Article

Low-Income Housing and Crime: The Influence of Housing Development and Neighborhood Characteristics

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Abstract
This study examines the distribution of crime across various types of low-income housing developments and estimates the main and interactive effects of housing development and neighborhood characteristics on crime. Negative binomial regression models were estimated to observe the influence of security and design features, neighborhood concentrated disadvantage, residential stability, and nearby nonresidential land use on crime at the housing developments. The findings suggest that low-income housing developments are not uniformly criminogenic, and both development characteristics and neighborhood conditions are relevant for understanding crime in low-income housing developments. Implications for prevention are discussed.

Keywords
low-income housing, criminal opportunity, concentrated disadvantage

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Introduction

There is an affordable housing shortfall for very low-income households in the United States. Nationwide, 17.67 million rental households earn below 50% of the area median income, but there are only 15.52 million affordable rental units for these households (National Low Income Housing Coalition, 2015). Assisted housing programs are designed to help address the affordable housing crisis. Given the demand for affordable housing across American cities, it is important to consider the conditions that produce the safest low-income housing for residents. Over two decades ago, Holzman (1996) argued that "criminologists are woefully uninformed about the nature of the public housing universe and its crime problems" (p. 361). Since then, there remain few theoretically informed criminological studies examining crime in public housing. Even less common are criminological studies examining other forms of low-income housing that make up a substantial proportion of the current affordable housing stock. Most research in this area has examined the association between the presence of public housing and surrounding neighborhood crime rates, with mixed results suggesting a nuanced relationship (Haberman, Groff, & Taylor, 2013; Holloway & McNulty, 2003; Roncek, Bell, & Francik, 1981; Santiago, Galster, & Pettit, 2003). The present study focuses instead on crime occurring *in* low-income housing developments—including public housing, Low-Income Housing Tax Credit (LIHTC) projects, and affordable housing—with a focus on the main and interactive effects of housing development and neighborhood characteristics.

Our perspective is informed by crime and place research, which has demonstrated that crime is not uniformly distributed across homogeneous sets of facilities, such as bars, but rather concentrated at relatively few locations, with micro-level place features accounting for within-facility-type variation in crime (Eck, Clarke, & Guerette, 2007; see also Sherman, Gartin, & Buerger, 1989; Weisburd, 2015). We therefore examine the extent to which security and design features are associated with violent, property, and drug crime at low-income housing developments. We also draw from the communities and crime literature to consider whether neighborhood conditions affect crime in low-income housing developments or whether these developments are isolated havens largely unaffected by the surrounding community. In doing so, we examine the effects of concentrated disadvantage, residential stability, and nonresidential land use in the surrounding community on crime at low-income housing developments, net of housing development characteristics. In addition, and consistent with a multilevel opportunity framework asserting that macro- and micro-level characteristics can interact to influence crime at places (Wilcox, Gialopsos, & Land, 2013; Wilcox, Land, & Hunt, 2003), we consider

whether neighborhood conditions can moderate the effects of development characteristics on crime. In other words, are the effects of security and design features weaker among low-income housing developments located within communities suffering from high levels of concentrated disadvantage?

The present study examines the influence of housing development characteristics and neighborhood conditions on violent, drug, and property crime in low-income housing developments in San Antonio, Texas. San Antonio Housing Authority (SAHA) multifamily rental properties represent the housing developments, with quarter-mile buffers representing the surrounding community.[1] In addition to providing theoretical implications with respect to the factors that influence crime in low-income housing developments, the findings from the present study provide much needed prevention implications for those interested in providing safe housing for the large number of Americans who rely on low-income housing.

Explaining Crime in Low-Income Housing Developments

Most empirical research in this area has focused exclusively on crime in and around *public housing*. Dunworth and Saiger (1994), for example, studied the nature of crime in public housing developments across Washington, DC, Los Angeles, and Phoenix. Across all three cities, the rates of violent and drug offenses within the housing developments were higher than nearby neighborhood rates, and substantially higher than citywide rates. Similarly, Holzman, Hyatt, and Kudrick (2005) examined crime in and around public housing in three unidentified cities and report that the risk of aggravated assault in public housing developments was higher than in the 300-m buffers surrounding the developments, which in turn were more dangerous than the jurisdiction as a whole (see also Holzman et al., 2005).[2] Yet these aggregate rates mask the considerable variation in crime among public housing developments within each city. The most dangerous public housing development in Los Angeles, for example, had a serious crime rate 15 times higher than the least dangerous. Despite the perception of public housing developments as crime-ridden, Dunworth and Saiger (1994) report some developments' crime rates were lower than the citywide rates (see also Haberman et al., 2013).

Development Characteristics

The observed variation in crime among public housing developments is consistent with a body of empirical research demonstrating the concentration of crime across various types of places within cities (Braga, Papachristos, &

Hureau, 2010; Braga, Hureau, & Papachristos, 2011; Eck et al., 2007; Johnson et al., 2007; Sherman et al., 1989; Weisburd, Morris, & Groff, 2009) or what Weisburd (2015) has termed the "law of crime concentration at place." Sherman et al. (1989), for example, analyzed calls to the police in Minneapolis over a 1-year period and found 50.4% of calls went to 3.3% of all addresses and intersections (see also Eck, Gersh, & Taylor, 2000). Weisburd, Bushway, Lum, and Yang (2004) report similar concentrations on street segments in Seattle over a 14 year period, stating that "[b]etween 4 and 5 percent of the street segments account for about 50 percent of incidents in our data in each of the years examined" (p. 294). In Boston, Braga and colleagues examined crime across street segments and intersections over a 29-year-period and report that more than half of all gun assaults occurred at fewer than 3% of places (Braga et al., 2010) and approximately two thirds of all robberies occurred at just 5% of places (Braga et al., 2011).

