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Abstract: There is ongoing debate regarding the association between disorder and criminality. The literature has shown mixed, reduced, or no effects between the two phenomena, although few studies have dealt with the problem in terms of social disorder and its spatial heterogeneity. Using official records, we analyzed crime incidence involving vehicles in Mexico City neighborhoods with a combination of spatial methods, classification algorithms, and non-parametric tests. We found that the presence of people who demand payment for taking care of cars (social disorder) is probably spatially linked to auto parts robbery (crime). It is possible that such social incivility sends a signal that encourages the commission of crimes upon the vehicles, forming spatial clusters due to the undesirable effects of public policies. Our findings enable the broken windows theory to improve its explanatory capacity, considering spatial hypotheses and complementing its explanations with other criminological theories.

Keywords: broken windows; auto parts robbery; parking attendants; spatial analysis; Mexico City



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1. Introduction

The traditional formulation of the "broken windows" theory argues that visible (physical) signs of minor crime, antisocial behavior, and civil disorder create an urban environment that, in turn, encourages more crime and greater disorder, including more serious crimes and a greater accumulation of trash on corners [1]. This assumption has had significant consequences for police work, as it reorientates policing in a city towards minor crimes such as vandalism, vagrancy, the consumption of alcohol in public spaces, jaywalking, and fare evasion on public transport. Viewed simply, these appear to be minor crimes, but their enforcement helps to create an atmosphere of order and legality that prevents the escalation of crime.

The deterioration of physical (trash, graffiti, abandoned buildings, etc.) and social (street fights, consumption of alcohol, public intoxication, etc.) conditions creates a sense of "disorder" that transmits a signal to residents to avoid certain places. The absence of residents in public spaces reduces informal controls and, at the same time, increases physical and social disorder. In parallel, criminals perceive signs of decadence of public spaces as signals of being able to commit crimes without being caught, and thus crime increases [2].

These ideas have been the object of debate in areas of both the social sciences as well as in the public sphere. In fact, they have had an enormous impact on public policies for urban security in many countries [3], essentially through practices calling for "order maintenance" or "zero tolerance" [4]. These terms are ambiguous and encompass various meanings but in general are understood as the exhaustive and aggressive application of the law "without restrictions" [5], focused on physical and social disorder [6].

However, "The disorder-crime association is probably one of the most debated topics in sociology, criminology, and criminal justice" [7,8], given that studies on the link between disorder and crime have been inconclusive, and empirical tests have produced mixed results [7–9].

Considering this, modifications to the broken windows theory have been proposed in order to improve its explanatory and predictive capacity. Yang [10] proposed analyzing physical and social disorder separately, as each can produce different effects. However, research rarely separates these phenomena and tends to use global measurements due to the difficulty of obtaining records of social disorder [11]. In general, indicators of physical disorder are used, as they are considered to be more reliable [12] and easier to construct from administrative records [13].

Another option to advance the theory is offered by the use of spatial analysis. De Biasi [14] noted that the relationship between disorder and crime is not linear, and thus, the functional form should be considered by statistical models in order to prove the link more effectively. However, spatial heterogeneity may influence the association between disorder and street crimes and, once again, produce inconclusive results. Sampson and Raudenbush [11] argued that the relationship is not one of causality but rather that both phenomena arise out of the structural conditions of neighborhoods. Nevertheless, the spatial implications of the theory are under-studied and remain an open line of research [15].

In sum, there are few studies on social disorder and few explicit hypotheses on its spatial effects on crime. Our research questions thus seek to respond to whether social disorder tends to be concentrated in space and whether it is more likely that certain crimes arise compared to others in such areas of concentration. As an indicator of disorder, we chose to use the presence of the so-called "franeleros" (people who demand payment from drivers to take care of a vehicle parked on public roads) both because they illegally appropriate public space (the street) and because inhabitants and authorities also consider them signs of disorder and the absence of state authority. In addition to occupying public spaces, they frequently use rocks, buckets, pieces of cement, or other objects to prevent drivers from parking without their assistance. Not only do residents have to live with their streets filled with such obstacles, but drivers also feel extorted, as they must pay for these to be removed in order to park. Identifying the crimes that arise in neighborhoods with social disorder would enable a better understanding of neighborhood conditions, governmental policies that reinforce clusterization, and the spatial link between social disorder and crime.

Using registers of 911 calls and crime incidence in Mexico City, we analyzed the robbery of auto parts, non-violent theft of articles from inside vehicles, and damage done to vehicles in neighborhoods with the presence of informal parking attendants. We used measures of spatial autocorrection to identify hotspots of reports and non-parametric tests to find significant differences between various crimes. Furthermore, we employed a hierarchical clustering algorithm to identify neighborhoods with similar structural conditions but without spatial contiguity with the concentration of social disorder.

We found that social disorder ("franeleros") tends to be concentrated in space in areas of Mexico City that have a high flow of national and international tourists. Reports on franeleros form clusters in the neighborhoods of Roma-Condesa and San Angel-Coyoacan, which have similar characteristics in terms of population, cultural attractions, and international museums (with little physical disorder due to the high investment in these areas by the city government). Furthermore, on average, neighborhoods with reports of "parking attendants" have a greater risk of victimization of auto part robberies and intentional damage than neighborhoods with similar characteristics but without the presence of parking attendants. No significant differences were found for the theft of objects from the interior of vehicles.

The spatial concentration of parking attendants may be explained by the demand for public space resulting from the high flow of visitors in these areas, which is clustered in municipalities where governmental programs have "legalized" (in some respects) informal activity. By facilitating the formalization of employment, the same people who guard vehicles may use their networks to incorporate friends and families in these same areas,

creating the spatial patterns that we found in Mexico City. The agglomeration reinforces the phenomenon of social disorder in the detected hotspots.

