helps to identify what is a great chance or how to look for opportunities.

Eck and Weisburd (1995) stated that crime pattern theory is a combination of rational choice and routine activity theory in an attempt to explain how and why crime is distributed across places.

One factor in the offender model is the victim's pattern of activity. According to Brantingham and Brantingham (1993), in order to understand criminal patterns, one must at least understand routine activities. The routine activities of potential offenders have effects on the space and time aspects of the offense, as they generally define both the places (where) and the times (when) they choose to commit a crime. Additionally, the routine activities of potential victims also shape the distribution of crimes by place and time.

MATERIALS AND METHODS

In this analysis, official data on police occurrences from the Social Defense Events Registry System (REDS) in the city of Belo Horizonte, Minas Gerais - Brazil were used, considering the following criteria:

a) criminal typologies:
- Property crimes (theft, robbery and extortion).
b) analysis periods (years 2019 and 2020):
- 03/18 to 07/25 (period of social distancing);

- 07/25 to 09/24 (two months after the start of the easing of restrictions).

The temporal distribution of events (by day of the week, by time slot) was analyzed, as well as the spatial distribution of events, correlating them with the volume of circulation around urban facilities, where different functions are performed. This parameter was established based on community mobility reports made available by Google®, whose data reveal changes in the displacement patterns of people in an urban environment due to COVID-19 and present mobility trends over time, in the surroundings of urban facilities retail and leisure facilities, markets and drugstores, parks, public transport stations, workplaces and residential areas.

Community mobility reports aim to provide information on changes in the pattern of intra-urban circulation derived from social isolation policies implemented to face the COVID-19 pandemic. The report inputs are georeferenced data on the positioning of Google services users, due to the activation of the "location history" feature on their mobile devices. The data are treated in an aggregated and anonymized manner (GOOGLE online, 2020).

The associations between the criminal incidence and the volume of people displacement were carried out with the help of Pearson's correlation coefficient (BAILEY, 2001), using as a spatial unit groupings of crime points in squares with dimensions of 500 meters x 500 meters. Recent works using these techniques have been used in the search for the identification of correlations between demographic and socioeconomic variables, land use and occupation and criminal incidence (FARIA et al., 2020; FARIA; ALVES, 2020; FARIA et al., 2018).

In this study, the interpretation based on the classification proposed by Ferreira (1999) was used, according to the intervals contained in Table 1.

Table 1 – Correlation magnitude according to Pearson's coefficient Interval r_s

Interval r_s	Correlation Magnitude
0,1 < *rs* < 0,4	weakly positive
0,4 < *rs* < 0,8	moderately positive
0,8 < *rs* < 1,0	highly positive
-0,2 < rs < -0,4	weakly negative
-0,4 < rs < -0,8	moderately negative
-0,8 < rs < -1,0	highly negative
rs = 0	no correlation

Source: Ferreira (1999, p. 99).

RESULTS AND DISCUSSIONS

In this section, the results obtained in this research are described and analyzed. Table 2, as follows, describes the criminal occurrences related to property by typology.

It is observed that in 2020 there was a lower absolute number of crimes, with the average reduction being equal to 34%; from 03/18 to 07/25 there was a reduction of 36% and from 07/25 to 09/24, the reduction was 25%. These results, therefore, confirm a significant impact of social isolation measures on property crimes.

Table 2 – Property crimes registered in Belo Horizonte, Minas Gerais – Brazil between 03/18 to 09/24, 2019 and 2020

Tipology	2019	2020	Variation
Robberies	30,647	21,140	-31%
Thefts + extorsions	7.811	4,408	-44%
TOTAL	**38,458**	**25,548**	**-34%**

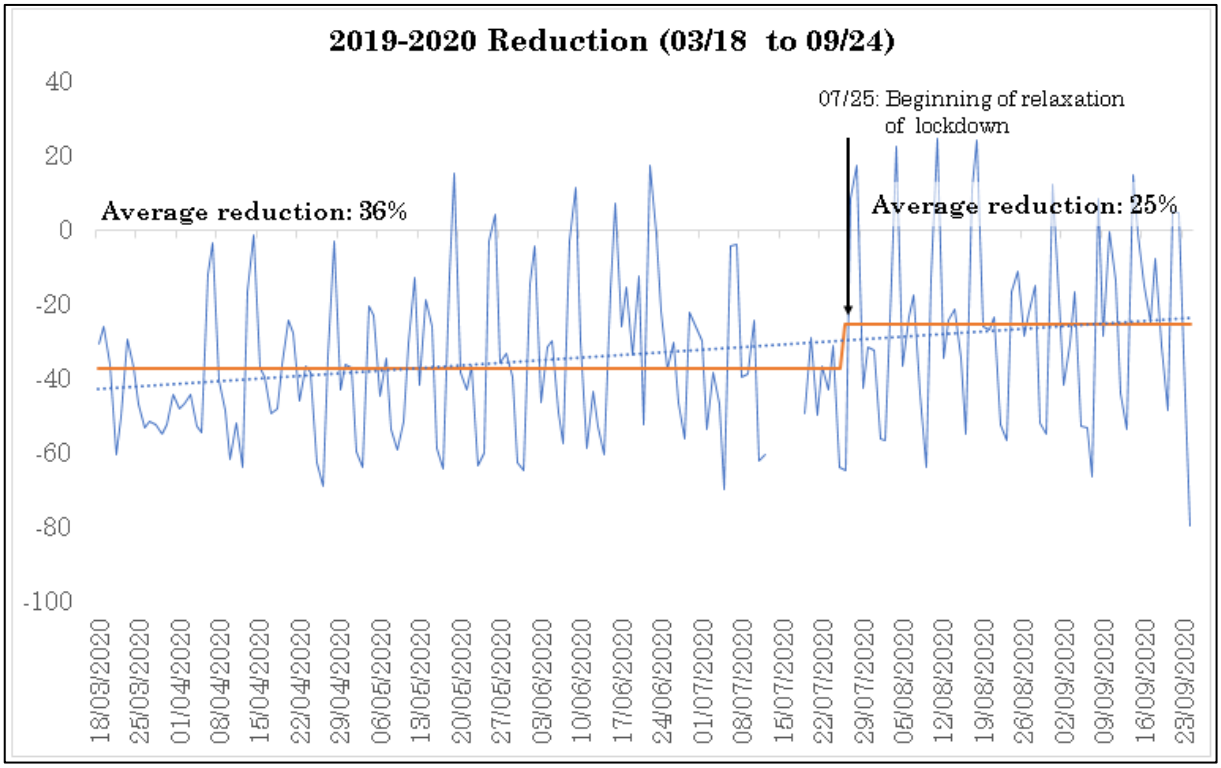
Source: Minas Gerais (2020).

