Schools as Criminal "Hot Spots": Primary, Secondary, and Beyond
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Americans are deeply concerned about crime. Increasing crime problems in America’s schools and expanding youth involvement in crime are two reasons. These trends should be linked to criminological developments regarding crime incidents and the places where they occur. Routine Activities Theory emphasizes the conditions and locations where crime occurs. Research also indicates crime is concentrated in small areas called “hot spots,” often centered on locations integral to the offender’s routine activities. Schools are one focal point for the routine activities of youth. Accordingly, using Tobit analysis of block-level burglary rates, this research examines the importance of different types of schools as focal points of acquisitive crime.

Keywords: burglary; hot spots; police strategy; school crime; spatial analysis; Tobit analysis

In recent decades, media and politicians lamented changes undergone by schools, focusing specifically on crime and violence (DeVoe, Peter, Noonan, Snyder, & Baum, 2005). Yet schools have not received much scholarly attention as crime facilitators and the majority of school-related incidences are not credited to the schools themselves (Felson, 1987). Studies document that areas near public high schools have higher crime levels than other residential areas (Gouvis Roman, 2002; Roncek & Faggiani, 1985; Roncek & Lobosco, 1983). However, lower level schools have been largely ignored as crime facilitators, despite the fact that some of their crime problems are worse (Toby, 1983; Wilcox, Michelle, Bryan, & Roberts, 2005). This research examines the effect of primary and middle schools (public and private) on burglary in the surrounding residential areas.

This vein of research has several potential benefits. First, it can identify whether one major foci of youth routine activities is associated with crime. This, in turn, would demonstrate how schools affect crime vulnerability in the immediate surrounding areas. Thus, it can inform the public and policy makers of certain long-term risks or consequences associated with the location of schools in residential areas. Second, this work approximates a quasi-experiment for public schools because their distribution is, at least ostensibly, not based on race or class. Therefore, isolating their effects on burglary should be relatively simple because their locations should not be correlated with the aforementioned factors that...
also affect crime. Third, focusing on a potentially criminogenic facility can lead to more effective crime prevention measures. For example, research shows that concentrating patrol efforts on criminal hot spots can reduce incidence of criminal events without displacement (DeVoe et al., 2005; Green, 1996; Weisburd et al., 2006). Thus, schools and their surrounding areas represent a potential focus for such efforts.

Theoretically, an association between the presence of elementary, junior high, or senior high schools on or adjacent to residential city blocks and the number of burglaries on said blocks lends credence to Routine Activities Theory (L. E. Cohen & Felson, 1979; Felson, 1993) and identifies schools as hot spots for crime. This would have several implications for police policy. First, expanding police presence at schools might significantly affect burglary incidence (Coupe & Blake, 2005) in the surrounding areas. Second, residents of blocks close to schools might be advised to take special target-hardening efforts (Clarke, 1983). Third, such residents could make their property less attractive by trimming back shrubbery that might conceal offenders as they attempt to gain entry to the home. Finally, the formation of neighborhood watch groups would improve the guardianship in such areas (Weisel, 2002; Wright, Logie, & Decker, 1995). Thus, this vein of research has practical and theoretical applications. With that in mind, we first discuss our theoretical framework.

**Theoretical Underpinnings**

**Ecological Criminology and Routine Activities**

Most crime can be viewed as the result of conscious and usually rapid decisions about the attractiveness of criminal opportunities. The extant literature demonstrates that crime is not simply caused by a criminally minded person; other situational conditions must be present, such as target availability and opportunity (L. E. Cohen & Felson, 1979). For example, the physical environment of convenience stores, bars, and schools lend themselves to criminal activity (Gouvis Roman, 2002; Roncek & Maier, 1991; Sherman, Schmidt, & Velke, 1992). All have ready accessibility because of the functions they serve. Thus, environment is a powerful inhibitor or facilitator of crime, and situational prevention strategies can affect its likelihood of occurrence (L. E. Cohen & Felson, 1979; Weisburd et al., 2006). Therefore, criminal event theory should incorporate the nature and distribution of criminal opportunities, demonstrating how offender choices are associated with circumstances at hand.