The significant emergence and concentration of auto part robbery could be explained with the theoretical assumptions of the broken windows [1] and the rational choice [16] theories. On one hand, it is likely that criminals perceive the tolerated actions of parking attendants as a sign of the potential to commit crimes without being caught or that this makes it more difficult to pursue them. On the other hand, if an offender surveys cars without being noticed, it may be easier to select the brand and model of auto parts and estimate a price on the illegal markets. Thus, the agglomeration of criminals in areas of social disorder can be explained by the calculation made regarding the low probability of being caught and the greater expected benefits from the robbery of auto parts. This also explains why the theft of articles from the interior of vehicles is not significant: it is difficult to estimate the expected value of objects taken from within a vehicle, as it is only by committing the crime that this will become known.

In this way, the presence of "parking attendants" as a factor of social disorder is concentrated in space due to the undesired effects of local government policies and is spatially linked to certain types of vehicle crime. Criminals identify areas where they are less likely to be noticed while analyzing targets, given the presence of people demanding payment to "protect" vehicles. The broken windows theory [1] can thus improve its explanatory capacity with the aid of other criminological theories and by focusing on crimes where the object (auto part robbery) coincides with the behavior that constitutes social disorder (parking attendants). The validity of the broken windows theory is important since, despite the numerous critiques regarding the inconsistency of empirical tests, authorities have translated it into security policies with serious consequences [17].

The following section presents the "Zero Tolerance" policy in Mexico City, where the phenomenon of the "parking attendants" in its current form emerged. We also present the literature on the broken windows theory, which underlies these policies. The third section contains the reports of 911 calls and the criminal investigation files from the 1814 districts of Mexico City in addition to the methodology used. Finally, we present the results, discussion, and conclusions.

1.1. "Zero Tolerance" Experience in Mexico

In Mexico, the idea of preventing crime by controlling social disorder has been widely received. So much so that in 2002, Giuliani Partners consulted with the Mexico City government in this regard. Their final report consisted of 146 recommendations to upgrade the local police, reform the criminal justice system, and improve government relations with citizens and the quality of life on the streets of the city. Measures taken to reduce social disorder ranged from reducing environmental noise and eradicating prostitution, windshield washers, *franeleros*, and illegal markets to relocating the homeless and street children. The recommendations included an entire public policy focused on eradicating public disorder, and the repot was translated into important changes in terms of street policing and on a legislative level.

Recommendation 123 [18] suggested immediate intervention to remove *franeleros* and windshield washers from the streets.

"Public road. 123. Effective measures of control to prevent the proliferation of *franeleros* and windshield washers. The number of people performing jobs on public road has increased exponentially in recent years, be they *franeleros* who reserve parking spaces in the street with objects to later charge for parking, or the windshield washers who impose a non-requested service. The fact is that both cases constitute a problem for citizens. The SSP has considered it necessary to identify all of these and to apply mechanisms to impede their proliferation, starting with a mandatory job-study policy for young people".

One of the first consequences of the report was the promulgation of the *Ley de Cultura Cívica del Distrito Federal* (Mexico City Law of Civic Culture) [19] that included new measures to sanction *franeleros*: articles 27 (I and V), 28 (II), and 29 (VI). This law forbids the

demand for payment for the use of public road by a third person and considers this a legal infraction against the peace and security of citizens. These administrative infractions do not sanction people who ask for money peacefully on public roads or the homeless population.

On one hand, in the city government, the persecution of *franeleros* became public policy, enforced through specialized citizens' service and attention centers that received complaints, civil courts, and police operatives, e.g., 911 calls. However, at the municipal level, programs were initiated to formalize this activity. This included registration in a census through the *Programa de Registro de Trabajadores No Asalariados* (Non-Salaried Workers Registration Program) [20], training programs, credentialing, provision of uniforms, and the assignment of a specific schedule and streets. It aimed to avoid extortion of government officials, promote citizen reports of anomalies, and, at the same time, order traffic (avoiding double parking) and prevent the stealing of auto parts.

1.2. Parking Attendants in Mexico and Latin America

In Mexico, people who demand payment for a non-requested service on vehicles may be referred as "cuidacoches", "franeleros", "traperos", "gorrillas", or "viene-viene" ("Car guards", "flannels", "rags", "gorillas" or "come-come" (respectively), in reference to their activity, use of cloth to attract drivers' attention, manner or directions frequently given to drivers). According to Argüelles [21], they are found in big cities with a certain permissiveness regarding working on the streets and in those with a high flow of traffic but without efficient public transportation. Most are located in central areas and in any part of the city with a particular concentration of traffic (for example, around clinics, schools, churches, malls, street markets, and places where mass events are held). Generally, cities adopt ambiguous policies: On one hand, they prosecute this activity (through the police), and at the same time, they promote it by formalizing their activities (even though these people are not incorporated into the state payroll) or permitting their unionization. In fact, in a study on franceeros in the metropolitan area of Monterrey, Argüelles found that most parking attendants belong to the Sindicato de Trabajadores al Servicio de los Usuarios de Automóviles, Estacionamientos, Similares y Conexos del Estado de Nuevo León (State of Nuevo Leon Union of Workers providing Services to Car Users, Parking lots, Similar and Related) (XIX). While the administration of the municipality of Monterrey rejects the function performed by the parking attendants, it maintains an agreement with this union to allow them to work under certain conditions (elderly people, respectful treatment, voluntary tips, etc.) to the degree that while the Directive of Street Markets of the municipality of Monterrey does not issue permits for people who work in the streets as parking attendants, it does accept those issued by the union itself (XX).

This phenomenon has been little-studied in Latin America, although certain studies conducted in Montevideo (Uruguay) are notable, for example, that of Miranda Gil [22] that analyzed the parking attendants' construction of social identity, that of Ayala [23] researching the training of informal work in this sector, that of Oholeguy [24] focusing on the social representations of parking attendants, that of Schoeder and Michelena [25] addressing social inclusion of parking attendants in Montevideo, and finally, that of Cabrera and Cid [26], who examined the informal market of parking attendants. Other studies have been carried out in Argentina, such as that by Camji et al. [27], who approached this topic from the point of view of informal work and the privatized use of public spaces in La Plata, and Pérez [28], who studied the mediatic representations of parking attendants in Buenos Aires.