The data corroborate the assumptions of the theory of routine activities, as the modeling of the displacement patterns of potential victims determines the offer of opportunities for the commission of predatory crimes, such as property crimes (COHEN; FELSON, 1979; FELSON, 1994; FELSON; CLARKE, 1998). In the same way, lifestyle theory suggests that

people's routines influence vulnerability to criminal victimization (HINDERLANG et al., 1978; KENNEDY; FORDE, 1990; GAROFALO, 1987). During the pandemic period, the social dynamics of the urban environment was profoundly changed by the limitation of access to certain public places or services and, on the other vertex, increased displacement of people to supplying equipment of primary consumer goods (market and drugstores), in addition to permanence in residential areas, due to the adoption of home office regimes.

Figure 1 reveals the effect of movement restrictions on crime from a time perspective. It should be noted that there was a daily reduction in criminal incidence in practically the entire period, analyzing 2020 in relation to 2019. Of the 190 days of analysis, only 16 did not present a reduction. Despite the average reduction of 36% in the general incidence of property crimes, there is a greater reduction at the beginning of the lockdown, with a tendency to a gradual increase in incidence during isolation, adding substantially to the easing of restrictions.

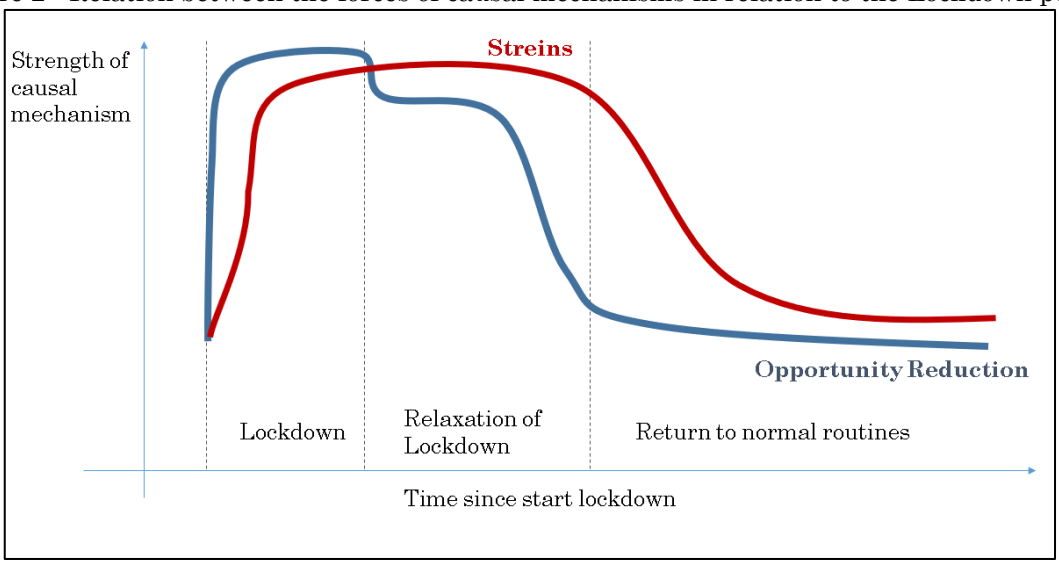
Figure 1 – Daily comparative reduction of property crimes in Belo Horizonte, Minas Gerais – Brazil from 03/18 to 09/24 in 2019 and 2020



Source: The authors (2022).

The justification for reducing the effects of social isolation on crime even before the period of flexibility lies in the fact that at the beginning of the distancing there was a community adherence to isolation measures (EISNER; NIVETTE, 2020), which drastically reduced opportunities for committing crimes, due to the scarcity of victims, which is consistent with the theory of opportunities. However, the difficulty of maintaining isolation due to the tensions generated by the distancing itself, as presented by Eisner and Nivette (2020), causes its effect on crime rates to be smoothed over time. Figure 2 visually demonstrates this mechanism.