Ecological criminology studies how the social and physical environment affects crime, looking at space as a fixed quantity that shapes offenders’ activities (Brantingham & Brantingham, 1991). From the mid-1800s, specific city areas have been consistently associated with high crime and concentrations of criminals. Frequently these areas share common characteristics such as low-income, mixed or minority ethnicity, and dilapidated housing. Such commonalities inspired an ecological approach to criminology (Shaw & McKay, 1942). Later research turned away from ecological criminology, focusing almost exclusively on individuals, in part, because earlier studies ignored underlying differences in and between areas (Brantingham & Brantingham, 1991).

Routine Activities Theory (L. E. Cohen & Felson, 1979) reinvigorated environmental criminology. Central to the theory is the assumption that crime feeds on legitimate activities and opportunity. Specifically, it isolates three necessary components of any criminal
act: a motivated and able offender, a suitable target, and lack of adequate guardians. Under this perspective, the absence of any of these precludes successful crime completion. Thus, when controls on routine activities decrease, crime increases. L. E. Cohen and Felson further postulated that the effects of these components may be multiplicative rather than additive, meaning that target suitability, for example, exponentially increases with a decrease in guardianship.

L. E. Cohen and Felson (1979) defined *routine activities* as commonplace activities that provide for basic population and individual needs, as well as furnish offenders with suitable targets (by converging potential victims and offenders in the presence of influences conducive to criminal activity). Thus, the spatial and temporal structure of activities such as work, school, and leisure are important for explaining crime rates of given communities. Furthermore, Routine Activities Theory shows how community structure and organization as well as societal technology produce circumstances favorable to crime (L. E. Cohen & Felson).

Subsequent discussions of Routine Activities Theory explain how common activity nodes changed over time, further contributing to criminal victimization (Felson, 1987, 1993). The tremendous growth metropolitan areas still undergo demonstrates how modern society is ever expanding. Countless cities have grown beyond their boundaries, encroaching into previously isolated suburbs. The intense movement associated with this growth creates areas of increased risk that congregate offenders and targets. Concentrating several popular activity nodes in one location (e.g., shopping centers) reduces the number of destinations but increases victimization opportunities.

This linkage between movement and activity nodes is essential to Routine Activities Theory. Although the essential players are moveable, the crime itself occurs at a fixed point. The convergence of victim and offender as well as the flow of movement that brings them together adds temporal and spatial dynamics to crime analysis. As these movement flows vary with the time of day and the day of the week, the activity at and importance of criminal nodes also varies by both factors (Coupe & Blake, 2006; Townsley & Pease, 2002).

Certain areas are more subject to crime because they have suitable targets, and offenders subjectively perceive these areas as feasible locations for criminal acts. This reality necessitates consideration of the intricacy movements and perceptions of potential offenders. Because of the difficulties in ascertaining offender motivation, one way to identify environments that offenders perceive as good locations for crime is ascertaining where offenders actually commit crimes. Therefore, spatial analysis of crime requires identifying and documenting crime-prone environments (Brantingham & Brantingham, 1983).

Such nodes of consistently recurring criminal activity are often generated by specific land usages that attract potential victims and offenders. For example, Sherman, Gartin, and Buerger’s (1989) evaluation of Minneapolis police data revealed that relatively few addresses (or hot spots) produce most police calls. Several studies demonstrate high schools (Roncek & Faggiani, 1985; Roncek & Lobosco, 1983) and bars (Gorman, Zhu, & Horel, 2005; Roncek & Maier, 1991; Sherman et al., 1992) to be criminal hot spots. Moreover, police attention to such hot spots can significantly affect crime rates at these locations without displacement to other areas (Braga, 2001; Braga et al., 1999; Farrell & Sousa, 2001; Weisburd et al., 2006).