As can be seen, the vast majority of studies focuses on the subject of parking attendants from a sociological, economic, and anthropological point of view, but as far as we know, no criminological studies appear to have been performed regarding parking attendants in the region and their spatial effects on crime as an element of social disorder.

2. Literature: Broken Windows Theory

In general terms, the broken windows theory states that urban disorder promotes the perception that a community and the authorities do not care about an area, leading to an escalation of criminal activity [1]. Consequently, an adequate public policy should start by resolving issues of disorder and minor crimes (incivilities) to prevent acceleration to major crimes and greater disorder [9]. The theory was initially implemented in New York and later, with certain adaptations, in Chicago, Los Angeles, and New Jersey [29]. While doubts have remained regarding its effectiveness as a criminal theory, it later became one of the most popular public policies for police almost all over the world. Police "zero tolerance" policies are based on an aggressive application of the law in enforcing minor crimes, resulting in an increase in detentions for disordered behavior—vandalism, alcohol consumption in public spaces, drug dealing, etc. [30].

Franeleros are connected to the broken windows theory in various ways but mainly through the relationship between incivility and crime. The essence of this idea is precisely that the correlation between disorder and criminality can be tested, in this case, between franeleros and the robbery of auto parts. Should this correlation be proven, it would have obvious public policy implications: The elimination of franeleros would be accompanied by a decrease in auto part robbery. Incivility here refers to the action of reserving parking spaces on public roads, charging for these spaces, and the friction between drivers, neighbors, and the francleros themselves. At the same time, streets filled with stones, concrete blocks, boxes, and buckets, etc., transmit a perception of disorder and negatively impact the quality of life of the neighborhood. In turn, fear of crime increases as a result of the perception of criminal activity [31]: According to authors such as Gau and Pratt [32], the perception of disorder is generally directly associated with the perception of incivilities and crime. This continuum, i.e., lack of differentiation between these factors (that are different), is the basis of the broken windows theory [33]. Residents of a community believe that crime is increasing as they intuitively associate disorder with crime. If the theory is correct, policing the franeleros can decrease the perception of insecurity, increase the quality of life of a neighborhood, and prevent an increase in criminality (as offenders also perceive disorder as a sign of a place that is ignored by the authorities or one of low social cohesion).

Despite the strength of this argument, aggressive policing of disorder has had mixed results. Some studies have shown positive results such as reduction of violent crimes [30], and a decrease in homicides with firearms [34], while other studies have shown that this type of policing had no effect on serious crime [35]. Finally, another current study directly questioned such policing and its results: Lehrer's [36] study was unable to provide concrete data that policing minor crimes reduces more serious crimes. At the same time, Harcourt and Ludwig [9] analyzed detentions for smoking cannabis and found no consistent evidence of a reduction of other types of crimes. These authors further argued that zero tolerance policies have displaced other practices, such a proximity policing, that may show evidence of effectiveness. This is an ongoing discussion. Tacher [37] indicated that the policing of social disorder is positive in relation to the maintenance of public order, although it has no direct effect on crime. That is, the broken windows theory may be useful for improving public order without this necessarily implying a reduction in crime [4].

That said, beyond policing disorder, some studies have gone further than the analysis of the solution (zero tolerance) to attempt to directly prove a correlation between disorder and crime. Once again, the literature presents contradictory evidence [9] or at least shows that the relationship is not perfect: Greater levels of disorder do not necessarily produce more crime [38]. Not even repeated acts of incivility appear to create an escalation of crime. Thus, Sampson and Raudenbush [11] maintained that the relationship is not one of causality but rather that both phenomena emerge out of the structural conditions of neighborhoods.

Broken Windows in Latin America

The broken windows theory has been well received in the region, particularly on the policing level. This is reflected in the Latin American literature on the issue, which has

concentrated on studying the effects of zero tolerance policies on security agendas as well as on the effectiveness of these policies for the real reduction of crime.

Regarding the first, the majority of these studies look at the increase in punitiveness derived from the application of zero tolerance policies. For example, Müller [39] identified such a policy as promoting the emergence of the penal state and the global expansion of neoliberalism in the region. Nevertheless, in some countries, such as the cases of Mexico and Uruguay, it has not been conservative governments that have incorporated the broken windows theory into public policies. In the Uruguayan case, Sclofsky [40] stated that broken windows was implemented by a social-democratic government (Frente Amplio) in response to the rising crime, even when there was no real electoral risk to the government, given that the political coalition enjoyed broad support and renewed their mandate (2004–2010). In the second period of government (2010–2015), Uruguay implemented a zero tolerance public policy. In reality, the literature indicates a general hardening of security policies in the region almost independently of the political preferences of the government of the day. For example, Sozzo [41] showed that post-neoliberal governments (Venezuela, Ecuador, and Brazil) have also adopted many harsh policies against crime due to political pressure exerted by the opposition to social movements that demand an answer to social problems through punitive measures [42]. In sum, the broken windows theory has formed the theoretical basis of hardline security agendas that have predominated Latin America over the past 20 years (street policing, more punishable behaviors, and longer sentences). These policies have resulted in a dramatic increase in the prison population [43]. Within this context, Dammert and Malone [44] noted that the increase in crime and the consequent increase in fear of crime are determinants of the extensive social acceptance of aggressive policing of disorder. Given this, Glebbeek [45]) studied the consequences of the application of heavy-handed responses in Central America, and Swanson [46] looked at the punitive inequalities of these policies in Latin American cities (in particular the consequences for marginalized youth).

On the other hand, more recent studies have emerged that focus on the reception of the broken windows theory from a crime-reduction point of view, that is, from the impact of the implementation of this theory on criminal behavior. For example, Vilalta et al. [47] studied homicide counts and census data at the neighborhood level in Mexico City and concluded that social and physical disorder cannot be considered separate elements that operate independently—the combined impact of social disorder and physical disorder is less than their independent effects. The impact of social disorder decreases as neighborhoods become less physically disordered and vice versa. In the Colombian case, Mejia et al. [48] found that the direct effects of broken window policing are more immediate and precise in lowcrime areas, but beneficial indirect effects are more relevant in crime hotspots. The effects of this policing appear to circumscribe cities with low or moderate levels of organized crime—perhaps due to the planning of activities by criminal organizations. Finally, Vilalta et al. [49] found a limited effect between homicides and physical and social disorder in Mexico City, possibly because other socio-economic components have greater weight. In turn, other authors have explored the response of youth gangs to "zero tolerance" policing in Honduras in terms of the re-spatialization of organizational structures in urban neighborhoods, the creation of new closed spaces or gang territories [50], and the restriction of public access to the center of a city as some of the most significant consequences of the implementation of "zero tolerance" policing in Mexico City [51].