Figure 2 - Relation between the forces of causal mechanisms in relation to the Lockdown period



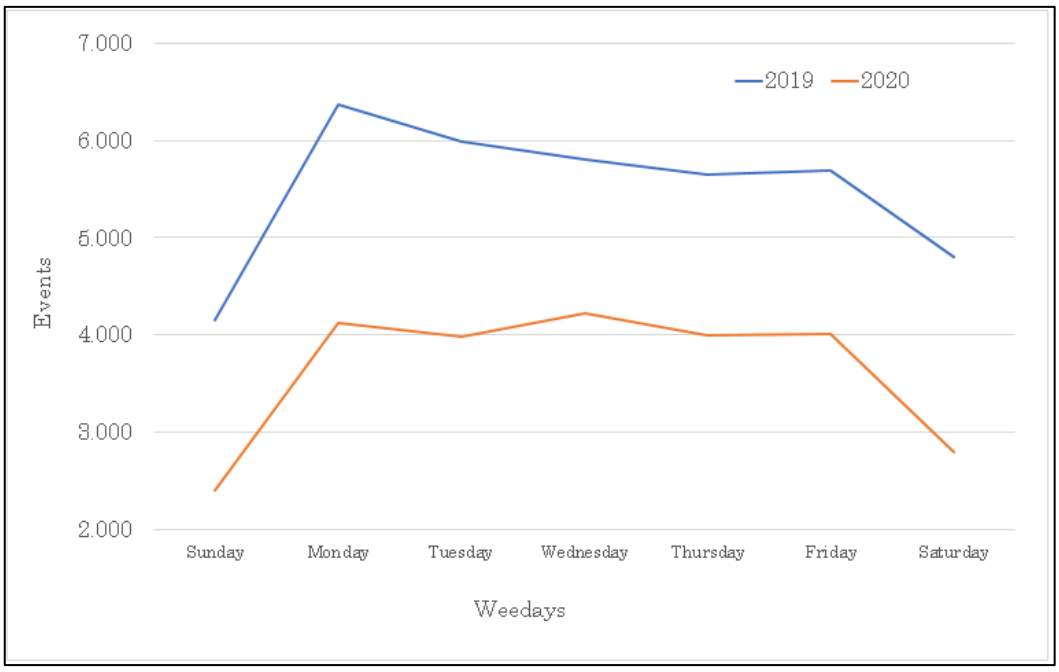
Source: Eisner and Nivette (2020).

Time distribution of events

In order to identify whether there was a change in the pattern of the temporal distribution of events in the period of social distancing, we sought to analyze the pattern of distribution by day of the week and by time slot in 2019 and 2020.

The weekly distribution of events is shown in Figure 3:

Figure 3 – Property crimes by weekday in Belo in Belo Horizonte, Minas Gerais – Brazil from 03/18 to 09/24 in 2019 and 2020



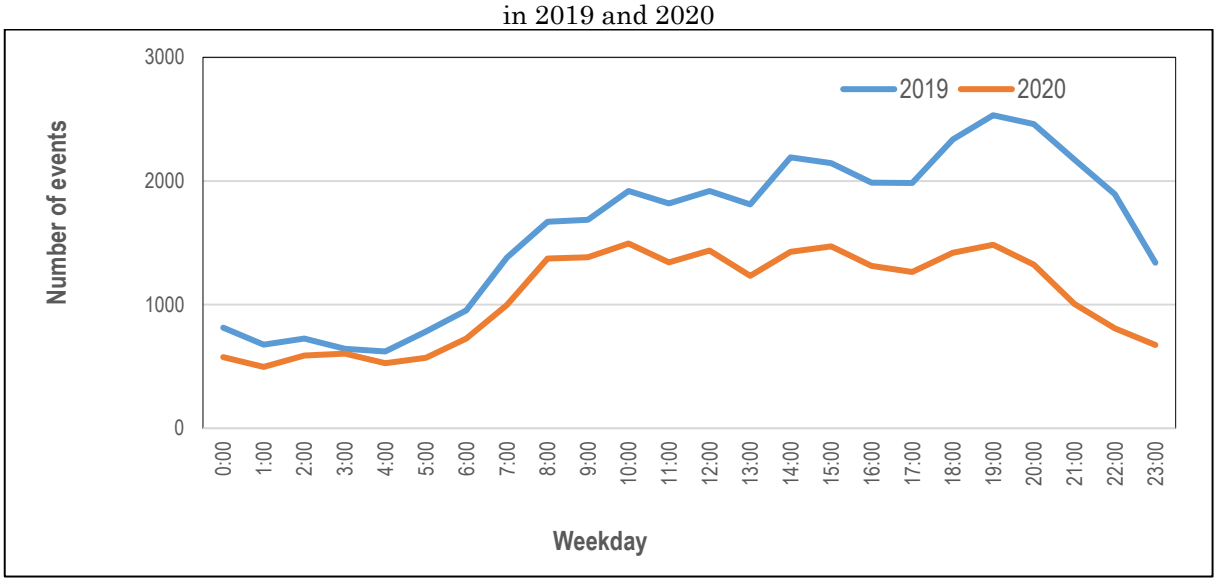
Source: Minas Gerais (2020)

The change in social dynamics imposed by social distancing did not interfere with the pattern of criminal behavior in terms of performance per day of the week (Figure 3). Both in 2019 and in 2020, there was the same trend of committing crimes more frequently

during work days, with the highest absolute number observed on Mondays, followed by a successive decline on other work days, accompanied by a significant reduction at the end of the week. Thus, it can be seen that the drop in the absolute number of events is due to a decrease in the "supply" of victims, according to the theory of routine activities, due to sanitary measures, with no reflection on the criminal's behavior.