Environmental criminology offers potential explanations for clustering of crime at places, including public housing developments and other forms of low-income housing. These opportunity-based theories suggest that criminal behavior is influenced by the immediate environment and the spatial distribution of crime is a function of real or perceived opportunities for crime (Wortley & Mazerolle, 2008). That is, housing developments do not uniformly provide opportunities for crime and victimization. Routine activities theory, for example, suggests that crime events require a motivated offender to converge in time and space with a suitable target in the absence of capable guardianship (Cohen & Felson, 1979; see also Reynald, 2011). The routine activities of potential offenders, targets, and guardians determine the likelihood of this convergence. Taken together, the crime and place literature and routine activities theory point to the importance of place management—that is, how the space is organized, regulation of conduct, and access control—as an explanation for the distribution of crime across places (Eck, 1994; Eck & Wartell, 1998; Felson, 1995; Madensen, 2007; Madensen & Eck, 2008). Similarly, situational crime prevention assumes a rational offender (Clarke & Cornish, 1985; Cornish & Clarke, 2008) whose behavior can be shaped by increasing the risk and effort associated with crime and reducing the rewards and provocations, and removing related excuses (Cornish & Clarke, 2003). Within a housing development, relevant techniques may include controlling access, natural and formal surveillance, rule setting, utilizing place managers, and so on. In addition, Brantingham and Brantingham (1981) argue that potential offenders use cues emitted from the environment when determining whether an area is favorable for crime. Finally, and consistent with the aforementioned environmental criminological perspectives, environmental design theories (e.g., crime prevention

through environmental design [CPTED] and defensible space) posit that the physical environment can influence crime via surveillance and accessibility (Cozens, 2008; Jeffery, 1971; Newman, 1973; Taylor & Harrell, 1996). In sum, these theories suggest that low-income housing developments with security and design features that control access, enforce rules regulating conduct, facilitate natural and formal surveillance, and generally increase the risks and efforts associated with offending will have less crime.

Research by Mazerolle, Ready, Terrill, and Waring (2000) examining the effects of a problem-oriented policing project on crime in public housing developments lends some support to the application of these opportunity perspectives to a low-income housing context. They note that problem-oriented policing can

> draw on CPTED, situational crime prevention, and civil remedies (e.g., evictions and restraining orders) . . . [but] does not preclude the police from using traditional methods (e.g., sweeps, buy busts, surveillance operations) if a case can be made that such a tactic will affect a persistent problem. (Mazerolle et al., 2000, p. 135)

Examples within their study included improved lighting, surveillance, and warrant enforcement. In addition, there were efforts to target nuisance apartments (i.e., those generating 10 or more calls to the police in the year prior to intervention), ranging from counseling and treatment to eviction and arrest. Collectively, these efforts aimed at changing the physical and social context, and thus, opportunities for crime were associated with a reduction in calls for service to the police related to serious crime (Mazerolle et al., 2000).

Neighborhood Characteristics

The community in which the housing development is embedded may also contribute to the observed variation in crime among low-income housing developments. This is consistent with the communities and crime literature, which has largely focused on how social structural characteristics influence crime in neighborhoods. For example, Shaw and McKay (1942) posited that social disorganization—as indicated by poverty, population heterogeneity, and residential instability—creates a disruption in communities that undermines residents' ability to solve problems, including exerting informal community controls to address crime and delinquency (see also Bursik, 1988; Bursik & Grasmick, 1993). Sampson, Raudenbush, and Earls (1997) have argued that neighborhoods with certain characteristics—including high levels of concentrated disadvantage, residential instability, and immigrant populations[3]—lack collective

efficacy or mutual trust among residents and the willingness to intervene for the common good. Such communities, therefore, struggle to realize residents' common values and exercise social control over problems, including crime. Furthermore, criminologists advocating for integration between social disorganization and opportunity theories have argued that such neighborhood characteristics can serve as an indicator of general levels of criminal opportunity in an area (see, for example, Sampson & Wooldredge, 1987; Wilcox et al., 2013; Wilcox & Tillyer, 2017). For example, neighborhoods with high levels of concentrated disadvantage and low levels of residential stability may lack the collective guardianship necessary to control area crime problems.

In addition to social structural characteristics, previous research suggests that the physical structure of the area can influence crime (Kurtz, Koons, & Taylor, 1998; Wilcox, Quisenberry, Cabrera, & Jones, 2004). Drawing on social disorganization and opportunity theories of crime, scholars have argued that nonresidential land use may affect both social and physical processes linked to criminal opportunity. Kurtz et al. (1998), for example, studied the relationships among land use, physical deterioration, resident-based control, and calls for service to the police. Their findings suggest that nonresidential land use is associated with increased calls for service to police along Philadelphia street blocks, and that this relationship is mediated by decreased perceptions of control among residents and increased physical deterioration. Wilcox et al. (2004) used data aggregated from residents living in 100 census tracts in Seattle to examine the impact of land use on crime. Business land use was associated with more violence and burglary in the census tract, an effect that was partially mediated by physical disorder. They did not find support, however, for their hypothesis that interaction among neighbors would mediate the relationship between land use and crime.

