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Crime Risks Increase in Areas Proximate to Theme Parks: A Case Study of Crime Concentration in Orlando

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ABSTRACT
Research has examined the influence of ecological characteristics of cities on spatial crime distributions. Given the potential economic and human impacts, a subset of this work has focused on special events or specific venues, which attract a significant number of people and represent unique logistics. In this context, the spatial attributes of tourist cities, particularly those near heavily trafficked attractions, may be related to elevated risk for property crime and violence. This study examines crime patterns surrounding Universal Studios Florida theme park by analyzing census block data in Orlando. Various statistical techniques are utilized including geospatial mapping, local indicators of spatial association analysis (LISA), and spatial regression analysis controlling for autocorrelation between neighborhoods. Results indicate that the location of the theme park is associated with uneven crime distribution in Orlando, but those impacts are significantly influenced by the consideration of crime-generating/attracting facilities located within census blocks.

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Introduction

The criminology of place occupies a central position in both historical and modern-day criminological thought and research (Shaw & McKay, 1942; Sampson, 2013; Weisburd, Groff, & Yang, 2012). Generally, this line of research has focused on how crime is patterned in certain locales throughout a city (or region), how it waxes and wanes over a period of time or season(s) of the year, and how some crimes are concentrated near categories of potential crime-generating/attracting milieus, such as bars, restaurants, shopping malls, casinos, and tourist attractions. While the literature on the criminology of place is voluminous and nuanced, key findings from the empirical research examining geographical crime patterns consistently show that crime is concentrated in measurable "hot spots," which typically include a small proportion of addresses, street segments, or facilities (e.g. Sherman, Gartin, & Buerger, 1989; Weisburd & Telep, 2014).

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Theoretically, the routine activity perspective is central to trying to understand the locale-specific patterning of criminal activity. At its core, routine activities predicts that crime will be more likely to occur when motivated offenders meet suitable targets or victims in a space without a capable guardian (Cohen & Felson, 1979). While routine activities theory has been linked to other criminological theories, most notably rational choice, it also fits nicely within the more general environmental criminology perspective that relates to crime prevention and policing strategies oriented toward the concentration of crime in certain locations (Braga, Papachristos & Hureau, 2014). From this perspective, tourism has attracted attention from scholars studying crime concentrations and other spatial dynamics, because tourist venues attract larger than average crowds (representing both motivated offenders and suitable targets), often feature unusual temporal elements such as late-night activities, and are difficult to police using traditional methods (Cohen, 1979; Harper, 2000; Ryan, 1993).

In this paper, we contribute to the literature on the relationship between tourism and crime by examining the concentration of crime and related spatial attributes near one high profile theme park, Universal Studios Florida. Such an analysis is of interest not only for criminological purposes, but also for enhancing strategies that police, private security, and theme park officials may consider to keep its visitors safe. The issue of safety is no small matter when it comes to the adverse effects of crime within the tourism industry broadly, and safety concerns directly impact individual and family decisions about whether to attend an event or visit a tourist attraction (see e.g. Brown, 2015; Hajibaba, Gretzel, Leisch, & Dolnicar, 2015; Schroeder, Pennington-Gray, Kaplanidou, & Zhan, 2013; Seabra, Dolnicar, Abrantes, & Kastenholz, 2013). Moreover, Orlando represents an especially important locale as a case study in tourism-related crime, due to its outsized influence relative to the broader tourism industry as well as the local economics throughout Florida. Next, we introduce a line of studies regarding tourism and crime, and then move to an overview of the relationship between theme park and crime concentration.

Tourism and Crime

Tourism impacts various facets of society, including economy, culture, and environment (Fujii & Mak, 1980). The negative environmental externality of increased crime has attracted some attention from researchers (Dimanche & Lepetic, 1999), and numerous studies have examined the relationship between general tourism and crime in different contexts (Chesney-Lind & Lind, 1986; Fujii & Mak, 1980; McPheters & Stronge, 1974; Miller & Schwartz, 1998). Overall, scholars have observed a positive association between tourism and crime (i.e. more tourists lead to a higher likelihood of criminal victimization), with various reasons to anticipate such a relationship. In addition to swelling crowds of potential victims and offenders, which suggest greater exposure to risk as a function of chance, there are many variables that contribute to crime opportunity.

The most popular explanation for the link between tourism and crime is that tourists may attribute the concentration of opportunities for crime because they play a role of vulnerable victims or motivated offenders (Barker, Page, & Meyer, 2002).

Tourists tolerate various behaviors that are not acceptable in everyday life in tourist attractions (Ryan & Kinder, 1996). From the victim's perspective, a carefree "vacation" mentality expected in tourist venues (Cohen, 1979) may be accompanied by diminished situational awareness, greater exposure to intoxicants, and overreliance on third-party guardianship; tourists may also typically carry cash and valuables (Harper, 2000), and in the case of international travelers, language and cultural differences could represent barriers to reporting crime after the fact. From the offender's perspective, these vulnerabilities may contribute to an enhanced assessment of the reward to risk ratio in targeting tourist areas, consistent with routine activity theory (Cohen & Felson, 1979).

Evidence for a relationship between tourism and crime has been studied within the context of the routine activity perspective. Generally, research has revealed a positive association between increasing tourism and crime rates in the community (Fujii & Mak, 1980; McPheters & Stronge, 1974; Walmsley, Boskovic, & Pigram, 1983; Van Tran & Bridges, 2009). Many studies have employed official data to compare tourism figures and crime rates. For example, McPheters and Stronge (1974) found that property crime rates for robbery, larceny, and burglary appeared consistent with tourism trends in Miami. Most recently, Van Tran and Bridges (2009) analyzed data from forty-six European countries and found higher rates of property crime in countries with a greater number of tourists.