In addition, often offenses are committed in the course of an offender’s routine activities and not necessarily near the offender’s home (L. E. Cohen & Felson, 1979). For example,
studies indicate few burglars were willing to travel significant distances to reach their targets (Repetto, 1974). Moreover, research indicates that most offenders commit crimes close to activity nodes, providing evidence of offender opportunism (Cromwell, Olson, & Avary, 1991). In fact, many offenders commit crimes on routes used for work, school, and leisure (Brantingham & Brantingham, 1983, 1999; Pyle et al., 1974). Such results bolster Routine Activities Theory. More recently, studies of youth delinquency (Vazsonyi, Pickering, Belliston, Hessing, & Junger, 2002), vandalism (Tewksbury & Mustaine, 2000), and burglaries (Tseloni, Wittebrood, Farrell, & Pease, 2004) support Routine Activities Theory, suggesting that it remains an effective method for explaining crime that succinctly distinguishes between the routine activities of potential offenders and the effects they have on crime (Gabor, 1990).

Empirical Evidence

Schools and Crime

Although school crime has always been a problem, it grew from the late 1960s onward (Rubel, 1977). Yet empirical evidence does not support the current public perception that schools are plagued with violence, crime, and disorder. Systematic research indicates that severely violent or costly crimes are relatively rare in schools whereas minor victimizations are common (Garofalo, Siegel, & Laub, 1987). Most studies conclude that school crime, like most crime, is mainly nonviolent (DeVoe et al., 2005; Toby, 1983).

For most of the year, school is a primary activity node for youth. If, in accordance with Routine Activities Theory, concentrating individuals increases the opportunities for crime, then facilities that do so may become hot spots. Thus, intuitively, school enrollment (i.e., the number of potential victims and offenders concentrated in the school) should be positively correlated with the number of offenses in the immediate vicinity (Felson, 1993). Yet despite findings that the areas surrounding schools are consistently associated with violence and property loss (Hellman & Beaton, 1986), most crime and school studies focus on the school itself and not its impact on the neighboring areas. One study, however, examined National Criminal Victimization Survey data, finding that substantially more victimizations occur on the way to school rather than within the school itself (Garofalo et al., 1987). Many of these resulted from peer interactions during routine activities that escalated into criminal acts. Thus, students are demonstrably a sizable pool of potential offenders who lack adequate guardianship during several school-related routine activities.

Because the routes to and from school are relatively unsupervised, it is not surprising that schools are credited with and experience only a fraction of the crime they generate (Felson, 1993). Furthermore, as a rule, school days conclude long before people return home from work. This, coupled with the advent of two-income families where neither partner stays at home, leaves a substantial timeframe in which homes lack adequate guardianship. Thus, the houses en route from school can be prime targets for students freshly released from the classroom. One obvious result can be youth crime.

Individuals should be concerned about potential victimization when they are in areas that allow criminal motivation to blossom into criminal acts. Such areas have social control problems because they are intensely used and publicly available. As public places used regularly by many people, high schools might have criminogenic effects on surrounding areas.
In fact, studies show that city blocks with public high schools and those blocks directly adjacent to them had higher levels of crime (Roncek & Faggiani, 1985; Roncek & Lobosco, 1983). More recently, research uncovered that daytime burglaries are highly correlated with truancy, and a large proportion of household burglaries occur in close proximity to schools (Scott, 2004). Thus, the idea that proximity to public high schools produces additional block-level crime has substantial support.

Beyond this, research shows that junior high schools (serving ages 11–14 years) had worse crime problems than senior high schools (Toby, 1983). In fact, junior high schools often have higher rates of assault, theft, and criminal threats than their senior counterparts (Wilcox et al., 2005). The higher enrollment of involuntary students in junior high schools is one possible explanation for this. If such students are indeed the bulk of the problem, their dropping out in high school (ages 14–18 years) might explain the different rates of these crime types between junior and senior high schools. It, therefore, makes intuitive sense to test whether these differences hold true for other offenses.