In sum, criminological theory suggests that the characteristics of the community in which a low-income housing development is embedded will influence crime in the housing development. In particular, housing developments located in areas with high levels of concentrated disadvantage, low levels of residential stability, and numerous nonresidential land uses will likely have higher levels of crime relative to those located in communities with lower levels of concentrated disadvantage, higher levels of residential stability, and few nonresidential land uses. Indeed, the combination of findings described above is consistent with a multilevel criminal opportunity theory that identifies both micro- and macro-influences on crime and victimization (Wilcox et al., 2013; Wilcox et al., 2003). In addition to their main effects, such processes may interact to influence crime risk, as the broader "neighborhood crime market" is hypothesized to enhance or temper effects of micro-level indicators of criminal opportunity. For example,

Wilcox et al. (2013) have argued that "the effects of individual- or place-level crime-event *protective factors* are greater in *low-opportunity* [crime] contexts than in high-opportunity [crime] contexts" (p. 586). Their argument is grounded in the assumption that the demand for targets increases in high-opportunity crime contexts—that is, contexts marked by a large supply of motivated offenders and weak environmental-level guardianship—thereby reducing the importance of costs for offenders associated with particular targets (i.e., those that are well-guarded). In short, place-level guardianship is expected to matter less in communities with a large supply of motivated offenders and weak aggregate guardianship.

Several studies support the argument that individual- or place-level guardianship is related more negatively to crime and victimization outcomes when aggregate guardianship is greater, while the effect is weaker in contexts that lack strong collective guardianship (e.g., Miethe & McDowall, 1993; Miethe & Meier, 1994; Tillyer & Tillyer, 2014; Wilcox Rountree, Land, & Miethe, 1994; Wilcox, Madensen, & Tillyer, 2007). For example, Wilcox et al. (2007) found that individual-level guardianship—in the form of target hardening, natural surveillance, and place management—was more effective in reducing residential burglary risk among Seattle residents when neighborhood-level guardianship was high. If we extend this rationale to low-income housing developments, the effects of protective factors aimed at reducing crime may be weaker when housing developments are located within communities with a high supply of motivated offenders and weak collective guardianship. That is, the crime-reducing benefits of security and design features may be weaker in housing developments located in neighborhoods with high levels of concentrated disadvantage. In these neighborhoods, offender decision making may be more influenced by the potential rewards of a given criminal opportunity than the added effort and risk posed by housing development security and design features, because the broader community does little to reinforce the market risk of crime. Conversely, efforts to control access, enforce rules regulating conduct, and facilitate natural and formal surveillance in housing developments located in well-controlled contexts may be more effective because the collective guardianship offered by the broader community reinforces the risks to the offender.

Yet it is unclear the extent to which surrounding neighborhood conditions—be it social structural factors or land use—permeate low-income housing developments to affect crime or whether these developments are largely isolated from the larger community. For example, Griffiths and Tita (2009) analyzed the location of homicides in the Southeast Policing Area of Los Angeles from 1980 through 1999 and victims' and offenders' location of residence (i.e., whether or not they resided in public housing). Their analyses indicate that homicides occurring in public housing were often

committed by residents against residents; they found no evidence that public housing draws in homicide offenders from the outside, nor does it generate homicide in the surrounding community. These findings led Griffiths and Tita (2009) to conclude that violence in public housing developments results from social isolation from the broader community. The present study examines whether concentrated disadvantage, residential stability, and nonresidential land use in the surrounding neighborhood permeate low-income housing developments to influence violence, drug, and property crimes.

The Present Study

The present study examines the influence of housing development characteristics and neighborhood conditions on violent, drug, and property crime in low-income housing developments. Informed by the literature above, we test the following hypotheses:

> **Hypothesis 1:** Violent, drug, and property crimes are nonrandomly distributed across low-income housing developments.
> **Hypothesis 2:** Crime will be lower in developments with security and design features that control access, enforce rules regulating conduct, facilitate natural and formal surveillance, and generally increase the risks and efforts associated with offending.
> **Hypothesis 3:** Surrounding neighborhood conditions influence crime in low-income housing developments, such that crime will be higher in developments located in areas with high levels of concentrated disadvantage, low levels of residential stability, and more nonresidential land use.
> **Hypothesis 4:** Neighborhood conditions and development characteristics interact to influence crime in low-income housing developments, such that neighborhood concentrated disadvantage will weaken the crime-reducing effects of security and design features at the development.