Meanwhile, research comparing crime rates of tourism places with comparison places has found a significant difference in crime rates in large part due to the number of visitors (Chesney-Lind & Lind, 1986; Walmsley, Boskovic, & Pigram, 1983). For example, Chesney-Lind and Lind (1986) compared the crime rates in two Hawaii counties which have a huge difference in the number of visitors. The results revealed a higher crime rate in the more visitor dominated county than the counterpart county. Similarly, Ochrym (1990) examined crime rates of three tourist destinations and found that communities with a casino have higher mean crime rates than urban centers.

Geographically speaking, several elements such as reward, visibility, access, and inertia that characterize the suitability of targets motivate criminals to favor places where vulnerability is often observed (Barker, Page, & Meyer, 2002). In this context, tourist venues specifically create more favorable environmental conditions for criminals (Gartner, 1996). Relatedly, the demand from visitors for illegal goods, such as prostitution or drugs, is another likely factor contributing to a highly localized manifestation of the tourism-crime relationship. Supporting this idea, Ryan (1993) classified the relationship between tourism and crime into five types[1] that involve tourists as either victims or offenders and suggested that criminal activity could be a byproduct of certain demands of tourists localized to tourist venues.

More specific insight has been accomplished with spatial and temporal consideration of tourism effects. Chesney-Lind et al. (1983) analyzed the crime trends of Honolulu for 23 years and the findings revealed a positive relationship between tourism trends and the crime rate that was mainly predicted by the number of tourists in the resort community of Honolulu. Similarly, Curran and Scarpitti (1991) examined the

[1]The five types include: (1) tourists as incidental victims; (2) the tourist location as a venue for crime; (3) tourism, the provider of victims; (4) tourists—generators of a demand for criminal activity?; and (5) tourists and tourist resources as specific targets of criminal action.

long-term crime rates of Atlantic City that legalized casinos in 1978 and found an increase in property crime rates while violent crime rates continuously declined. Most recently, Biagi and Detotto (2014) examined the role of geographic effects of tourism based on the types of tourism across destinations. Their results showed that the influence of tourism on crime rates is relatively considerable, particularly with tourist-centric recreational venues as compared to natural attractions.

Spatial Effects of Stadiums and Theme Parks on Crime

Although a handful of studies suggested the decay of effects from specific environmental facilities such as bars (Bernasco & Block, 2011; Groff & Lockwood, 2014; Haberman & Ratcliffe, 2015; Ratcliffe, 2012), the focus on spatial effects of large size infrastructures or events, including sports stadiums or theme parks, on crime distribution is relatively new to criminology. Research on crime concentration around specific types of special events or tourist attractions has grown in recent years. Much of this work has identified crime patterning related to sports, mainly by researchers in the United Kingdom who have focused on crime concentration around soccer (football) stadiums (see Kurland, Johnson, & Tilley, 2014; Kurland, Tilley, & Johnson, 2018), with results indicating more crimes in the areas around stadiums on game days compared to non-game days. Other studies have also explored the decay of spatially distributed crime patterns around sporting events at varying distances from the venue. Breetzke and Cohn (2013) found that certain crimes (assaults, drunk, and disorderly conduct) increase up to a 1-mile radius around soccer and rugby stadiums in a South African city, while Billings and Depken (2011) observed that areas immediately surrounding NFL and NBA games in Charlotte, NC incur more violent and property offenses—which tend to decline one and two miles away from the venues. The importance of geographical scale is critical because it shows that crime is spatially concentrated around the venues themselves and decays with distance away from the venues.

Two recent studies in the United States examined crime concentration around a major arena (The Prudential Center) in Newark, NJ on National Hockey League (NHL) game days compared to non-NHL game days as well as crimes around Busch Stadium in St. Louis, MO, home of the St. Louis Cardinals Major League Baseball (MLB) team. Using crime data on 216 game days and 216-matched comparison (no) game days between 2007 and 2015, Kurland and Piza (2018) detected significantly more crime on game days than non-game days, with thefts (various types) and robberies among the most common. Moreover, they found that certain street segments falling within one kilometer of The Prudential Center having a significantly higher number of crime events and crime on game days remained higher than crime on non-game days even over five kilometers (3.1 miles) away. Mares and Blackburn (2019) undertook a comprehensive 23-year analysis of crime during home game days of the Cardinals. They found significant and substantial increases in crimes on game days up to 1.5 miles surrounding the stadium, especially for larcenies, motor vehicle thefts, simple assaults, disorderly conduct, and destruction of property.

With respect to amusement parks, peer-reviewed research on crime concentration is sparse. Nichols (2008) examined crime patterns within two buffers (.5 mile and 1 mile) surrounding Valleyfair Amusement Park and Canterbury Park (a horse racing

facility) in the town of Shakopee, Minnesota. Descriptive analysis of crime data for the years 2002 and 2007 showed that the number of crimes increased in both locales. For example, in 2002, there were 27 crimes within a mile of Valleyfair Amusement Park and 38 crimes in 2007, while the respective numbers for Canterbury Park were 61 and 215 in 2002 and 2007, respectively. There were similarities with respect to the most commonly reported crime types as well. Drugs, theft, and miscellaneous crimes were the most common at Valleyfair, while drugs, miscellaneous, property damage and theft were the most common at Canterbury Park. Although Nichols did not perform any predictive analysis, he did note the rather large number of patrons and the longer opening hours at Canterbury Park.