3. Data

3.1. Civil Infractions

We return to the studies of Sampson and Raudenbush [52] as well as that of St. Jean [53] to categorize the work of parking attendants as social disorder. Sampson and Raudenbush argued that social disorder refers to the behavior of a third party that is considered to be threatening. As such, the central element of this type of disorder is "... the presence of actors who perform the offensive actions" [38] (p. 4926–4940).

Similarly, local Mexico City laws classify the activities of parking attendants as a social incivility. In fact, threatening and aggressive behavior by parking attendants when demanding payment from drivers is legally sanctioned. The government considers such conduct to be a "civil infraction", in accordance with article 27, section I and article 28, section II of the *Ley de Cultura Cívica de la Ciudad de México* (Mexico City Law of Civic Culture).

Article 27.- Infractions against public peace:

Provide a service without being requested, and in any way coerce the person receiving such a service in order to obtain payment for such a service. The charging of the offender will only proceed by prior complaint;

Article 28.- Infractions against citizen security:

. . .

Prevent or hinder in any way the use of public roads and spaces, the freedom of transit or action of people, without a permit or justified cause...

The unit of analysis thus comprised reports of parking attendants in each of the 1814 neighborhoods of Mexico City [54]. The reports came from 911 calls and did not include people peacefully asking for money on public roads or the homeless population. The location of parking meters was also included to identify neighborhoods with a high flow of cars and demand for parking on public roads [54].

The 911 reports and information on parking meters contain geographic coordinates that facilitated the classification of the 1814 neighborhoods of the city into four groups: neighborhoods with the presence of parking attendants, those with parking meters, those that had both characteristics, and those with neither characteristic (Table 1). We identified 20 neighborhoods that reported the presence of parking attendants and parking meters, 228 with only parking attendants, and 12 with only parking meters. Finally, 1554 neighborhoods did not report either parking attendants or parking meters. Figure 1 shows the neighborhoods with at least one report of the presence of parking attendants (248).

Table 1. Neighborhoods with reports of parking attendants and parking meters in Mexico City in 2019 [41].

Total	Parking Attendants	Parking Meters	Both	No Reports
1814	228	12	20	1554

3.2. Property Crimes against Vehicles

These crimes correspond to investigation files opened by the Attorney General of Mexico City to persecute crimes (FGJCDMX, 2022). Classification of crimes by the Prosecutor is as follows:

- 1. Robbery of automobile accessories (auto part robbery);
- 2. Robbery of objects from the interior of an automobile (robbery of objects);
- 3. Intentional damage to an automobile (intentional damage).

From 1 January to 31 December 2019, the files contained 8246 auto part robberies, 6617 robberies of objects from the interior of an automobile, and 1409 intentional damage to vehicles. The pre-pandemic period was selected to avoid the effects that the COVID-19 health emergency had on crime patterns around the world [55–58] and in Mexico [59–62].

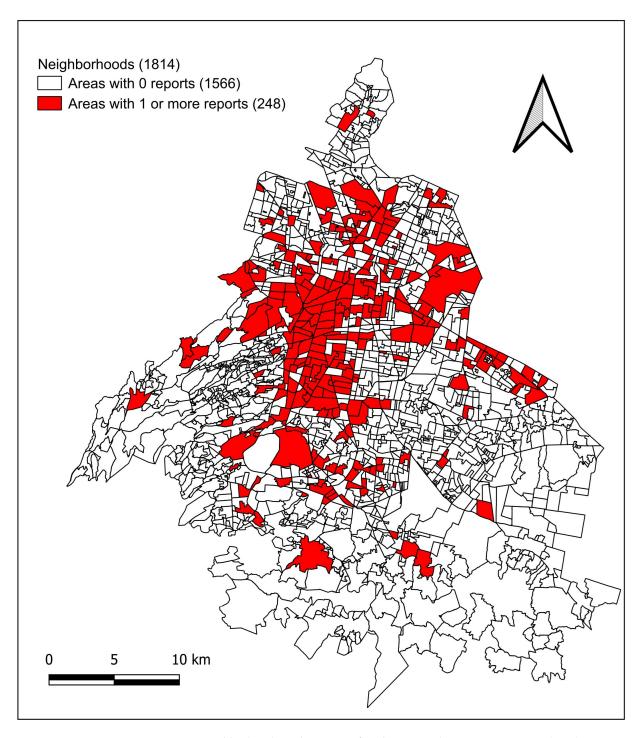


Figure 1. Neighborhoods with reports of parking attendants in Mexico City (2019).

4. Methodology

Global and local Moran's I [63] were estimated to quantify the degree of spatial auto-correlation of reports of parking attendants and the crimes of auto part robbery, robbery of objects, and intentional damage to vehicles. Using LISA maps with a 0.01 significance level, hotspot neighborhoods were identified. Furthermore, the degree of spatial correlation was tested between reports of parking attendants and crimes on vehicles using the bivariate Moran's I. The hypothesis to be tested was the spatial autocorrelation of social disorder and the significant differences between different crimes in areas that concentrate reports of parking attendants.

In order to do this, we implemented hypothesis testing to compare the crime incidence of auto part robbery, robbery of objects, and intentional damage to a vehicle in four types of neighborhoods: those with reports of parking attendants, with the presence of parking meters, with both characteristics, and with neither of these characteristics (Table 1). This allowed for the comparison of the first three types of neighborhoods (with a high demand for parking) with neighborhoods with neither parking meters nor attendants (as a base group) to analyze the crime incidence associated with places with *franeleros*.