The distribution of criminal events is shown in Figure 4:

Figure 4 - Property crimes by time slot in Belo Horizonte, Minas Gerais – Brazil from 03/18 to 09/24 in 2019 and 2020



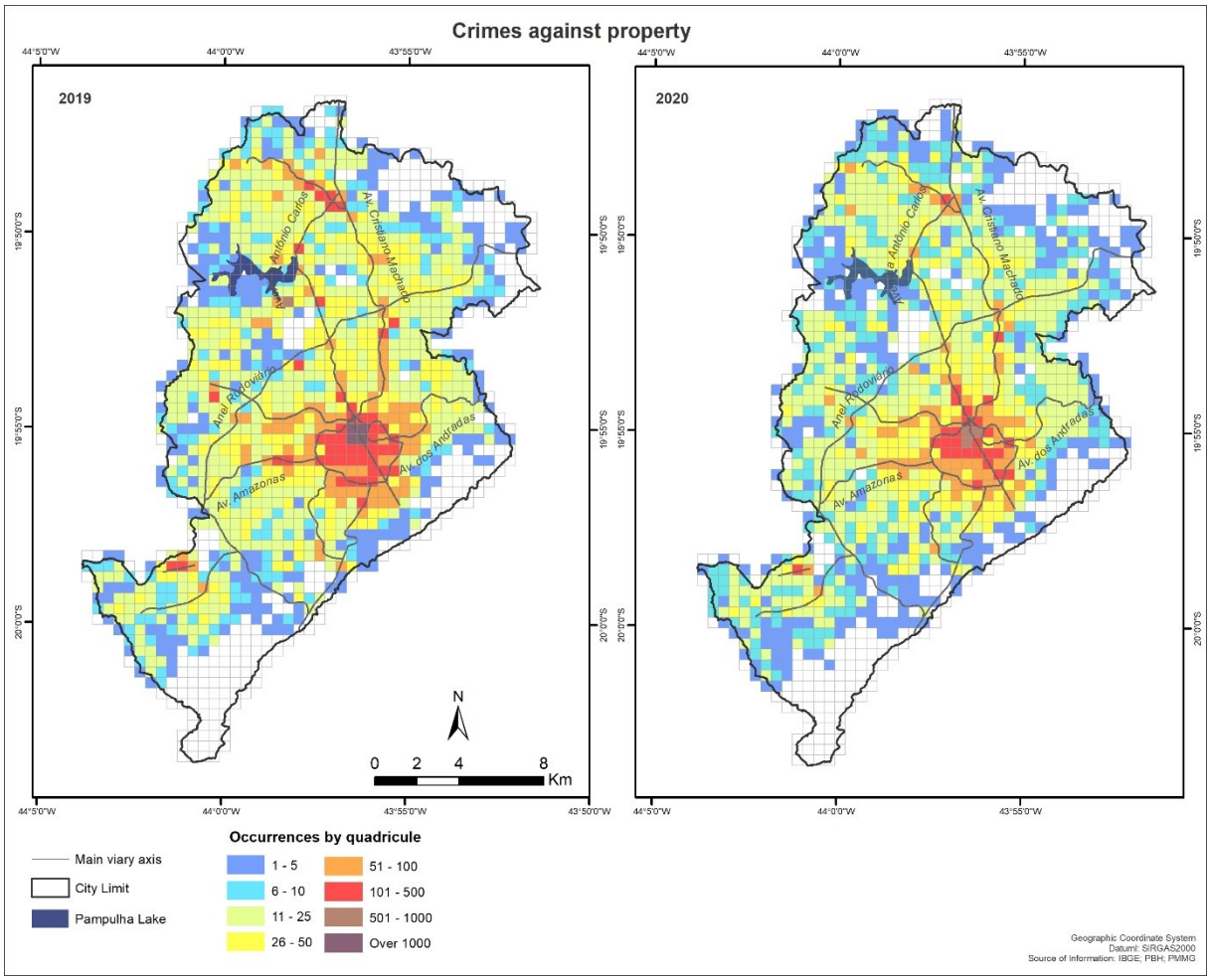
Source: Minas Gerais (2020)

In the same way that there was no change in criminal behavior in the time distribution by day of the week in the pre- and post-pandemic period, there was also no change in its distribution by time slot (Figure 4). The shape of the distribution curve remained the same, with only a proportional decrease in the number of cases. It is inferred, therefore, that the crime reduction is due to the reduction in the number of potential victims, for whom emergency measures are more effective, in relation to the perpetrators, with a change in the victims' routine regarding the people's displacement points (nodes and paths) and the places visited throughout the day, which corroborates the theories of crime pattern (BRANTINGHAM; BRANTINGHAM, 1993) and routine activities. With regard to crime perpetrators, by maintaining the distribution of the time of criminal events, it appears that the routine maintains unchanged in the predatory behavior, typical of property crimes.