Beyond the peer-reviewed literature, analyses by the *Los Angeles Times* focused on Southern California theme parks (Disneyland Resort, Universal Studios Hollywood, Six Flags Magic Mountain, and Knott's Berry Farm) from 2014 through the first half of 2016 revealed that crime rates were lower inside the parks than in the cities surrounding them (Stych, 2017). Not surprisingly, property crime rates were higher than violent crime rates for every million visitors within the parks. As one example, Disneyland Resort had a property crime rate of 10.3 for every one million visitors while its corresponding violent crime rate (including the Resort, Disney California Adventure, Downtown Disney, and three hotels) was 1.41 for every one million visitors. Corresponding rates in the cities surrounding these tourist attractions were much higher.

Current Study

Although there is a limited knowledge base focused on assessing the relationship between tourist attractions and crime, to the best of our knowledge there has been no such peer-reviewed study focused on the spatial concentration of crime around prominent theme parks in the United States. Accordingly, this study examines the extent to which crime is (a) concentrated in neighborhoods near one such theme park, Universal Studios Florida, and (b) may dissipate as one moves away from the theme park, akin to the notion of distance decay documented elsewhere (see Rengert, Piquero, & Jones, 1999; Kurland et al., 2018). To study these phenomena, we feature Orlando crime data from 2015 to 2017, performing a geospatial analysis with crime maps and local indicators of spatial association analysis (LISA), as well as estimating spatial regression models controlling for geographic autocorrelation with various zones (such as census blocks within a one-mile radius around the park). The analysis also controls for several variables widely used in previous macro-level analysis, indicating the number of crime generating or attracting facilities such as bars or hotels, as well as disadvantage in the neighborhood such as the percentage of vacant homes, as well as the percentage of Hispanic population and the percentage of Black population. The following two hypotheses are examined:

> Hypothesis 1: Census blocks within one mile from the theme park will have higher crime rates than others, while controlling for structural factors.

> Hypothesis 2: In addition to the theme park proximity effect, there will be an indirect tourism crime effect from the presence of known crime attractors (hotels, bars, etc.) in areas proximate to the theme park.

Study Sites

Orlando, Florida claims one-third of North America's total theme park attendance, and in 2017 alone, the City reported that a record 72 million visitors attended its various theme park attractions (Schneider, 2018). Demographically, Orlando is a metropolitan city with a 2017 population estimate of 280,257 located within an area of approximately 110 square miles in the center of the Florida peninsula.

Orlando is world famous as a family-centric recreational tourism destination, with international theme parks such as Walt Disney World, Universal Studios, and SeaWorld. Those parks are situated in the southwest quadrant of the city, and various amenities and commercial places, including a shopping mall, hotels, and restaurants, are located nearby (see Figure 1; Universal Studies is the dark blue shaded portion on the middle-left hand side of the map). Orlando also possesses relatively high crime rates compared to the average of the State of Florida and the United States (Federal Bureau of Investigation, 2018). Table 1 illustrates relatively higher crime rates in Orlando compared with the state and national averages, with the city having more than double the comparable rates for both property and violent crime categories. Although the influx of tourists and the documentation of above-average crime rates is consistent with other published studies, the comparison of crime rates alone lacks essential spatial context. Furthermore, it is ideal to include all theme parks and their surrounding neighborhoods in the analysis in order to examine the effect of tourism. However, Universal Studios is the only theme park which is located within the Orlando municipal boundary. Other parks are considered as a part of the Orlando metropolitan area, but practically they are situated beyond the jurisdiction of the Orlando Police Department. Thus, data capturing crime incidents for those theme parks were unavailable for analysis. As a result, this study is focused on potential criminogenic effects, including crime concentration and corresponding distance decay, related to Universal Studios Florida and its surrounding census blocks.

Research Design

The primary purpose of this study is to examine the effect of tourism, especially from a high-profile theme park, on crime rates of a nearby neighborhood. Few studies have assessed the influence of tourism focusing on its geographic characteristics while controlling other community and environmental features. Without the consideration of other neighborhood characteristics, it may not be clear whether the theme park effect would persist independent of these influences. To control for neighborhood characteristics, data representing census-defined jurisdictions are employed, and consequently, the census blocks are utilized as the unit of analysis. Census blocks are the smallest census designation used by the U.S. Census Bureau that contains demographic characteristics of communities such as ethnic composition and housing situation of residents. Thus, 4,588 census blocks in Orlando are included in the analysis.[2]

[2]A total 5,469 census blocks are identified as situated in Orlando boundaries. However, after consideration of geographic characteristics of Orlando such as lakes, 4,588 census blocks are included in the analysis.