The hypothesis consisted of the following:

Hypothesis 1 (H1). There is a significant difference in crime incidence between neighborhoods with parking attendants and neighborhoods with parking meters.

A comparison was made between areas with a high demand for parking on public roads, where one area had signs of social disorder. Neighborhoods with reports of parking attendants but no parking meters (228 neighborhoods) were compared with neighborhoods with parking meters and no parking attendants (12 neighborhoods). Non-parametric tests were used given that the count distribution of crimes per neighborhood were distributed differently to the Gaussian bell-shaped distribution. The Kolmogorov [64] Smirnov [65] and Wilcoxon [66] tests were thus implemented, with the latter applied in a differentiated way between the groups. The Wilcoxon test analyzed whether there were significant differences between the medians of property crimes against vehicles in each neighborhood. The Kolmogorov–Smirnov test compared the accumulated distributions of the property crimes against vehicles in the neighborhoods to analyze whether there were significant differences in addition to the median. This test also detected ties in the data that complicated appropriate calculations (R-4.3.1 for Windows was used). We present the results of both tests, as they show significant differences in auto part robbery and intentional damage, although not in the robbery of objects.

Finally, an unsupervised hierarchical classification algorithm for clustering was used to group neighborhoods with internal coherence but that differed from each other [54,55]. Steenbeek and Kreis [67] proposed this method "to identify areas with similar levels of disorder (from serene to "tipping" to crime-ridden) which is crucial for a valid empirical test of Broken Windows Theory". Similarly, we aimed to identify neighborhoods with similar levels of disorder and flow of neighbors and visitors, even though they were not located next to each other. With this, we attempted to identify similar characteristics of both hotspots located in different parts of the city. The classification used information on the population and tourist attractions and museums in Mexico City neighborhoods 2023). Tourist sites were included in order to identify neighborhoods with low physical disorder, as these are areas with significant investment by the local government to preserve and maintain national and international tourist attractions in Mexico City [68].

5. Results

The spatial autocorrelation tests showed that the presence of parking attendants and the crimes of auto part robbery, robbery of objects from the interior of vehicles, and intentional damage to vehicles are significantly autocorrelated in space in Mexico City neighborhoods (Table 2). Auto part robbery shows the largest spatial autocorrelation in the city (Moran's I = 0.572278), while intentional damage to vehicles has the lowest estimated autocorrelation (Moran's I = 0.093849). Regarding the results of the bivariate Moran's I, the presence of parking attendants is spatially associated with auto part robbery (bivariate Moran's I = 0.273853) and to a lesser degree with the robbery of objects from the interior of vehicles (bivariate Moran's I = 0.234785). The spatial association between auto parts robbery and robbery from the interior of vehicles is also notable (bivariate Moran's I = 0.291432). The univariate and bivariate Moran's I were significant at a confidence level of 0.01.

Moran's I	Parking Attendants	Auto Part Robbery	Robbery of Objects	Intentional Damage
Parking attendants	0.247817			
Auto part robbery	0.273853	0.572278		
Robbery of objects	0.234785	0.291432	0.324129	
Intentional damage	0.092675	0.138337	0.119211	0.093849

Table 2. Global and Bivariate Moran's I (diagonal) between variables.

Note: Values significant at a 0.01 confidence level.

Figure 2 shows neighborhoods with high levels of reports of parking attendants surrounded by neighborhoods with similar levels. These neighborhoods, in red, form two different hotspots of social disorder in Mexico City. It is interesting to note that the hotspots shown in Figure 2 overlap the tourist corridors of Roma-Condesa and San Angel-Coyoacan (Figure 3), in which are concentrated many of the main museums and places of interest for national and international tourists in Mexico [68]. In fact, 40 of the 52 museums in the city are located within these clusters (76.92%). The neighborhoods and their surroundings undergo constant maintenance by the city government due to their national and international attraction [68]. Such is the case of the Frida Kahlo Museum, dedicated to the celebrated painter and located in the "Del Carmen" neighborhood, and the National Museum of Anthropology in "Bosques de Chapultepec" that exhibits the main archaeological pieces found from Aztec and Mayan cultures. Figure 3 shows the museums as green points located within the hotspots of Figures 2 and 4.

Despite the lack of physical contiguity between the two *franeleros* hotspots, some neighborhoods in both areas have similar levels of population, museums, and tourist attractions. The clusterization algorithm identified five neighborhoods that form part of both hotspots or are located in their proximity: Bosques de Chapultepec and Centro IV and VIII are part of the Roma-Condesa corridor and are located on its edges (upper part of Figure 3). The neighborhoods of San Ángel and Del Carmen are spatial neighbors with the parking attendant hotspot located in the south and form part of the San Angel-Coyoacan tourist corridor (lower part of Figure 3). The five neighborhoods mentioned were grouped in the same cluster by the algorithm, as they have a similar number of inhabitants, museums, and other tourist sites of interest.

Figure 4 shows 32 neighborhoods with high levels of auto part robbery that neighbor others with high reports of parking attendants (high-high in red). The map maintains the pattern from Figure 2, in which two different hotspots appear, corresponding to the Roma-Condesa and San Angel-Coyoacan tourist corridors (Figure 3). The spatial pattern between auto parts robbery and the presence of parking attendants thus coincides with the clusters identified in Figure 2 (99% significance level).

Regarding crime incidence per type of neighborhood, on average, more crime occurred in the 228 neighborhoods with reports of parking attendants than in the 12 areas with only parking meters. Auto part robbery and intentional damage occur, on average, 3.64 and 4.9 times (respectively) more than in areas with parking meters. Differences in median values were also greater in neighborhoods with parking attendants for auto part robbery and intentional damage (Table 3). These differences are statistically significant with a 5% confidence level, according to results of the Kolmogorov–Smirnov and Wilcoxon tests (Table 3). However, while on average there is a greater incidence of robbery of objects from the interior of vehicles in areas with reports of parking attendants (10.21 robberies) than in areas with parking meters (8.33), the mean, the median, and distribution differences of these crimes are not significant (Table 3).