Spatial behavior of property crime in times of the COVID-19 pandemic

In order to investigate a possible change in the pattern of the spatial distribution of the phenomenon, compared to the change in behavior in the community's displacement, the distribution of the criminal phenomenon in 2019 and 2020 was comparatively analyzed and it aimed at checking its correlation with the community's mobility, on the stage of social relations which has the urban space of Belo Horizonte, Minas Gerais - Brazil as its scenario.

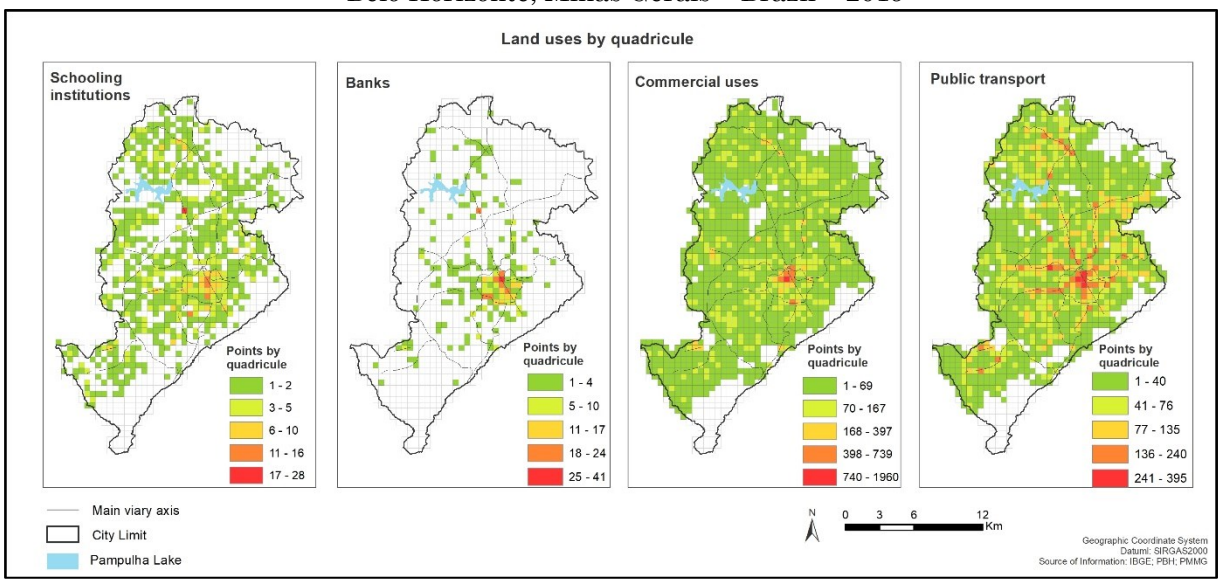
Figure 5 – Map of property crimes in Belo Horizonte, Minas Gerais - Brazil between 03/18 to 09/24 in 2019 and 2020.



Source: The authors (2022).

The spatial distribution of events maintains the same pattern of the period without distancing, due to a possible influence of the crime-attractor distribution (Figure 5). As a way of identifying this influence of the distribution of commercial facilities and service providers (banks, educational institutions, public transport) in the conformation of the criminal phenomenon distribution, it describes the distribution of these urban facilities, through the identification by use and the Belo Horizonte's land occupation. The concentration data, grouped by squares, appear in the map collection in Figure 6.

Figure 6 – Distribution of commercial facilities and service providers by use and land occupation – Belo Horizonte, Minas Gerais – Brazil – 2019



Source: The authors adapted the data from Belo Horizonte's Town Hall coming from IPTU (property tax) (BHGEO, 2021).

It was found that the hyper center of Belo Horizonte, Minas Gerais - Brazil concentrates commercial and service facilities (educational institutions, banking institutions, commercial uses, public transport), a place with the highest concentration of property crimes (Figure 6). The concentration of commercial and service facilities is, therefore, an explanatory factor for the agglomeration of criminal activities, since, according to the theories of crime patterns and routine activities, these regions bring together a large number of people who can be potential victims, people who commute to carry out daily activities.

In order to check the linear correlation between the variables: property crimes and land use and occupation, Pearson's correlation analysis (r) was used, whose data are shown in Table 3.