Low-Income Housing

The SAHA's housing stock is organized into three low-income housing categories in this study: public housing, LIHTC projects, and affordable housing.[4] Public housing authorities are most widely known for providing public housing, which is the oldest, but no longer the largest, housing subsidy in the United States (Schwartz, 2015). Public housing provides low-income households rental housing assistance by subsidizing the difference between their rent and approximately 30% of the household's income.[5] Public housing has long had a very negative stigma attached to it and is portrayed at the heart of

the inner-city ghetto as a breeding ground for criminal activity. Counter to public perception, most public housing properties are very different from the notorious Cabrini Green or Pruitt-Igoe. In 2012, there were 9,691 public housing developments in the United States with 1,152,494 units, a substantial decrease since 1994 when there were over 1.4 million units. Public housing tends to be located in more minority-concentrated and higher poverty neighborhoods than other assisted housing programs.[6]

The LIHTC, the largest supply-side affordable housing program in the nation, has funded over 2.5 million rental housing developments. The Internal Revenue Service allocates funds for LIHTC to each state based on population. LIHTC provides equity to finance rental housing development by offering investors a dollar-for-dollar reduction in their federal tax liability.[7] Although some LIHTC developments are mixed income, the majority serves low-income households; however, the average income of these households is higher than other programs such as public housing. Many very low-income or extremely low-income households need a Housing Choice Voucher to live in LIHTC housing (Schwartz, 2015). Little is known about households that live in LIHTC housing if they do not receive additional assistance through another program because LIHTC tenant data are not easily accessible or consistently reported in most states. Although LIHTC housing has been found to be concentrated in high-poverty, minority-concentrated neighborhoods, it has provided more units in less distressed neighborhoods compared with other assisted housing programs (Freeman, 2004; Oakley, 2008).

The affordable housing category is often difficult to capture and describe because there are a variety of programs that may be supported by federal subsidies, state, local programs, and/or public–private partnerships. A few examples include the Section 8 Project-Based Program that subsidizes a specific housing unit through a contract between U.S. Department of Housing and Urban Development (HUD) and the public housing authority; Section 202 that provides housing for the elderly through capital advances from HUD to finance the acquisition, construction, or rehabilitation of a project; and state housing trust funds that provide financial support for the development of affordable housing. Public housing authorities may also have a portfolio of projects in this category that are not tied to any federal or local subsidies and are funded by their own revenue stream.[8]

Data and Measures

SAHA multifamily rental properties represent the housing developments, with a quarter-mile buffer depicting the surrounding neighborhood (i.e., the standard urban planners use to represent the neighborhood concept and walking distance;

see Note 1 for more information). A point shapefile was obtained from SAHA that contains a list of all properties in SAHA's housing stock ($n = 110$). The primary address of each property, the total units,[9] the type of property (i.e., public housing, LIHTC, affordable housing), and the population served (e.g., elderly and disabled residents) are included in the data set. Four properties were removed because they were listed under the homeownership program and only multifamily rental properties were included in the study; two additional properties were removed because they were in neighborhoods with a surrounding population less than 100, which means the neighborhood variables could not be collected.

SAHA administered a survey to property managers to collect data on additional housing development characteristics, including security and design features. Survey data could be linked with 97 properties. This study examines the collective impact of several security and design features aimed at reducing crime at the housing developments by controlling access, enforcing rules regulating conduct, facilitating natural and formal surveillance, and generally increasing the risks and efforts associated with offending. Specifically, we measure the following 11 dichotomous variables ($0 = $ no, $1 = $ yes): secured parking area, secured building entrance, secured entrance to common area(s), enforced visitor policies, bars or lattices on the windows, security cameras inside, security cameras outside, patrolled interior, patrolled exterior, alarm systems in units, and security mirrors ($\alpha = .71$). These items were summed to create a variable measuring the count of security and design features.

A shapefile was created for each development that delineates the property boundaries using the Bexar County Property Appraiser shapefile, building footprints, and aerial imagery. A quarter-mile buffer was created around each housing development property boundary. The buffer type used was "outside only," so the buffer only captures the surrounding neighborhood and excludes the housing development. This is important for the collection of neighborhood data from the Environmental Systems Research Institute's (ESRI's) Community Analyst—web-based mapping software that allows demographic and socioeconomic data to be collected at a customized geography by importing shapefiles. This allowed the neighborhood data to be calculated for the surrounding neighborhood only, excluding the demographics and socioeconomics of the SAHA properties.

The neighborhood shapefile was imported into Community Analyst and customized reports were pulled for the defined neighborhood boundaries to create the concentrated disadvantage and residential stability variables. Concentrated disadvantage is a factor created from the following five variables: percentage of residents in poverty; percentage of residents aged 16 and older in the labor force who are unemployed; percentage of residents who receive food stamps and Supplemental Nutrition Assistance Program (SNAP)

Table 1. Descriptive Statistics.

	M	SD	Minimum	Maximum
Crime				
Violent crime	3.33	11.44	0.00	82.00
Drug crime	0.57	2.76	0.00	22.00
Property crime	4.64	16.53	0.00	132.00
No. of housing units (logged)	4.36	0.97	1.39	6.28
Type of low-income housing				
Public housing	0.56	0.50	0.00	1.00
LIHTC	0.19	0.39	0.00	1.00
Affordable housing	0.26	0.44	0.00	1.00
Population served				
Families	0.56	0.50	0.00	1.00
Elderly and/or disabled residents	0.44	0.50	0.00	1.00
Security and design features	4.06	2.45	0.00	10.00
Neighborhood concentrated disadvantage	−0.06	0.98	−2.34	2.88
Neighborhood residential stability	0.57	0.15	0.16	0.89
Neighborhood nonresidential land use	0.28	0.17	0.00	0.84

Note. LIHTC = Low-Income Housing Tax Credit.

benefits; percentage of residents without a high school diploma, General Education Diploma (GED), or a higher educational degree; and percentage of residents who are non-White (α = .89).[10] Residential stability measures the percentage of residents who moved into their homes in 2009 or earlier, based on 2015 American Community Survey (ACS) 5-year estimates.