Furthermore, as was expected given the demand for parking on public roads, the 20 neighborhoods with parking attendants and parking meters had a higher number of auto part robberies and robberies of objects from vehicle interiors than the other three types of areas (Figure 5). Finally, among all neighborhoods studied, those with neither parking

meters nor parking attendants had, on average, the lowest incidence of auto part robbery, robbery of objects from vehicle interiors, and intentional damage (Figures 5 and A1).

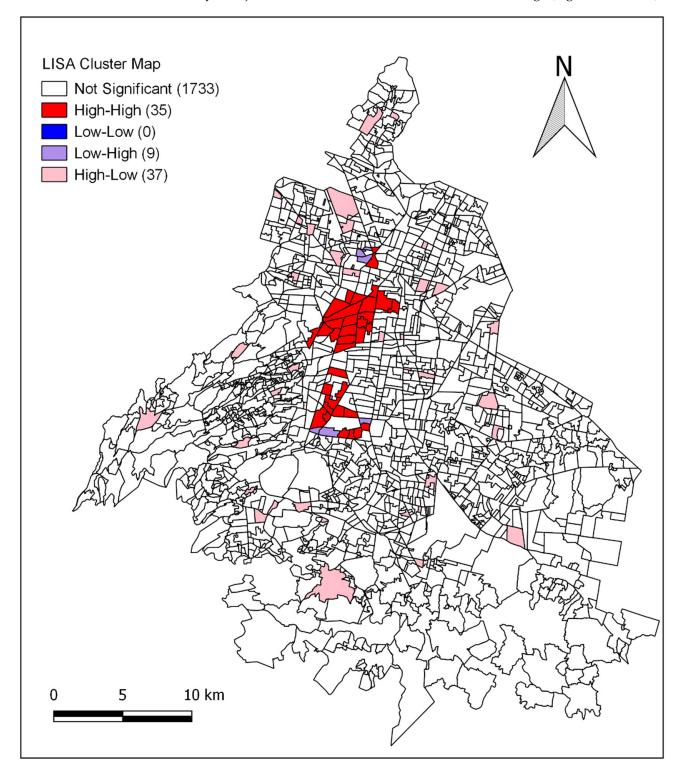
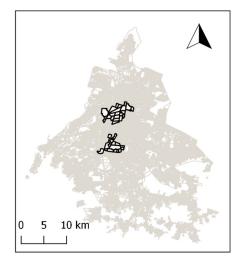
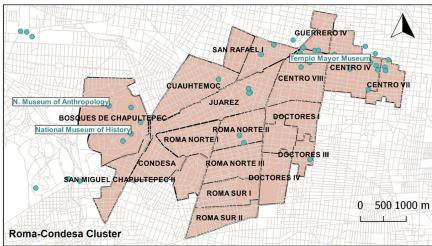


Figure 2. LISA map where 35 neighborhoods spatially concentrate reports of parking attendants in Mexico City during 2019. Significance level of 99%.





Top visited museums in Mexico City North cluster National Museum of History National Museum of Anthropology TemploMayor Museum South cluster Frida Kahlo Museum

Source: National Institute of Anthropology and History (2023)

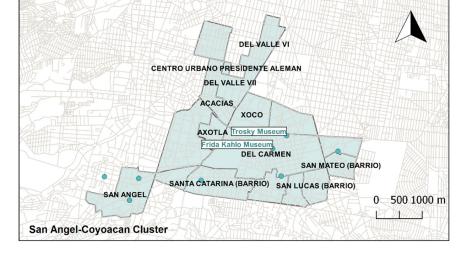


Figure 3. Main streets of parking attendants and auto part robbery hotspots. The neighborhoods of Roma Norte and Condesa fall within the center of the northern tourist corridor [68]. The Del Carmen neighborhood is located in the center of the southern tourist corridor [68]. The green points depict the city's museums.

Table 3. Crime incidence per type of neighborhood in Mexico City (2019).

	Parking Attendants (228 Neighborhoods)	Parking Meters (12 Neighborhoods)	Parking Attendants (228 Neighborhoods)	Parking Meters (12 Neighborhoods)
Crimes	Average	Average	Median	Median
Auto part robbery	14.26	3.91	8.0	1.5
Robbery of objects	10.21	8.33	6.0	6.0
Intentional damage	1.618	0.33	1.00	0.0
	K-S test p-value	Wilcoxon test p-value		
	0.0414 **	0.0017 ***		
	0.5935	0.6659		
	0.0450 **	0.0033 ***		

Note: ** *p* < 0.05; *** *p* < 0.001.

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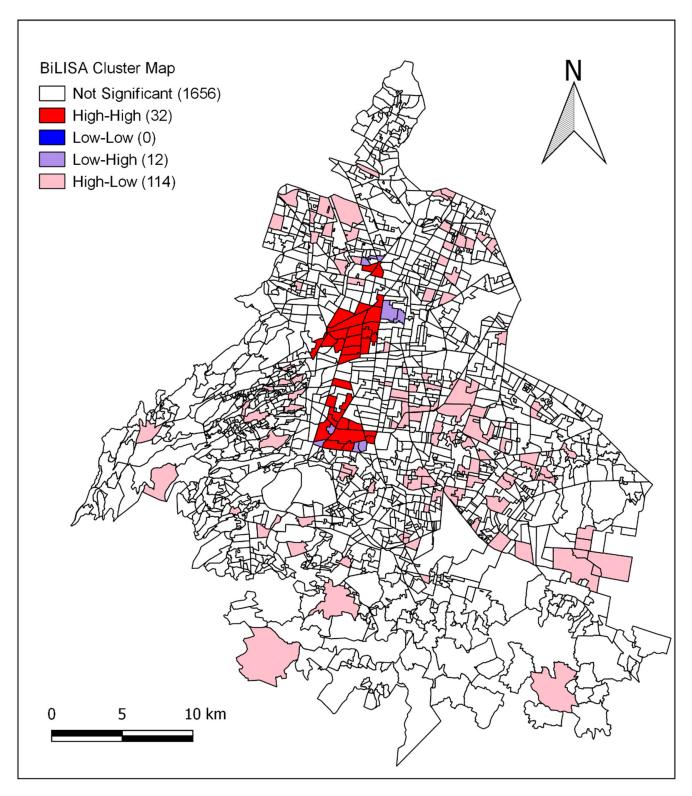
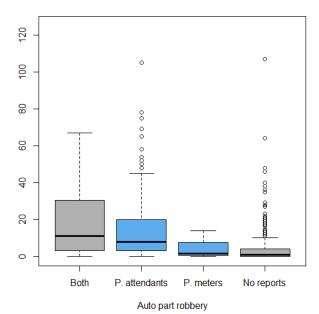


Figure 4. Bivariate LISA map of auto parts robbery and the presence of parking attendants (lag). Significance level of 99%.