In contrast, elementary schools have higher levels of guardianship than their junior and senior high school counterparts as a direct result of the attending students’ ages (5–11 years). Not only are higher teacher-to-student ratios required in elementary schools, but there is also an increased parental presence throughout the day (e.g., teacher assistants, recess monitors, crossing guards, or other volunteers) as well as before and after school when parents deposit and retrieve their children. In addition, children of this age group are not as self-sufficient as their older counterparts, making them less likely to be released unsupervised into the surrounding neighborhoods than older students. This suggests that there would be more-than-adequate guardianship and a distinct lack of vulnerable victims, therefore lower crime rates in the immediate vicinity.

Yet, by the same token, these increased supervision levels make elementary schools an increased activity node for the aforementioned supervisory adults. Furthermore, such schools, unlike junior or senior high schools, are equipped with playgrounds and playground equipment. These, by their entertainment nature and more so than sports fields, attract various age groups to the site during off hours and over the summer, making them a potential activity node separate from the student population. Thus, elementary schools represent a paradox of possibilities. Their presence can either promote or deter criminality. As there is little research on these types of schools as facilitators of crime, we explore the possibilities by including them in the current analyses.

**Burglary**

Research has shown that burglary is often a “spur of the moment” crime perpetrated by relative amateurs (Waller & Okihiro, 1978), most of whom would not commit the crime if it necessitated complex abilities or substantial commitment (Gabor, 1990). Thus, the average burglar is only an occasional offender, who will transgress only—but not always—when opportunity and incentive are present. In contrast to the less common professional burglar (see Tsoloni et al., 2004, for example), such offenders are often juveniles (Hepburn, 1984). In fact, recognition of the connection between schoolchildren and burglary has led some police departments (e.g., San Jose, California, and Milwaukee, Wisconsin) to form Truancy Abatement and Burglary Suppression programs (Garry, 1996).
More than 18 million burglaries and thefts occurred in the United States in 2004. Of these crimes, slightly more than one half were reported to authorities. Nationwide, approximately 20% of cleared cases were perpetrated by juveniles (Federal Bureau of Investigation [FBI], 2005). Roughly 30 houses out of every 1,000 in the United States were burglarized in 2004. One third of burglaries were by forced entry, whereas the offender entered through an open window or unlocked door for the remainder (Catalano, 2005). This demonstrates not only the prevalence and relevance of the problem but also the opportunistic quality of burglary in general.

In their ethnographic analysis of burglary, Cromwell et al. (1991) noted a high correlation between burglarized versus nonburglarized residences and their distance from a school. In fact, schools explained the highest amount of the variance as compared to other variables relevant to Routine Activities Theory such as distance from other activity nodes (churches, businesses, parks, etc.). Thus, the above constitutes further empirical evidence tying schools to incidence of residential burglary and underscores the need for further research examining the connection.

Data and Method

Data

The dependent variable is the number of police-reported burglaries on residential city blocks in Cleveland, Ohio, from January 1989 to October 1991. Because of changes in data access policy, later data were not available for analysis. However, recent research from Rountree, Land, Cohen, and others, by utilizing data ranging from 1977 to 1992, demonstrates that data age is not as relevant as the technique applied, findings uncovered, and resultant theoretical implications (Rountree & Land, 2000).

Although underreporting generally results in police data underestimating crime (O’Brien, 1985), such data are still crucial for investigating our research question. Victimization surveys lack the precision required to identify the focus of criminal hot spots within a city. In addition, ecological analysis requires a specific site and location. Because police reports are much more likely to capture precise locations as compared to other data sources, they remain the best option available. Moreover, burglary, in comparison to other offenses such as robbery, is the crime type most likely to have a specific address linked to its incidence. This feature of burglary not only makes it more readily adaptable to computer mapping programs but also facilitates precise ecological analysis.

The raw data file consists of 30,904 total burglaries. Of these, 10,554 occurred in 1989, 10,202 in 1990, and 10,148 in 1991. Our analyses use the average numbers of burglaries over the 3-year period because the average has smaller numbers that are easier to discuss. We use a 3-year span to smooth out possible year-to-year fluctuations. All burglaries, residential and nonresidential, are included because the concentration of potential offenders assembled by schools can result in victimizing businesses as well as residences. The final count of usable crime addresses is 30,566.