The San Antonio zoning shapefile was used to calculate the percentage share of nonresidential land use in each neighborhood. The parcels were first clipped by the neighborhood shapefile, so only the portion of the parcels that fell within the neighborhood was used in the calculation. Nonresidential land uses include commercial, industrial, office, arts and entertainment districts, and business park uses. The total area of nonresidential uses was summed and divided by the total area of the neighborhood to calculate the percentage share covered by nonresidential land use in each neighborhood.

The *X* and *Y* coordinates of incident crime data were obtained from the San Antonio Police Department for 2015. A spatial join of the point crime data with the housing development shapefile was conducted to obtain the counts of violent crime, drug crime, and property crime that were within the boundaries of each housing development. Table 1 reports the descriptive statistics for the housing development characteristics and surrounding neighborhood characteristics.
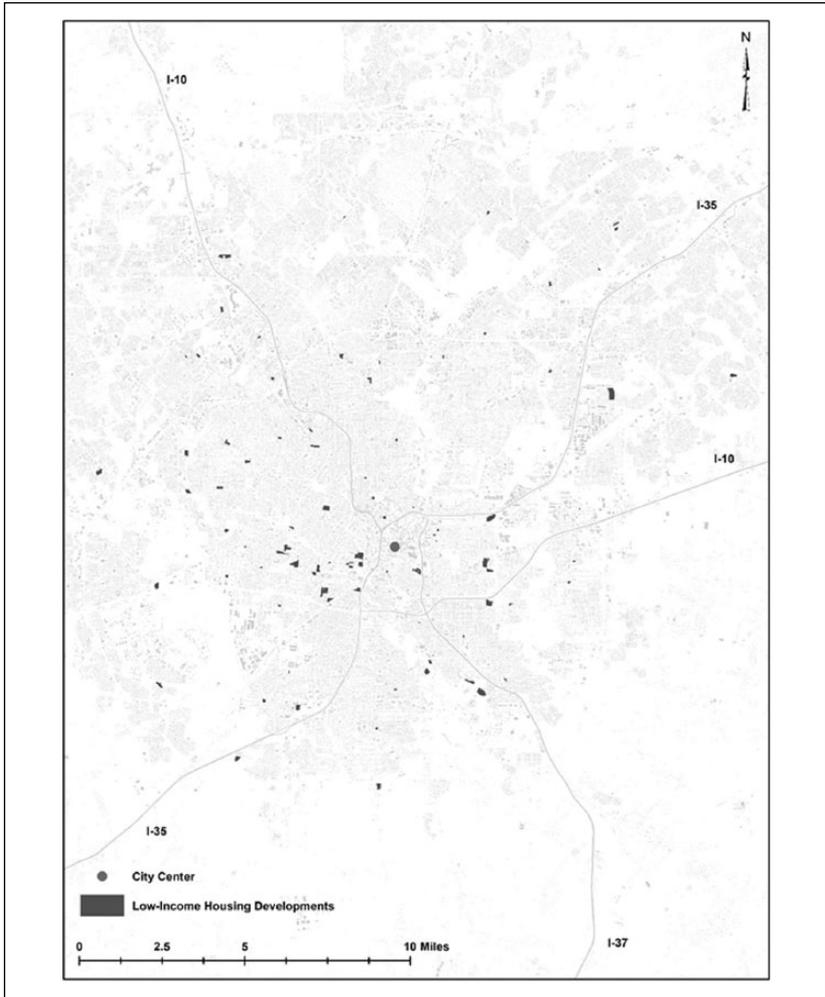
Figure 1. Low-income housing developments.

Analyses and Findings

Figure 1 displays the geographic distribution of the housing developments across the city of San Antonio. The developments are located across a socio-economically diverse set of communities. Based on the 2015 ACS 5-year estimates, 19.8% of residents in the city of San Antonio live in poverty, 7.5% of residents aged 16 and older in the labor force are unemployed, 16.5% receive

Table 2. Distributions of Violent, Drug, and Property Crimes Across Low-Income Housing Developments.

	Top 5% of properties	Kolmogorov–Smirnov test
Violent crime	72.44%	***
Drug crime	87.27%	***
Property crime	71.78%	***

$***p < .001.$

food stamps and SNAP benefits, and 18.6% do not have a high school diploma, GED, or a higher educational degree. Several developments in the present study are embedded in communities with better socioeconomic conditions relative to the city overall. Of the 97 developments in the study, 15.5% are in neighborhoods with poverty rates lower than the overall city rate, 57.7% are in neighborhoods with unemployment rates lower than the overall city rate, 24.7% are in neighborhoods with lower public assistance rates than the overall city rate, and 21.6% are in neighborhoods with higher education levels.