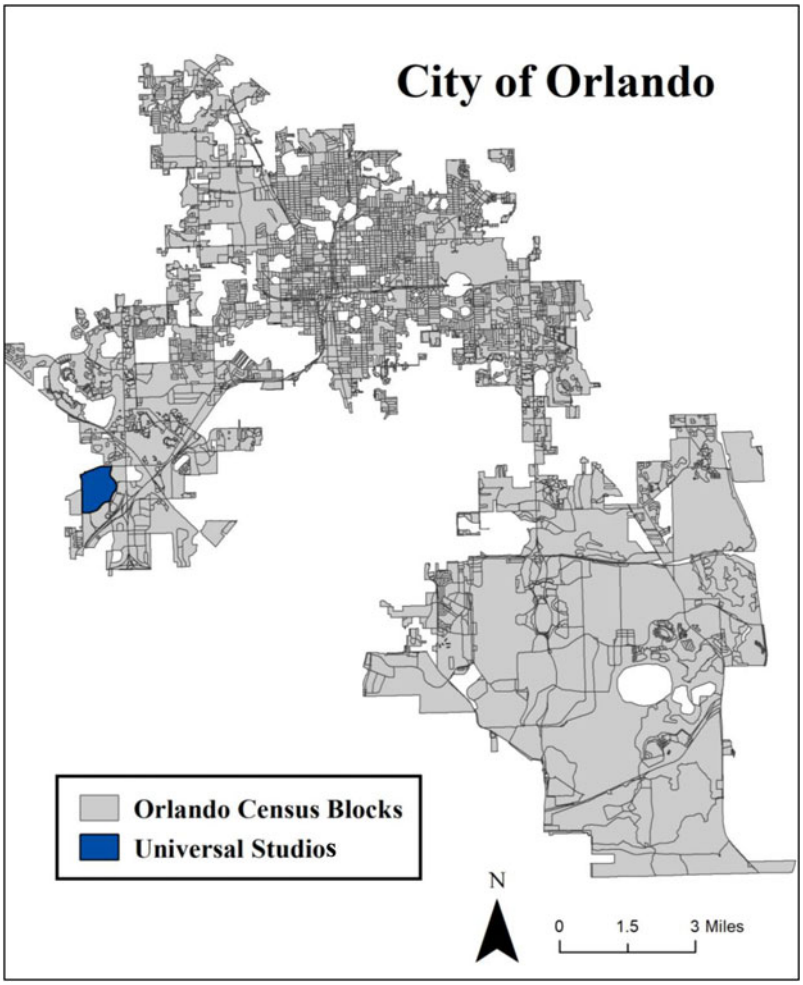

Figure 1. Orlando city limits and theme park locations.

Table 1. Orlando versus state and national crime rates in 2017.

	Orlando	Florida	National
Total Crime	6,198	2,920	2,756
Violent Crime	744	408	394
Property Crime	5,455	2,512	2,362

*Crime rates per 100,000 population (FBI, 2018).

Data

The data featured in this analysis includes three components: crime, theme park, and environment and demographic features of census blocks. Incident-level crime data from the Orlando Police Department (OPD) for three years (2015–2017) were used to compute census block-level crime rates. Among various crime types, only Part I violent and property offenses, as well as narcotics violations, were included in this study. Homicide and rape were excluded from the analysis since these offenses were very

rare. The crime data that were originally geocoded by the OPD and additional geocoding processes with the address of the crime incident are utilized to maximize the geocoding hit rate. As a result, among 60,108 UCR Part I crime incidents, about 88% of cases were successfully geocoded[3], and crime rates of census blocks were subsequently calculated using Geographical Information System (GIS) software. To examine the influence of theme park location on crime rates of proximal census blocks, the census blocks whose centroids are within one mile from Universal Studios are marked as Zone 1, and the Euclidean distances from the centroid of the Universal Studios to centeroids of other census blocks were calculated. Thus, proximity to the Universal Studios area is captured in two ways: being within a one-mile radius and computed centroid distance, both captured at the census block level.

Furthermore, some environmental characteristics are considered critical to explain crime distribution at the macro level such as number of hotels, bars, or ATM branches, since they provide very specific opportunities for crime (Bernasco & Block, 2011). Scholars argue that certain facilities play a role of generator or attractor of crime by attracting large numbers of people that may likely be victims or offenders (Brantingham & Brantingham, 1995). To measure crime-attracting or generating facilities for each census block in Orlando, the business tax receipts issued by the City of Orlando to permit business in the city are employed. A subset of four types of businesses was chosen, including hotels, motels, bar/package sale, and restaurants during the period of 2000 to 2017. The number of crime-attracting or generating facilities was also computed using GIS software and calculated for each census block.

Furthermore, neighborhood structural characteristics were utilized to control endogenous effects of neighborhoods on crime rates. Social disorganization theory (Shaw & McKay, 1942) generally suggests that structural features of a community such as concentrated disadvantage, residential mobility, and racial/ethnic heterogeneity influence the quality of neighborhood social ties, as well as the ability and willingness to solve community problems (Sampson, 1986; Sampson & Groves, 1989; Sampson, Raudenbush, & Earls, 1997; Shaw & McKay, 1942). Based on theoretical explanation and measurement strategy of previous literature (see Willits, Broidy, & Denman, 2013), major elements of social disorganization are captured from the 2010 Census data. In particular, residential mobility is measured with the proportion of vacant houses within the census blocks while racial/ethnic heterogeneity is captured by the proportion of Black and Hispanic population. Lastly, population density is employed to consider the number of people residing in a census block. Table 2 presents the descriptive statistics of features for census blocks.

Analytic Strategy

The current study was designed to examine the spatial effect of tourism in various ways. First, crime is spatially investigated over census blocks. The examination of the

[3]In spite of the attempts to maximize the geocoding hit rate for crime incidents, the hit rate is not considerably higher because some crime incidents either do not have any geospatial information or have limited crime attributes, dropping them from the analysis. However, the success rate of geocoding remains above the minimum acceptable level of 85% (Ratcliffe, 2004).

Table 2. Descriptive statistics for Orlando census blocks ($N = 4{,}588$).

Variable	Mean	*SD*	Min.	Max.
Crime	11.59	47.91	0	1,568
Zone 1	0.03	0.17	0	1
Distance (km)	12.59	5.09	0	28
Facility	0.38	2.04	0	39
Pct Black	13.91	28.22	0	100
Pct Hispanic	11.61	19.49	0	100
Pct vacant house	7.87	13.90	0	100
Population density	8.38	19.19	0	463

concentration of crime near the theme park area might indirectly explain the effect of tourism on crime in Orlando. This process began with geocoding crime incidents in ArcGIS, facilitating computation of crime counts per census block and distances between census block centroids. The choropleth map of crime rates in Orlando illustrates crime distribution across census blocks. Furthermore, the shapefile of census blocks with crime counts was exported to GeoDa software in order to generate spatial weights and calculate the spatial correlation between census blocks regarding crime rates in Orlando. The local indicators of spatial association (LISA; Anselin, 1995) represents spatial information about the distribution of crime concentration over census blocks, showing areas of high (or low) crime surrounded by other high (or low) units. These techniques facilitate creation of descriptive maps to illustrate the concentration of crime incidents near the theme park area.