Table 3 – Pearson's Correlation Analysis (r) - Property crimes and Land Use and Occupation - Belo Horizonte, Minas Gerais – Brazil – 2019-2020

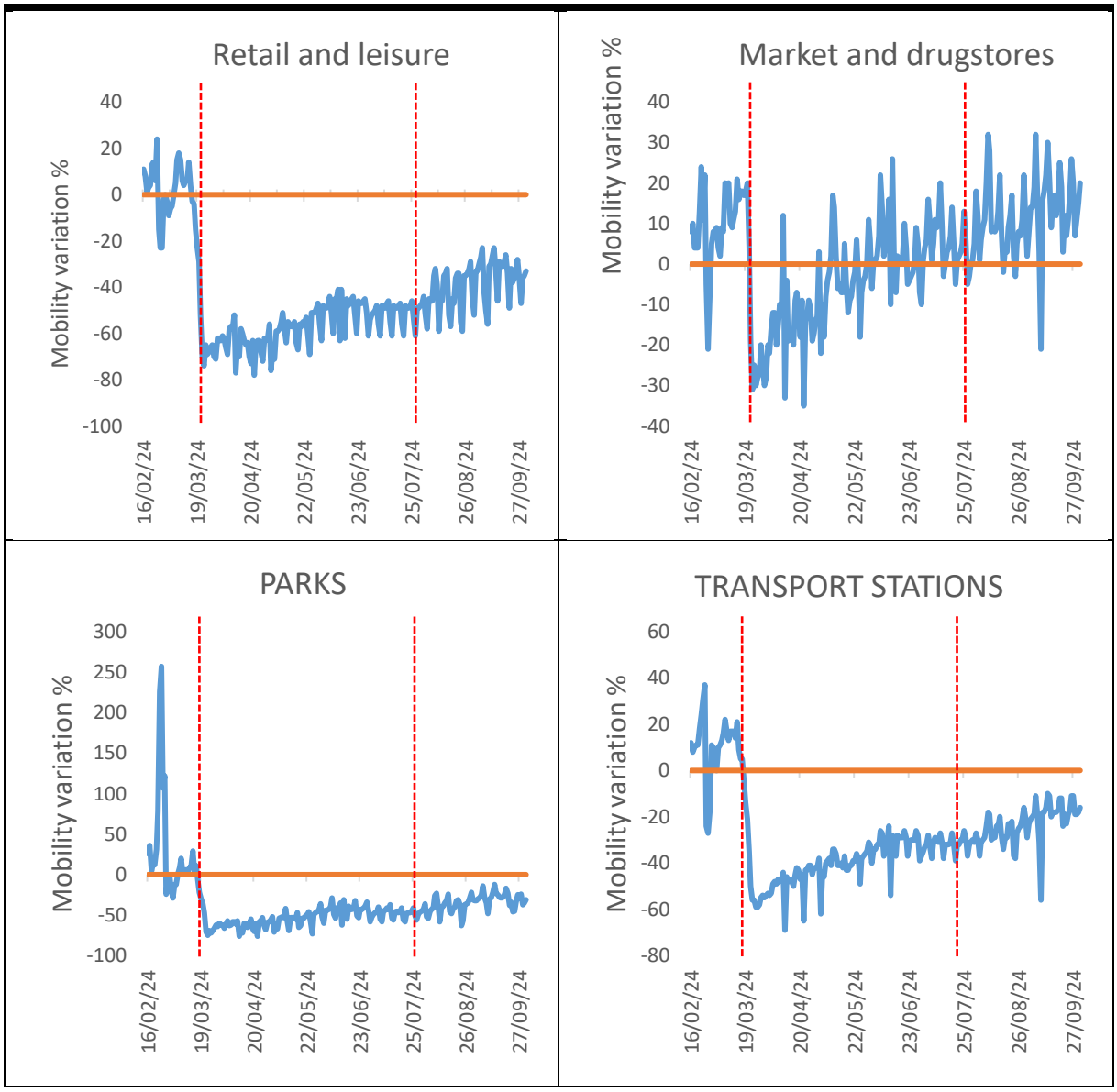
Year	Teaching	Banks	Transport	Commerce
r_{2019}	0,376	0,626	0,573	0,781
r_{2020}	0,405	0,618	0,628	0,804
Level of significance	0,05	0,05	0,05	0,05
Statistic significance	∃ relation between variables	∃ relation between variables	∃ relation between variables	∃ relation between variables

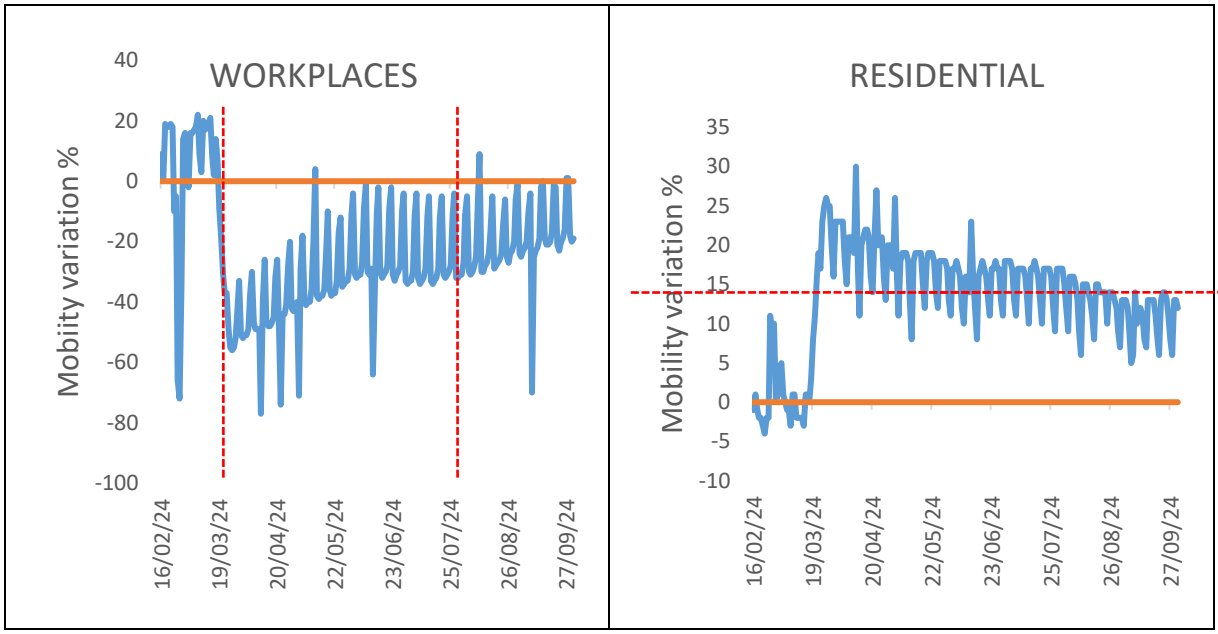
Source: The authors (2022).