We next examined the concentration of crime among sample cases. Table 2 presents data on the distribution of violent, drug, and property crimes across low-income housing developments in San Antonio and tests Hypothesis 1. Consistent with the existing research on crime and place (e.g., Sherman et al., 1989; Weisburd et al., 2004), we found that a relatively small proportion of housing developments account for a majority of all crimes observed across low-income housing developments in San Antonio. For example, the five developments (representing approximately 5% of all developments in the sample) with the highest frequency of violent crimes accounted for more than 72% of all violent crimes observed in the sample. Drug crimes were even more concentrated, with the top 5% of properties accounting for over 87% of all drug crimes. The distribution of property crimes across housing developments was similar to that of violent crimes, with approximately 72% of all reported property crimes occurring at just 5% of housing developments. Consistent with Hypothesis 1, the distributions of violent, drug, and property crime counts all differ significantly from the expected frequencies under the Poisson distribution that assumes independence in crime events ($p \leq .001$). Furthermore, the most dangerous developments are situated in the same region of the city. With the exception of one, all properties in the top 5% are located in an area directly west of downtown that is known for high crime and poor socioeconomic conditions. However, none of the properties that are in the top 5% for violent, drug, and property crime have overlapping neighborhood boundaries.

Table 3. Negative Binomial Regressions for Violent, Drug, and Property Crimes.

	Violent		Drug		Property	
Housing development variables	B	SE	B	SE	B	SE
No. of housing units (logged)	1.66***	0.29	2.98***	0.88	1.52***	0.27
Housing type						
Public housing	2.34***	0.70	2.10***	0.62	1.30*	0.72
Affordable housing	0.17	0.81	−0.59	0.76	−0.45	0.76
Population served						
Elderly/disabled residents	−1.37***	0.50	−1.24**	0.56	−0.55	0.43
Security and design features	−0.23**	0.11	−0.43***	0.17	−0.35***	0.11
Neighborhood concentrated disadvantage	0.78***	0.22	1.15**	0.59	0.65***	0.18
Neighborhood residential stability	−2.86*	1.50	−3.18*	1.75	−2.03	1.40
Neighborhood nonresidential land use	−1.83	1.46	−0.65	1.13	−2.52*	1.46
Omnibus likelihood χ^2 test	202.87***		125.45***		152.229***	

Note. "LIHTC" is the omitted housing type category and "family" is the omitted population served category in the multivariate analyses. LIHTC = Low-Income Housing Tax Credit.
*$p \leq .10$. **$p \leq .05$. ***$p \leq .01$.

We next built multivariate models to examine the main effects of development security and design features, neighborhood concentrated disadvantage, residential stability, and nonresidential land use in the surrounding neighborhood on violent, drug, and property crimes at the housing development. We estimated negative binomial regressions with robust standard errors because of concerns about overdispersion of the dependent variables given that the variances of violent crime, drug crime, and property crime were greater than their respective means (Cameron & Trivedi, 2013).[11]

Table 3 presents the results from the negative binomial regressions for violent, drug, and property crimes at the housing developments.[12] Results indicate that the logged number of housing units was positively associated with violent, drug, and property crime. In terms of housing type, all three forms of crime were highest at public housing developments; the differences in violent, drug, and property crime between affordable housing developments and LIHTC properties were not statistically significant. Findings varied for the population served variable. Developments that served elderly and/or disabled residents had significantly lower levels of violent and drug crimes. This variable was nonsignificant in the property crime models.

Consistent with Hypothesis 2, security and design features were significantly and negatively related to violent, drug, and property crimes at the

Table 4. Interactive Effects of Neighborhood Concentrated Disadvantage and Security and Design Features on Violent, Drug, and Property Crimes.

	Violent		Drug		Property	
	B	SE	B	SE	B	SE
Neighborhood Concentrated Disadvantage × Security and Design Features	0.34**	0.14	0.51***	0.13	0.21*	0.11

*$p \leqslant .10.$ **$p \leqslant .05.$ ***$p \leqslant .01.$

housing developments. We found partial support for Hypothesis 3. Neighborhood concentrated disadvantage was associated with significantly higher levels of violent, drug, and property crimes at the housing development. As predicted, housing developments in neighborhoods with high levels of residential stability had significantly lower levels of violent, drug, and property crimes. However, nonresidential land use as a percentage share of the surrounding neighborhood area was nonsignificant in the violent and drug crime models and maintained a marginally significant negative relationship with property crime.

Hypothesis 4 predicted that neighborhood conditions and development characteristics interact to influence crime at low-income housing developments. Specifically, we hypothesized that the negative relationship between security and design features and crime at the housing development would be weaker in neighborhoods with higher levels of concentrated disadvantage. To test Hypothesis 4, concentrated disadvantage and the count of security and design features were mean-centered to create an interaction term, and covariates were mean-centered in the models that include the interaction term. Table 4 presents these interactive effects.[13] The findings indicate support for Hypothesis 4 across all three types of crime. As predicted, the interaction of neighborhood concentrated disadvantage and housing development security and design features was positive and significant for violent, drug, and property crimes. In other words, the negative effect of security and design features on crime is weakened as neighborhood concentrated disadvantage increases.