Second, regression analysis considering autocorrelation within the study area examines the link between theme park proximity and crime rates. The Zone 1 and Euclidean centroid distance variables were entered into the negative binomial regression model while considering the effects of geospatial autocorrelation. In previous studies, the distance variable was created based on a specific distance (e.g. 0.5 or 1 mile) using bands or buffers to capture proximity from the target place (see e.g. Billings & Depken, 2011; Breetzke & Cohn, 2013). In addition to a one-mile buffer zone from the park (for centroid of census blocks), this study also calculated Euclidean distances (in kilometers) between centroids of census blocks and the centroid of Universal Studios, in order to examine the spatial effects of proximity to the theme park on crime distribution.

In addition, the issue of spatial dependency in the model is generally expected with any geospatial dataset, since the census blocks that are geographically proximal are likely to influence each other more than census blocks that are far apart (Anselin & Griffith, 1988). Therefore, without consideration of spatial dependency, the prediction of the relationship can be biased with unstable coefficients and inaccurate standard error estimates. Thus, to account for the spatial dependence of census blocks in association with the distribution of crime, we follow extant research and include spatially lagged terms for independent variables in the model (Bernasco & Block, 2011; Haberman & Ratcliffe, 2015). We created a spatial weights matrix based on the contiguity of census blocks, assuming that surrounding census blocks are more influential while distal and discontinuous census blocks have no effects on the focal block. The weight matrix is then multiplied by the matrix of scores for census blocks for

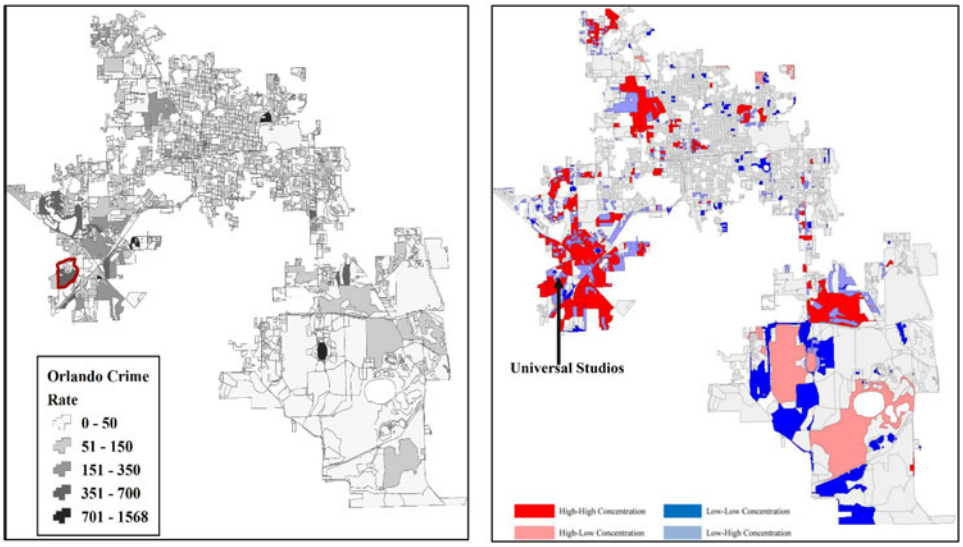

Figure 2. Crime rate and local indicator of spatial association for total crime in Orlando.

covariates (one-mile zone, distance from theme park, crime prone facility, percent Black, percent Hispanic, percent vacant home, and population density). However, the evidence of multicollinearity in the model indicates potential bias with a spatially lagged variable for Zone 1, which is captured dichotomously. As a result, spatially lagged variables for Zone 1 are excluded from the analysis model, and the mean VIF value was 1.80 for the final model, indicating no problematic multicollinearity in the final model.

Since the dependent variable crime count is discrete with non-normal distribution, negative binomial regression models are expected to account for both the observed count distribution and also for overdispersion (Osgood, 2000). Thus, the negative binomial model with crime counts as the dependent variable assesses the statistical relationship between zone/distance and crime rates in census blocks while controlling for endemic spatial autocorrelation and other environmental and structural control variables. This model is represented by the following equation:

$$\boldsymbol{E}(\boldsymbol{Y}) = \boldsymbol{exp}(\alpha + \ \boldsymbol{\beta}_1\boldsymbol{X}_1 + \boldsymbol{\beta}_2\boldsymbol{X}_2 + \boldsymbol{\beta}_3\boldsymbol{Z} + \boldsymbol{\beta}_4\boldsymbol{WZ} + \varepsilon) \tag{1}$$

Where y is the expected number of crime events in a census block, X_1 is a matrix of the dummy variable for Zone 1 and X_2 indicates the distances from the theme park, Z is a matrix of other covariates, and WZ is a matrix of the spatially lagged variables for distance and other covariates.

Results

Figure 2 illustrates crime patterns in Orlando during the study period. Crime incidents are concentrated in the center of Orlando and the southwest section of the city that is close to the theme park (outlined in red in the middle-left hand side of Figure 2) and other various commercial establishments, restaurants, and bars. The census blocks

Table 3. Negative binomial regression results with Zone 1 variable.