The units of analysis for the current analyses are the residential city blocks for Cleveland. Because completely nonresidential blocks have no social data available, their compositions cannot be controlled. Therefore, they are excluded from the current analyses. Thus, the total
block count is 4,747 and represents all residential blocks in Cleveland, a choice that avoids sampling error. Because blocks are the smallest area unit of analysis for which population and housing data are available, using them avoids the possibly misleading data that can result from using larger units of analysis (Roncek & Maier, 1991). To match the temporal span of the available police-recorded data (1989–1991), the social, demographic, and housing characteristics are all derived from the 1990 rather than 2000 census data. The average population of residential city blocks was 105 persons per block and the average residential block area is 7.83 acres. The average number of burglaries per residential block was 1.97.

Cleveland is an older, industrial city, and such cities often have relatively serious crime problems. The population of Cleveland declined 11.9% between 1980 and 1990, from 574,000 in 1980 to 506,000 in 1990. However, this is not as severe a drop as the one experienced between the two previous censuses, which was 33.6%. This apparent slowing of the decline may be due, in part, to the redevelopment of a decaying industrial area, the Flats, into an entertainment district and revitalization of the lakefront district. In 1990, the overall population of Cleveland was roughly 506,000. The racial composition of Cleveland was approximately 54% White, 44% African American, and 3% Hispanic. The total number of schools present in Cleveland from 1989 to 1991 was 193.4

Contemporaneous Uniform Crime Report (UCR) crime-level reports indicate that burglaries in Cleveland decreased steadily from the late 1980s through the early 1990s (FBI, 1996). This follows the national trend of declining burglaries over the same years. Although there are some minor fluctuations from national averages, Cleveland generally followed U.S. crime trends of the time.

Test Variables

The main test variables measure the presence and enrollment size of the schools, private and public, on residential city blocks as well as the primary and secondary adjacency of blocks to these schools. Primary adjacency, in this case, refers to those city blocks directly bordering on a city block that contains a school. Secondary adjacency describes those city blocks directly adjoining the city blocks that border the school blocks. Both measures are represented by the enrollment of the adjacent school. Because primary and secondary adjacency are specialized types of autocorrelation (Haining, 2003), corrections for autocorrelation (such as the Getis-Ord G, Moran, or Geary statistics) are not included in the model as they would mask one of the effects we attempt to measure. Apart from the findings of previous research, we include proximity because youths (and any other visitors) may take a variety of routes from the school to reach their next destination. However, tertiary adjacency and beyond are not modeled because this effect is expected to disperse over distance with the divergence of routes and destinations. This approach is supported by the inherently nonlinear nature of Routine Activities Theory (Bursik & Grasmick, 1993).

In addition, we isolated grade category, for public and private schools, to represent the other key test characteristic (e.g., whether it was an elementary, junior high, or senior high school). The final count of Cleveland public schools is 118 (14 high schools, 19 middle schools, and 85 elementary schools). There are 61 private schools: 53 elementary schools and 8 high schools. To identify the city blocks with schools, we geo-coded their addresses by computer using MapInfo (Version 4.0, 1996) and manually checked the results with city
census block maps. We then used the same mapping program to locate and identify the blocks with a school as well as those directly adjacent and secondarily adjacent to those blocks. We recorded the census tract and block numbers for each block and entered these into a master file. Finally, we cross-verified the resulting block plots using census block maps and a Cleveland city map file.

One hundred and four of the public schools and 59 of the private schools are located on residential blocks. Thus, for the majority of schools, census data for sociodemographics and housing are available for the block on which they are situated. Because the sociodemographic variables can be controlled for only these blocks, schools not located on residential blocks are excluded. This brings the final count of usable schools to 163. Despite this, primary and secondary adjacencies were still defined for the omitted schools, as those blocks may still be residential blocks.