In the periods of analysis, there was a highly positive correlation (FERREIRA, 1999) of the places of crime concentration in relation to facilities related to commerce and a moderately positive one for the other service-providing facilities (banking, teaching and transport). Thus, urban commerce and service facilities, also generically referred to as facilities, represent a specialized type of "nodes": criminal attractions. It was found that in both periods of analysis (before and during the emergency related to COVID) the distribution of shops coincides spatially with the areas with the highest concentration of property crimes.

Based on community mobility data, we sought to identify whether there is a correlation between the commission of crimes and people displacement. The data is organized in the following set of graphs, with people displacement variations over time by region and categories: retail and leisure, markets and drugstores, parks, public transport stations, workplaces and residential areas.

Figure 7 - Variation of community mobility in Belo Horizonte, Minas Gerais – Brazil –2020





Source: Google (2020). Elaborated by the authors (2022).

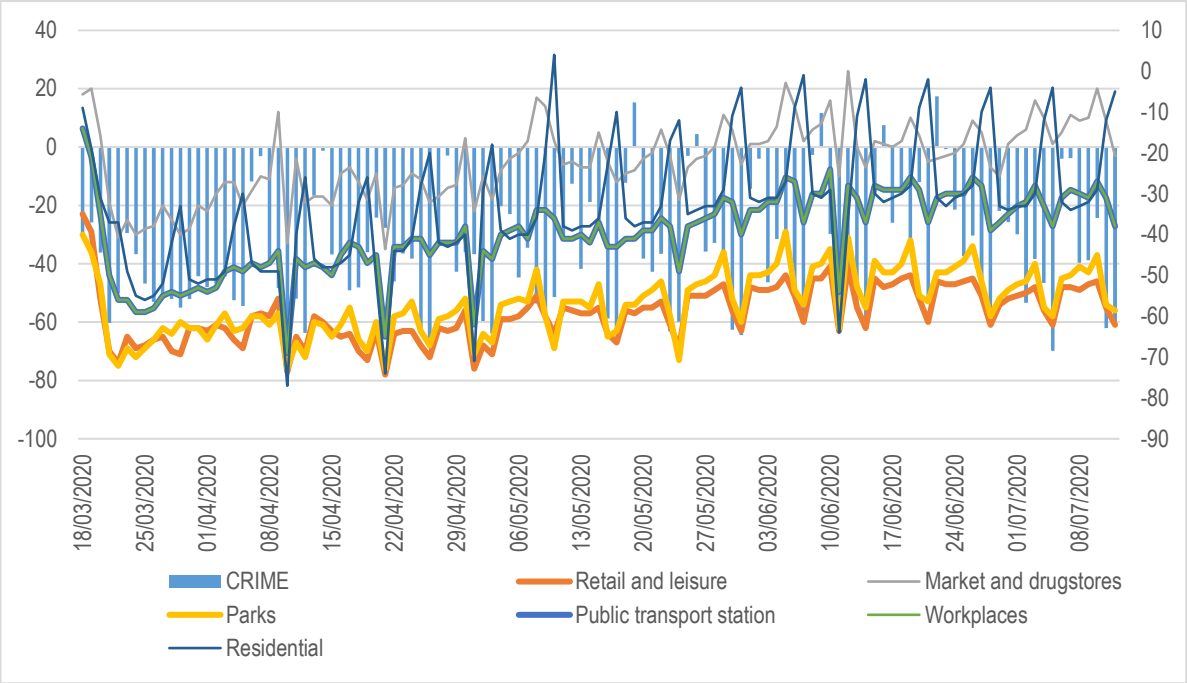
The graphs were constructed from a basis of displacements, having, therefore, a relative measure of variation in the concentration of people by region of interest, categorized according to the defined typology. Thus, the abscissa axis at zero stood out in the graphs, with the values above the axis representing an increase in displacements for the regions represented and the ones below the axis representing a decrease. The period of social distancing was also highlighted in red vertical lines, in order to demonstrate the effects of distancing. The data after the second red line represents the variation of displacements after the isolation easing measure (gradual reopening).