Variables	Assault	Robbery	Burglary	Theft	MVT	Narcotic	Total
Zone 1	1.951*	2.921***	1.734***	2.118***	1.943**	2.110*	2.988***
Pct Black	1.005*	1.006*	1.009***	1.001	1.002	1.006*	1.001
Pct Hispanic	0.998	1.001	1.005*	0.997	1.006*	1.004	0.997
Pct vacant	1.009**	1.013***	1.010***	1.007**	1.010***	1.007*	1.002
Population density	0.999	1.000	0.999	0.998	1.001	1.000	1.001
Lagged variable							
Pct Black	1.025***	1.025***	1.018***	1.008*	1.026***	1.040***	1.021***
Pct Hispanic	1.000	1.016	1.024***	1.012*	1.007	1.013	1.009
Pct vacant	1.009	1.031*	1.033***	1.049***	1.021*	1.002	1.041***
Population density	1.042***	1.031**	1.028***	1.018**	1.037***	1.026*	1.008
Constant	0.577***	0.083***	0.491***	3.333***	0.249***	0.204***	6.379***
lnalpha	1.991	2.161	1.097	1.661	1.674	2.203	1.462
χ^2	265.663	228.791	789.772	293.515	343.359	289.923	321.541
Moran's *I*	0.142	0.151	0.115	0.155	0.155	0.163	0.170

Note:
*$p < .05$,
**$p < .01$,
***$p < .001$.

where Universal Studios is located, as well as other blocks near the theme park in the southwest reflect higher crime rates than other areas of Orlando. The downtown Orlando areas that report higher crime rates are known for traditionally disadvantaged neighborhoods and also have a lot of recreational amenities.

To assess the correlation between crime rates for neighborhoods near Universal Studios, a LISA map visualizes the geographic concentration of crime rates relative to neighboring census blocks. The right-hand side of Figure 2 displays a LISA map representing spatial concentrations of total crime. Areas of high-high crime rate concentrations ("hotspots") are found in census blocks adjoining Universal Studios (which is denoted in the figure), indicating high rates surrounded by other blocks with high rates. While a map for total crime is presented showing high concentration, other crime types such as assault, robbery, burglary, theft, motor vehicle theft and narcotics reflected similar crime concentration patterns, generally concentrated nearby Universal Studios.

To examine whether crimes may dissipate as one moves away from the theme park while controlling other neighborhood characteristics, spatial regression models with Zone 1 and distance variables were estimated. Table 3 shows the results of negative binomial regression analysis for crime rates of census blocks with the Zone 1 variable. For each variable, the incident rate ratio (IRR) is presented which facilitates interpretation. For example, an IRR of 3.0 indicates that a one-unit increase in the independent variable increases the expected count of dependent variable by 200 percent. Beginning with the results of the seven models that estimate the influence of Zone 1 on the crime rate in census blocks for all types of crime, the results support the hypothesis that census blocks within one mile from the theme park have higher crime rates than others in the study area (for total crime; IRR $= 2.988$, $p < .001$). In particular, when census blocks are situated within a mile from the park, their crime rates are increased by about 198 percent. Among structural control variables, percent of Black residents reported a significant relationship with crime rates for assault, robbery, burglary, and narcotics, and those associations are marginal and positive (for burglary; IRR

Table 4. Negative binomial regression results with Zone 1 and distance variable.

Variables	Assault	Robbery	Burglary	Theft	MVT	Narcotic	Total
Zone1	0.850	1.327	1.036	1.120	1.228	1.148	1.585*
Distance (km)	0.833***	0.877***	0.905***	0.838***	0.891***	0.865***	0.861***
Pct Black	1.008***	1.007*	1.010***	1.003	1.005*	1.010***	1.003
Pct Hispanic	1.006*	1.005	1.008***	1.004*	1.010***	1.009**	1.000
Pct vacant	1.006*	1.011**	1.008***	1.003	1.007*	1.005	1.001
Population density	1.000	1.000	0.999	1.000	1.001	1.000	1.003*
Lagged variable							
Distance	1.196***	1.115***	1.093***	1.197***	1.132***	1.177***	1.163***
Pct Black	1.011*	1.013	1.010**	0.995	1.014**	1.025***	1.011**
Pct Hispanic	0.983**	1.012	1.020***	0.996	0.997	1.005	1.007
Pct vacant	0.994	1.024	1.016*	1.028***	1.012	0.987	1.021*
Population density	1.022**	1.016	1.012	1.005	1.024**	1.008	0.991
Constant	1.866***	0.232***	1.118	9.853***	0.516***	0.472***	16.222***
lnalpha	1.815	2.086	1.019	1.521	1.564	2.085	1.356
χ^2	532.110	293.676	942.287	719.113	482.305	414.492	719.002
Moran's *I*	0.148	0.128	0.122	0.168	0.106	0.142	0.192

Note:
*$p < .05$,
**$p < .01$,
***$p < .001$.

= 1.009, $p < .001$). However, the percent of Hispanic residents variable presented a significant association for only burglary (IRR = 1.005, $p < .05$) and motor vehicle theft (IRR = 1.006, $p < .05$), and the relationship is also positive, indicating that with higher Hispanic and Black population in census blocks, more burglary occurred. Looking at the percent of vacant residences, all crime types except total crime appear positively associated with percent of vacant homes in census blocks (for robbery; IRR = 1.013, $p < .001$). Census blocks with a higher proportion of vacant homes experience more criminal incidents for all types of crime.

In the next model, the Euclidean distance from the theme park to each centroid of census blocks was calculated and entered into the model to assess the influence of further proximity from Universal Studios. Table 4 presents the results of a spatial regression analysis incorporating the distance variable. Similar to the results of the regression for the Zone 1 variable, the link between distance and crime rates for all types of crime are consistent, but are negative—or less than 1.0—(for total crime; IRR = 0.861, $p < .001$). When census blocks were further every 1 kilometer from the theme park, crime rates decrease by 14%. Across all of the dependent variables, these relationships were statistically significant, while the Zone 1 variable lost its significant effects on most of dependent variables except total crime (IRR = 1.585, $p < .05$). Looking at the degree of influence, Zone 1 and distance variables generally presented greater effects than other control variables for total crime.