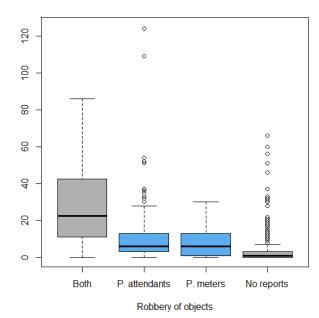


Figure 5. Frequency of robberies per type of neighborhood in Mexico City (2019). Auto part robbery is greater in neighborhoods with *franeleros* than in those with parking meters but not for robbery of objects from vehicle interiors (blue bars).

6. Discussion

We found that the presence of third parties who solicit money in a threatening way in return for taking care of cars form two separate clusters in the city and are spatially associated with auto part robbery and intentional damage to vehicles. We also found that in neighborhoods with this type of social disorder, there is probably a higher crime incidence of auto part robbery and damage to vehicles than in areas with similar populations and flows of people and vehicles but without the presence of parking attendants.

On one hand, it is possible that social disorder tends to be significantly concentrated in space as a result of the complex policy of the state itself: parking attendants are tolerated in certain areas, where their organization is permitted, and they are incorporated to a certain degree into the state structure, while at the same time, they are persecuted in other areas through detentions for administrative infractions (Argüelles, 2014). The spatial effects of these policies may explain the results. Neighborhoods in the city with a high demand for parking attract those who are prepared to take care of cars (at least 248 neighborhoods, as shown in Figure 1). Furthermore, local authorities have formalized these activities in the neighborhoods that constitute the central municipalities of the city with a government program [20]. It is possible that parking attendants use their social networks to include friends and family in these opportunities for informal work. Consequently, spatial clusters emerge that concentrate the presence of parking attendants (32 neighborhoods, as shown in Figure 2). Finally, as the activity is tolerated but can be sanctioned, parking attendants depend on the discretion of unions and local authorities, who take advantage of the fees and votes provided by the parking attendants.

The spatial grouping reinforces social disorder, as more people become interested in taking care of cars, and unions and local governments can acquire higher fees in neighborhoods with high flows of people prepared to pay for parking. As such, the social disorder analyzed (*franeleros*) is not even directly linked to places that are physically deteriorated (trash on the corners, graffiti, abandoned cars, etc.), but on the contrary, the spatial autocorrelation of parking attendants is associated with areas in Roma-Condesa and San Angel-Coyoacan with a high flow of pedestrians and with a wide offer of services to passers-by (restaurants, bars, cafés, museums, etc.). The government has invested in maintaining these neighborhoods, attracting a substantial flow of local and international visitors to attractions in the city. The classification algorithm shows that these types of

neighborhoods are located in both hotspots (Figures 2 and 3). Consequently, it is possible that the high flow of local inhabitants and visitors who demand parking on public roads make these neighborhoods more attractive for parking attendants than other areas of the city.

In sum, the spatial correlation tests and classification algorithm identified neighborhoods where no signs of physical breakdowns of the public space that ordinarily function as indications of the ability to commit crimes without being arrested could be identified [2] while, at the same time, concentrating social disorder due to the undesired effects of policies to formalize employment (Figure 2). Signs of incivility may thus be due to the permissiveness of local authorities who authorize the provision of services on public roads to people from outside these areas. As these signs are not accompanied by a physical deterioration, they do not appear to be strong enough to attract a variety of crime, but rather, criminal activity is limited to auto part robbery and intentional damage to vehicles in areas where the behavior of social disorder is focused on vehicles that may be the targets of robbery or damage.

Consequently, it is necessary to refer to the rational choice theory to discuss the results that show the greater incidence of auto part robbery and damage to vehicles in neighborhoods with social disorder [16]. It is possible that criminals are attracted to areas where they can easily pass unnoticed, analyzing cars to steal their accessories. The presence of parking attendants is thus a sign that attracts criminality to certain places, as is argued by the broken windows theory. However, it is also possible that criminals who steal auto parts are also attracted because it is easier for them to estimate the expected benefit of an accessory by analyzing the brand and model of vehicles rather than due to generalized disorder. The rational choice theory would also explain why there are no significant differences in the robbery of objects from the interior of vehicles in these areas of social disorder. Criminals cannot estimate the expected benefit from a robbery in these neighborhoods any better than in others, as the expected income is only known once the crime has been committed (the car has been opened and the belongings extracted). Finally, intentional damage may be due to threats carried out against drivers who do not agree to pay the amount demanded.

This research thus produced mixed or contradictory results [9], or better said, the relationship is imperfect (as has been mentioned): Incivility appears to be correlated with certain forms of crime (auto part robbery and intentional damage) but not with other associated crimes (robbery from vehicle interiors). The findings are consistent with the studies of Sampson and Raudenbush [11] that proposed that no causal relationship exists between disorder and crime, but rather, they both originate from underlying conditions in a neighborhood. This seems to be the case for the spatial link between parking attendants, auto part robberies, and damage to vehicles in Mexico City: Particular conditions encourage and spatially concentrate a certain type of social disorder and certain types of crimes. As argued by Yang [33], incivilities do not necessarily produce generalized crime, not even, as stated by Keizer et al. [3], in cases of repeated acts of incivility, which is exactly the situation of *franeleros* who operate daily in the same streets and urban areas.