In relation to the period prior to the sanitary isolation measures, there was an average reduction (negative variation) for the places described: retail and leisure (-56.93%), market and drugstores (-4.7%), parks (-53, 48%), transport stations (-39.58%), workplaces (-33.22%), residential areas (17.44%). Thus, only residential areas showed an increase in the concentration of people during the isolation period, which was already expected. After the easing period (from 07/25) there was an increase in the presence of people in all categories with the exception of residential areas. From 07/25/20 to 09/24/20: retail and leisure (-39.87%), market and pharmacies (11.10%), parks (-35.62%), transport stations (-24, 25%), workplaces (-20.13%), residential areas (12.30%). In other words, there was an approximation of the community mobility dynamics to the period before the pandemic. It is worth noting that even before reopening, there is a trend of retreat to occupation levels, corroborating Eisner and Nivette's predictions (2020) in which causal mechanisms promote a lower acceptance of sanitary measures impositions, resulting in disobedience.

As shown in Figure 7, it appears that retail and leisure, workplaces, parks and public transport stations showed a decrease in community displacements. The places that represent activities considered "essential", such as markets and drugstores, showed a significant increase, due to the demand maintenance, as well as the residential areas, contrary to workplaces, whose change was driven by the adoption of distance working.

The analysis of the curve aspect in comparison with the crime rate variation is shown in Figure 8.

Figure 8 - Variability of crimes property crimes and community mobility - Belo Horizonte, Minas Gerais – Brazil - (03/18-09/24) - 2020-2019



Source: Minas Gerais (2020) and Google (2020). Elaborated by the Authors (2022)

The influence of the reduction of community mobility for commercial (retail) and leisure places, as well as for parks, is compatible with the same drop in crime rates, which corroborates the criminal theories of the crime pattern and routine activities, since there is less availability of potential targets in these locations, which consequently reduces criminal activity in the same proportion (Figure 8).

To avoid being restricted to the eminently exploratory analysis of the aspect of the graph, a linear correlation analysis was also carried out between the variables: variability of community mobility and variability of property crimes. The data are shown in Table 4.

Table 4 - Linear correlation between the variables of the variability of community mobility and variability of property crimes - Belo Horizonte, Minas Gerais – Brazil - 2020

Parameter	**Retail and leisure**	**Market and drugstores**	**Parks**	**Public transport stations**	**Workplaces**	**Residential**
Pearson's coeficient	0,487	0,184	0,437	0,298	0,298	-0,227
Significance level	0,05	0,05	0,05	0,05	0,05	0,05
Statistic significance	∃ relation between variables	∃ relation between variables	∃ relation between variables	∃ relation between variables	∃ relation between variables	∃ relation between variables

Source: Minas Gerais (2020) and Google (2020). Elaborated by the Authors (2022)

Through the data in Table 4, it is identified that for public transport stations and workplaces, as for the availability of observations, there is no statistical significance which allows inferring about the relation between the variables. Considering the other categories:

a) there is a moderately positive correlation between the reduction in crime and the decrease in the presence of people in parks and retail and leisure places (crime decreases in proportions equivalent to the decrease in the number of people in these places);
b) weakly positive correlation between reduced crime and reduced supply of people to market areas and drugstores; and
c) inverse correlation for the commission of crimes and the increase in the number of people in residential areas (increase in the number of individuals in residential areas and decrease in crime in these areas).

The findings contribute to the understanding of the predictions established by the theory of routine activities, in which the search for targets and victims occurs along urban areas where there is movement or permanence of people willing to become victims of crimes, that is, notably on public roads. As an example, there is the case of a greater presence of people in residential areas and a decrease in crime in these places. Although there were more people in residential areas, the individuals were inside their houses, which did not confer them the "target availability" aspect from the theory of routine activities.

CONCLUSIONS

Research data indicated the existence of a correlation between lower social mobility during the period of social isolation and the lower number of property crimes.

It was possible to verify the maintenance of space and time patterns of criminal events distribution of the typologies addressed in the research. In this way, although the period of social isolation had a considerable impact on the total number of crimes committed (absolute reduction in the number of crimes), the patterns of commission by day of the week, time of day and spatial concentration remained unchanged, contributing to verify the application of theories of crime pattern, lifestyle and routine activities. The criminals' activity patterns were not impacted by the isolation measures, unlike people with lawful activities and occupations, who are more subject to formal rules of control and social responsibility of obedience to health emergency measures.

The location of the phenomena was correlated to the distribution of commercial and service facilities that imply a large concentration of people, which are considered, therefore, crime-attractive nodes.

It was also observed that, by analyzing the mobility of the community, there was a correlation between the variation of criminal rates and the variation of displacements to areas of retail and leisure and parks.

The results have the potential to support the development of public security policies aimed at crime prevention, notably in areas of concentration of people in environments predisposed to criminal occurrence, either by the use and occupation of the land or by the mobility of the community.

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AUTHORS' CONTRIBUTION

Antônio Hot Pereira de Faria conceived the study, collected, analyzed the data and wrote the text. Alexandre Magno Alves Diniz supported the data analysis and the final writing of the text. Diego Filipe Cordeiro Alves prepared the maps and supported the data analysis.