Lastly, one of the critical control variables, facility, which indicates number of hotels, motels, bars, and restaurants in census blocks is entered into the analysis model. As can be seen from Table 5, facility has a significant and positive association with crime rate for all types of crime (for total crime; IRR = 1.186, $p < .001$). Adding one facility such as hotel, motel, bar, or restaurant to the census block serves to increase the crime rate by about 19 percent. Interestingly, the Zone 1 variable is shown to have a

Table 5. Negative binomial regression results with Facility variable.

Variables	Assault	Robbery	Burglary	Theft	MVT	Narcotic	Total
Zone 1	0.497**	0.451*	0.716	0.484***	0.606*	0.574	0.469***
Distance (km)	0.901***	0.949**	0.921***	0.912***	0.929***	0.931***	0.921***
Facility	1.141***	1.183***	1.090***	1.183***	1.102***	1.133***	1.186***
Pct Black	1.010***	1.009***	1.010***	1.004**	1.005*	1.013***	1.004***
Pct Hispanic	1.009***	1.008*	1.009***	1.007***	1.012***	1.011***	1.004*
Pct vacant	1.006*	1.006	1.007**	1.004	1.006*	0.999	0.999
Population density	1.000	1.000	0.999	1.000	1.002	1.001	1.003*
Lagged variable							
Distance	1.130***	1.036*	1.075***	1.108***	1.085***	1.109***	1.082***
Facility	1.890***	1.867***	1.189***	2.053***	1.596***	1.856***	1.909***
Pct Black	1.033***	1.032***	1.013***	1.013***	1.025***	1.047***	1.027***
Pct Hispanic	0.999	1.022	1.020***	1.005	1.004	1.022**	1.012
Pct vacant	0.976*	0.993	1.009	1.006	0.988	0.964**	1.014
Population density	1.005	1.012	1.012	1.009	1.024**	0.990	0.993
Constant	0.503***	0.080***	0.884	2.783***	0.297***	0.157***	5.802***
Lnalpha	1.490	1.670	0.970	1.313	1.411	1.797	1.187
χ^2	960.173	523.985	1027.948	1296.864	643.033	679.626	1313.982
Moran's *I*	0.078	0.083	0.129	0.144	0.095	0.084	0.160

Note:
*$p < .05$,
**$p < .01$,
***$p < .001$.

negative association with crime rates (i.e. IRR $<$ 1.0), and it is opposite to the results of previous models displayed in Table 3 and our hypothesis that census blocks within a mile from Universal Studios will have more crime than other blocks. The Zone 1 variable is negatively related to the crime rate for assault, robbery, theft, motor vehicle theft, and total crime (for total crime; IRR $=$ 0.469, $p < .001$). Census blocks within one mile from the park would evince 54 percent less crime than other parts of the city when considering the effects of facilities. Finally, when facility is controlled for in the analysis, the distance coefficient still retains significant and negative relationships (as before) to each of the crime variables analyzed.

Discussion

Tourism is associated with various economic, social, and environmental impacts on tourist attraction areas. The issue of safety is a paramount concern, not only to visitors but also to local residents, the police department, and assorted private and business interests, and it directly implicates the quality of life of people residing and working in those areas. Thus, the purpose of this study was to assess crime patterns near a major American theme park, Universal Studios Florida, in order to examine crime rates in and around the theme park. Our results hold implications for understanding the relationship between tourism and crime, and for the practical implementation of police strategies.

For the study, several statistical techniques were utilized, and findings revealed empirical evidence supporting the link between theme park tourism and crime. First, the findings revealed high crime concentration near Universal Studios Florida. The crime rates in census blocks near the park were higher than other parts of the city, and the concentration of crime was statistically significant when considering the

spatial relationship between census blocks, as reflected in the LISA maps illustrating crime concentration in areas near Universal Studios. Also, the results of negative binomial regression with the Zone 1 variable show the positive association with all types of crime while controlling other structural and spatial lagged variables. These findings broadly support the results of the line of studies focusing on the geographic influence of tourist attractions, and they are consistent with theoretical orientations to tourist crime under the rational choice and routine activity perspectives, which bring together an increase in suitable targets and where motivated offenders see the potential benefits of crime from an increase in the availability of suitable targets (both as persons and property) (e.g. Ryan, 1993). However, when another indicator of spatial proximity, Euclidean distance, is added to the analysis model, the Zone 1 variable lost its significant influence on crime rates for all types of crime except total crime. It implies that distance is a more appropriate factor to explain the effects of tourism on crime incidents rather than clustering or buffering the area near tourism attraction such as theme park. This is so because the distance variable is capturing not just the crime that may occur adjacent to theme park (which is essentially what Zone 1 is picking up) but also the reduction of crime that is observed as one moves farther away from the theme park.