In this way, the explicit hypotheses of spatial effects for understanding the spatial concentration of social disorder and the crimes that arise in these areas contribute to the understanding of the usefulness of the broken windows theory [1]: It may function as a theory of crime of place for certain types of crimes but is not necessarily a general theory of crime.

This study has certain limitations. The spatial concentration of the analyzed crimes (Figure A2) may correspond more to the crime opportunities created by the high flow of vehicles and pedestrians [69] than to the incivilities considered by the broken windows theory. The spatial concentration of *franeleros* reflects the high demand for parking in public road, resulting in a high flow of vehicles that are suitable targets for likely offenders. It is possible that neighborhoods with reports of parking attendants have a higher flow than neighborhoods with parking meters, which may explain the greater auto part robbery and intentional damage in these neighborhoods and the concentration in the same neigh-

borhoods. However, if the higher incidence of auto part robbery and intentional damage to vehicles was related to a higher number of vehicles, then we should also see a higher incidence of robbery of objects from the interior of vehicles (with more objects available and the constant capacity of guardians, as they are the same neighborhoods). Nevertheless, the results show no significant differences in this type of robbery.

Despite this, we cannot discount the possibility that the Roma-Condesa and San Angel-Coyoacan clusters are "Target Rich Places" that increase crime risk [70] and, at the same time, that signs of neighborhoods with social disorder attract rational criminals seeking to increase their expected return. In fact, it is possible to characterize the behavior of offenders as rational within the framework of the routine activity theory of crime [71]. However, there is recent evidence from a natural quasi-experiment that identified rational criminal behavior in Mexico City that does not appear to be explained by routine activity theory [72]. The authors found that robberies around bus stops increased with the decrease in the cost of execution of a crime, within a context in which the flow of suitable targets decreased, but the capacity of guardians remained constant. Despite the progress, without better evidence on criminal behavior, the direct study of the rationality of offenders continues to be a limitation for the study of crime.

7. Conclusions

In conclusion, it is possible that incivilities of social disorder (the presence of parking attendants) are related to auto part robberies and intentional damage caused to vehicles, given that signs of impunity for criminals are created in relation to the automobiles themselves as possible material objects of crime. In this way, we aimed to respond to the original research question by showing that social disorder is spatially concentrated and is associated with other crimes in the same area. The presence of *franeleros* is not only an indicator of social disorder but also of the robbery of auto parts and intentional damage to vehicles. However, it is difficult to attribute the spatial concentration of robberies to a lack of informal control by residents who stop frequenting such areas, as the hotspots comprising the Roma-Condesa and San Angel-Coyoacan areas have high levels of commercial and tourist activity with high pedestrian flows. The Mexico City government has identified both areas as emblematic for global tourism in the city, and thus, the physical environment of these areas is closely taken care of. As such, the signs of social disorder are not necessarily linked to signs of physical disorder, at least not in the case of these areas of Mexico City.

This has a direct consequence for public policy, as there are no real problems of physical disorder to resolve (except, perhaps, the obstacles that are placed in the streets by the *franeleros* to prevent parking without their authorization), and at the same time, local authorities have still not defined parking attendants as a problem of incivility that can be resolved simply through aggressive policing. On the contrary, they are accepted as a minor inconvenience, and attempts have been made to incorporate them into state functions as a way of protecting the public space (regulating traffic) in some areas. In reality, however, this ambiguous attitude by the state also reinforces the spatial agglomeration of social disorder. The disconnect between physical disorder and social incivilities has perhaps inhibited the acceleration of a criminal dynamic in these areas, that is, an increase in other, possibly more serious and violent crimes (or a change from property crimes to crimes against persons). Consequently, the spatial effects are limited to certain types of robbery and damage to vehicles. At the same time, it appears to impede the design and implementation of a clear public policy in this regard.

Future Research

Finally, there is one issue not dealt with in this study but that remains necessary to develop better in order to incorporate it into the model of analysis: the perception of disorder and its spatial effects. One of the central points of the broken windows theory is that a perception of disorder is associated with a perception of incivilities and crime. However, this has not been studied in depth, particularly when there is no perception (we

assume) of disorder (as there is no physical deterioration), while there is a perception of incivilities (parking attendants). Future research should focus on incorporating the spatial effects of these perceptions of the model in such a way that what people perceive of both factors also serve to explain, to a certain degree, criminal behavior.

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Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

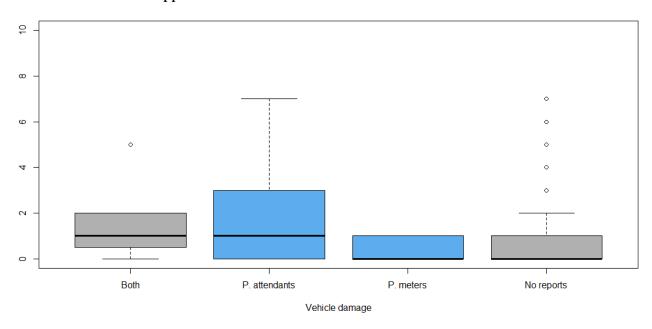


Figure A1. Frequency of intentional damage to vehicles by type of neighborhood. Significant differences are evident between neighborhoods with parking attendants and those with parking meters.

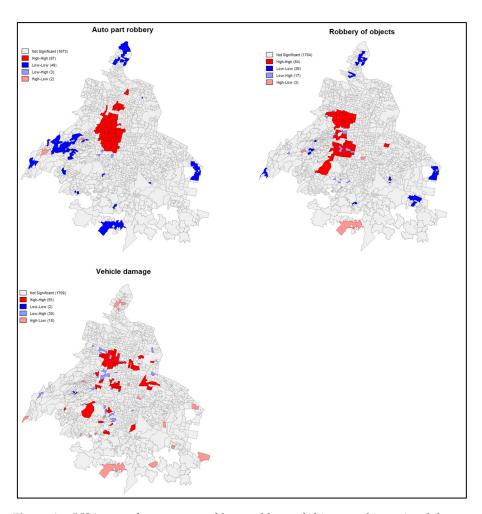


Figure A2. LISA maps for auto part robbery, robbery of objects, and intentional damage to vehicles.

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