Discussion

Given the demand for affordable housing and the large number of residents who live in various types of low-income housing, identifying the development characteristics and neighborhood conditions that produce the safest low-income housing for residents is vital. The present study explored these

issues using data from San Antonio, Texas. The analyses were informed by the extant crime and place research (e.g., Eck et al., 2007; Sherman et al., 1989; Weisburd, 2015), the communities and crime literature (Sampson et al., 1997; Shaw & McKay, 1942), and a multilevel criminal opportunity perspective (Wilcox et al., 2013; Wilcox et al., 2003; Wilcox & Tillyer, 2017). Despite the general stigma commonly associated with low-income housing developments (von Hoffman, 1996), the results indicate they are not all crime-ridden; the security and design features of these developments, as well as the communities in which they are placed, are important for understanding the variation in crime across developments. We discuss the findings and their implications for theory and crime prevention below.

First, and similar to other studies examining crime within a homogeneous set of facilities or land uses (e.g., Eck et al., 2007; Sherman et al., 1989 Weisburd et al., 2014), low-income housing developments in San Antonio were not uniformly criminogenic, with 5% of housing developments accounting for approximately 72% of all violent crime, 87% of all drug crime, and 72% of all property crime. As predicted, housing developments with more security and design features that control access, enforce rules, facilitate surveillance, and generally increase the risks and efforts associated with offending had lower levels of violent, drug, and property crime. Theoretically, this lends support to theories that view crime as a function of real and/or perceived opportunities for crime and reaffirms the applicability of environmental criminological theories for explaining the distribution of crime across various types of places, including low-income housing developments. With respect to policy, this suggests a need for an early and sustained commitment to crime prevention on the part of developers and managers, and that public funds and tax credits should be contingent on such a demonstrable commitment.

Second, low-income housing developments located in areas with high levels of concentrated disadvantage and low levels of residential stability had higher levels of violent, drug, and property crime. Theoretically, this indicates that low-income housing developments are not isolated havens, but rather part of the larger community in which they are embedded, and thus vulnerable to deleterious neighborhood conditions. Our findings support changes to federal policy aimed at incentivizing the development of subsidized housing in economically diverse and stable communities and moving away from previous practices of concentrating low-income housing in poor communities. Unexpectedly, nearby nonresidential land use was largely unrelated to crime at the housing development, with the exception of the negative relationship observed for property crime. The nonsignificance of the nonresidential land use variable suggests that low-income housing developments may in fact be

somewhat insulated from the people (and associated criminal opportunities) drawn to the nonresidential land uses in the nearby area. In other words, despite its physical proximity to places, the low-income housing development may be outside of nearby land users' "awareness spaces" (Brantingham & Brantingham, 1995). Given that many nonresidential land uses and facilities are identified by the housing authority staff as "assets" (e.g., banks, child care facilities, libraries, transit terminals, parks) that presumably improve the quality of life for residents, the fact that they do not simultaneously increase crime at the housing development is a welcome, if unexpected, finding.

Third, the findings provide support for the micro–macro interactions predicted by multilevel criminal opportunity theory (Wilcox et al., 2013). The relationship between security and design features and crime at the housing development varies by neighborhood concentrated disadvantage. In other words, the crime-reducing benefits of these efforts will be stronger in low-income housing developments located in more prosperous communities and weaker in developments located in more disadvantaged communities. This lends support to the idea that the effects of place-level protective factors for crime will be weaker in high-opportunity crime contexts (Wilcox et al., 2013). From a prevention standpoint, this finding highlights the importance of considering what Eck (2002) refers to as context sensitivity or "the variation in effectiveness caused by implementing the same intervention in different social, temporal and physical settings" (p. 95). In other words, efforts to prevent crime at low-income housing developments located across diverse neighborhoods may not produce uniform reductions in crime. Additional efforts may need to be made at developments located in neighborhoods suffering from high levels of concentrated disadvantage.

Although the present study offers important insight regarding the factors that influence crime at low-income housing developments, there are few limitations that future research in this area should address. First, the security and design features were not randomly assigned to properties. It is possible that they were implemented in response to existing crime problems at development and/or in the surrounding neighborhood. If this is the case, the actual negative relationship between security and design features and crime may be stronger than that observed in the current study. Future research should explore the use of experimental designs to isolate the effects of security and design features. Second, just as low-income housing developments are not uniformly criminogenic, the nonresidential land uses in the surrounding neighborhood likely contain considerable heterogeneity with respect to design, management, clientele, and so on. While nonresidential land use did not increase crime at nearby low-income housing developments, future studies should examine whether other characteristics of

nearby places—such as design, management, and user characteristics—influence crime at low-income housing developments. Third, there is likely considerable variation across micro-places and times *within* a housing development. For example, a recreation area might be particularly dangerous at night, while the remainder of the development is relatively safe. This is consistent with research on dangerous "unowned" places and times in schools (see Astor, Meyer, & Behre, 1999). The present study does not examine such variation and its sources. Fourth, because of the small sample size, we were unable to examine the *degree* to which the security and design features were implemented (e.g., how frequently the developments were patrolled, the rigor of the visitor policies). We assume that the magnitude of prevention benefits offered by such policies is contingent upon consistent implementation. Finally, our results are based on analyses of data from a single city, San Antonio. Additional studies are needed to determine whether the results can be replicated in other locations.