Yet, and perhaps most importantly, one of the main control variables, facility, is strongly associated with crime rates and alters the pattern of results previously noted. According to crime pattern theory (Brantingham & Brantingham, 1993), the types of facilities situated in a place likely determine the number and type of people who patronize and linger in that place. As a result, the place can play the role of crime generator or attractor by luring large numbers of people, who function as potential offenders or victims. In accordance with findings of previous studies (Bernasco & Block, 2011; Groff & Lockwood, 2014; Haberman & Ratcliffe, 2015), facilities are associated with increased crime in Orlando. Most interestingly, the Zone 1 variable displays a negative association with crime rate in census blocks when the facility variable is considered in the model. Census blocks within one mile from the park are less likely to have higher crime than other parts of the city, when the number of hotels, motels, bars, and restaurants are accounted for, especially for assault, robbery, theft, motor vehicle theft, and total crime. Those show the importance of these types of facilities strongly influencing the crime rate above and beyond other factors and removing or lessening the number of such facilities could help lower the incidence of criminal activity. This is so because these facilities increase the number of potential suitable targets in the form of persons, many of whom are on vacation and may take less precautions with their property and general safety especially when alcohol may be involved. Further, such persons may also believe that being near a prominent tourist attraction means that there would be additional security giving them a false sense of security with regard to their own safety and the personal measures they need to take to remain safe.

The distance variable still maintains its significant and negative influence on the crime rate of blocks, indicating even after controlling for the facilities, the distance from the park is still an essential factor influencing crime distribution in Orlando. The facility variable may be a driving force of high crime rates in census blocks, but

Universal Studios attracts more facilities near the park, and therefore a higher crime concentrations in those census blocks because of the increase in the number of suitable targets who may not practice adequate security or take the necessary protective precautions with their property. The choropleth map of facility in the Appendix presents an identical pattern of distribution compared with crime rates in Orlando. There are more facilities near the park, where there is a higher crime rate and a more serious concentration of crime (as denoted in Figure 2).

These findings produce several recommendations that are pertinent to crime prevention efforts. First, increasing the guardianship in those areas could also help to reduce crime opportunities. Therefore, efforts such as increasing the presence of uniformed patrols or citizen patrols who perform surveillance functions as well as installing more physical surveillance strategies (e.g. cameras) may be useful. Similarly, other physical environment adjustments such as signs for guiding tourists to the proper place and employing staff to provide information to tourists may be considered as a potential way of mitigating the perception of a crime-favorable environment (Shearing & Stenning, 1985). Also, various efforts need to be made to inform tourists that they may be more exposed to crime when they participate in certain types of activities, i.e. go to bars, go to theme parks, leave goods (computers, jewelry, etc.) unlocked in cars and hotel rooms. Prevention of these activities during their visit might involve providing safety tips on automated teller machines, hotels, restaurants, and bars or the location of specialized tourist police or auxiliary patrols (Crotts, 1996).

Second, the results of the regression analysis examining the effects of the theme park on crime rates in census blocks indicate that less crime will occur as one moves away from Universal Studios. These findings indicate the need for more active policing strategies not only in the theme park areas but also more distant neighborhoods under the influence of the theme park. In fact, the tourism attractions themselves have fewer crime incidents due to high profile security on-site, and local police may be more efficient by focusing on surrounding areas to limit tourist-driven "demand" crimes such as prostitution and narcotics (Kurland, Johnson, & Tilley, 2011). For all prevention and enforcement activities, the cooperation of the local community is essential. For example, hotels and motels may help police departments provide useful information for preventing crime to visitors or building funds to support special security measures in those areas (De Albuquerque & McElroy, 1999).

This study highlights an important relationship between theme park tourism and crime, but it is not without limitations. First, the available crime data provides useful inferences only for low-level street crime. The application of these findings to more serious forms of violence, especially to high-profile incidents involving mass shootings or terrorism, is not necessarily supported by the available data. Second, while Orlando is an ideal case study for the relationship between tourism and crime, it may not reflect the social/structural, compositional, and context effects found in other potential study sites involving theme parks or other "special event" venues. Few study sites can rival Orlando's influx of annual visitors, and this may limit generalizability. This limitation is especially salient when making international comparisons to small-scale theme parks, although this effect should be readily tested in other settings. Third, our study focused on crime around Universal Studios. Analysis of similar issues in other theme

parks around the United States, including Disneyworld and Disneyland, Six Flags, Kings Dominion, Kennywood, and other attractions would be important to compare our results to. Fourth, as is the case with officially recorded crime data, there may be crimes that occur around theme parks that victims do not report thereby making our count an under-estimate to some unknown degree. Finally, although our findings document a spatial association between a major theme park and crime rates for the surrounding community, no attempt has been made to account for the presence or tactics of local law enforcement. It is likely that local police are aware of the potential for theme parks as a crime-generating or crime-attracting milieu, and further, that they are organically adapting their strategies to combat various dimensions of the problem. Our result offer evidence of a general trend, rather than a specific evaluation of local police activity relative to theme park crime. Therefore, future research should attempt to gather data on "capable guardians" as well as security cameras/personnel in order to examine the extent to which these factors mitigate the risk of victimization in the areas near theme parks.

The way forward in this line of research is multi-faceted. Given the overall support for the association between "special event" venues and crime, replication and expansion are encouraged utilizing a variety of different event venues as well as community contexts. The articulation to criminological theory, especially involving rational choice and routine activity elements, is consistent with these findings, but not explicitly tested. Thus, while we believe that our work is largely consistent with these two perspectives future research should attempt to operationalize these constructs, potentially involving data collection from an offender sample, in order to address unanswered hypotheses regarding cost/benefit ratios and perceptions of both suitable targets (e.g. vulnerable individuals vs. property) as well as guardianship in these contexts. A deeper understanding of how offenders select targets, whether in the form of persons, cars, hotel rooms, etc., would provide important insight into the veracity of these two theoretical perspectives as well as to help better inform prevention strategies. Theme park tourism stands to top record levels in successive years, and contemporary criminological evidence for the sources and modalities of crime will contribute to a growing literature on this important international industry.

Disclosure Statement

No potential conflict of interest was reported by the authors.

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Appendix. Choropleth map of facility