In conclusion, both development and neighborhood characteristics are relevant for understanding crime in low-income housing developments. Specifically, the findings from the current study suggest that assisted housing programs should invest in security and design features, encourage management practices that reduce opportunities for criminal behavior, and locate developments in economically diverse communities. Given the demand for affordable housing across the United States, additional studies should examine the extent to which these relationships exist in other cities.

Declaration of Conflicting Interests

Funding

Notes

1. This is the standard urban planners use to represent the neighborhood concept and walking distance (e.g., Duany & Plater-Zyberk, 2002; Ewing & Hodder, 1999; Perry, 1929). Quarter-mile buffers around the properties are considered to be more representative of the neighborhood than arbitrary boundaries such as census tracts or census block groups because buffers capture the conditions of the immediate surroundings. The LEED (Leadership in Energy and Environmental Design) for Neighborhood Development Rating System, the U.S. Green Building Council's certification for neighborhood-scale projects, also

adopted the quarter-mile standard for several of their credits pertaining to walk distance, connectivity, and neighborhood patterns and design.

2. Property crime rates did not follow the same pattern, possibly because there is less valuable property to steal in housing developments or such low-value losses went unreported to the police (Dunworth & Saiger, 1994). Holzman et al. (2005) report similar findings with respect to property crime.

3. Some subsequent research, however, has found that immigrant concentration is associated with lower, not higher, neighborhood crime rates (e.g., MacDonald, Hipp, & Gill, 2013).

4. Public housing authorities have discretion over how criminal histories are used in making housing admission decisions. Historically, they have been urged to adopt very stringent policies and procedures consistent with a one strike and you're out philosophy. These policies include extensive lookback periods, the use of arrests rather than convictions, and broad general categories of criminal activity. Often there are no time limits for certain crimes, and some policies prohibit admission to applicants with any minor offenses such as littering, public intoxication, or civil disobedience. Mitigating evidence concerning the nature and seriousness of the incident is often not taken into consideration (Tran-Leung, 2015). Due to these policies, residents who are listed on housing leases often have no criminal histories or very minor infractions. It was only recently, in response to the Second Chance Act, that public housing authorities have been directed by the U.S. Department of Housing and Urban Development (HUD) to reconsider the use of criminal backgrounds in admission for housing and abolish blanket bans on individuals with criminal records that disproportionately target protected classes under the Fair Housing Act of 1968 (HUD, 2011, 2015, 2016). The current study was conducted prior to any such changes at San Antonio Housing Authority (SAHA).

5. It is estimated that over 10 million low-income households (defined as households that earn less than 80% of the area median income) in the United States spend more than half of their income on rent. Approximately 53% of these households have at least one household member with a job, 39% of these households are elderly or disabled, and 38% of these households have children (Center on Budget and Policy Priorities, 2015).

6. Over half of all public housing was located in census tracts where the poverty rate was 30% higher and the percentage of minority households was more than 60% in 2012. In 2013, the average annual income of a public housing household was US$13,724, 36% of the households were disabled, 32% were elderly, 40% were families with children, and 36% were female-headed. White households made up 50% of the public housing population, whereas Black households account for 45% of the population (Schwartz, 2015).

7. The program offers a 9% and a 4% credit. The 9% credit provides approximately 70% of the qualified development costs for a project, whereas the 4% credit offers about 30%. Tax credits can be used for both new construction and rehabilitation.

8. Kleit and Page (2015) discuss the changing role of public housing authorities and their growing flexibility in affordable housing delivery. Public housing authorities own a portion of housing developments that are not within the HUD-assisted housing stock. Although affordable housing is usually targeted for low-income households, some affordable programs may target households that are over 80% of the area median income. As there are no uniform tracking systems in place for affordable housing, like the Public Housing Assessment System (PHAS) for public housing, less is known about the location and tenant characteristics of housing developments that fall within this category.

9. We controlled for the natural log of the total number of housing units rather than population size of the housing developments because tenant data were unavailable for all properties. SAHA collects tenant data at public housing developments, but these data are unavailable for Low-Income Housing Tax Credit (LIHTC) and affordable housing developments. Although SAHA is a stakeholder in these developments, private management companies are usually in charge of daily operations.

10. Factor analysis using varimax rotation confirmed that all items used to construct the concentrated disadvantage variable loaded on a single factor (Kaiser–Meyer–Olkin [KMO] $= .82, \chi^2 = 352.92, p \leq .001$).

11. All variance inflation factors were less than or equal to 2.43.

12. Global Moran's I was used to test the Pearson residuals from the regression analyses for spatial autocorrelation. Pearson residuals and deviance residuals are appropriate to use with heterogeneous population sizes and log-linear or Poisson regressions on count data (Lin & Zhang, 2007). The pattern was not significantly different from random across the violent crime (Moran's $I = .005, Z = .168, p = .866$), drug crime (Moran's $I = .006, Z = .882, p = .378$), and property crime models (Moran's $I = -.030, Z = -.216, p = .829$).

13. The interactive effects described in Table 4 were estimated controlling for the logged number of housing units, housing type, population served, security and design features, neighborhood concentrated disadvantage, residential stability, and nonresidential land use.

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