Control Variables

The control variables include social indicators and environmental variables. Such variables are useful for identifying different types of residential areas. Several are also integral components of Routine Activities Theory, further justifying their inclusion. Indicators of family or household composition have demonstrated effects on city-block crime levels (Andresen, 2006; Baumer, Horney, Felson, & Lauritsen, 2003), meriting their inclusion. The independent variables representing these characteristics are the percentage of primary individual households, the percentage of female-headed households, and the percentage of residents older than age 60 years.

Previous research also found that minority and racially diverse as well as economically deprived areas have higher crime rates than other areas (Klinger, 1997; Stolzenberg, D’Alessio, & Eitle, 2004; Velez, 2001). Thus, the demographic composition of an area is an important factor. Therefore, the percentages of Black residents, Hispanic residents and a measure of non-Black racial heterogeneity are included as indicators of minority composition. To capture the socioeconomic status of blocks, we use the value of owned housing. Notably, clearance data was not available, precluding the inclusion of offender characteristics in these analyses.

Several control variables reflect block environmental conditions. Percentage of overcrowding, percentage of apartments, and vacancy rates per 100 year-round housing units constitute the housing measures while resident population size and block area in acres capture block size. These variables are theoretically important in regard to guardianship levels (L. E. Cohen & Felson, 1979), and previous studies have shown their significant effects on crime (Roncsek & Faggiani, 1985; Roncsek & Maier, 1991).

Analyses

In analyzing the data, we first conduct t tests comparing blocks with schools to all other blocks to establish whether or not they differed significantly in burglary incidence. The difference was statistically significant (.01) justifying further analysis. Because the dependent variable, burglaries, is left censored, we conduct Tobit analysis so as to not violate ordinary least squares (OLS) regression assumptions (Tobin, 1958). As an added bonus of this analytical
choice, Tobit estimates the risk of burglary associated with having a school on a crime-free block as well as the additional risk associated with having a school on a block with burglaries already present (Roncek, 1992). In some respects, this makes Tobit a superior tool for testing the tenets of Routine Activities Theory because it enables us to estimate the effect an increase in population at the activity node (here, school enrollment) will have on crime in the surrounding area.

Results

Before moving to interpretation, an explanatory note on the Tobit results and associated statistics is in order. The chi-square test is a significance test analogous to the $F$ test in regression analysis. Likewise, the Lemeshow pseudo $R^2$ is analogous to the $R^2$ in regression. However, here it is a measurement of the reduction in error rather than the amount of variance explained. Similarly, the standardized effect is analogous to the beta weights of regression analysis in that they can be used to rank the independent variables in order of importance. Thus, coefficient interpretation is, in many ways, analogous to OLS regression. That similarity ends, however, in regard to the effect above the limit and the probability effect. Here, the effect above the limit indicates the effect of the independent variables on blocks that already have burglaries. The probability effect gives the effect of each independent variable on blocks that do not already have burglaries. In other words, both provide the effect of each independent variable on the probability that these blocks will have either another burglary or a burglary given a unit increase in the independent variable (see Roncek, 1992, for additional discussion). Notably, variance inflation factor (VIF) and the Condition Index tests indicate that collinearity is not a problem in these analyses.

The results of our Tobit model are listed in Table 1. The chi-square was statistically significant at .05 or better whereas the Lemeshow pseudo $R^2$ indicated an 18.45% reduction in the log likelihood. Of the control variables, all were significant at the .05 level or better with the exception Hispanic population and percentage overcrowding. The standardized effects indicate the population to be the most influential significant variable, followed by the vacancy rate, racial heterogeneity, block area in acres, percentage of the block population older than age 60 years, the mean value of owned housing, the percentage of block African American population, percentage of apartments, percentage of primary individuals, and the percentage of female headed households, respectively.

It is surprising to note that in regard to the test variables only two significantly predicted burglary. Of the school presence measures, only public K-5 (approximately ages 5 years through 10 years) schools significantly (.01) influenced the probability of burglary, and the betas indicate it to be the second least influential variable. The effect above the limit shows a .103 increase in burglaries per additional student present for blocks that already have burglaries. In other words, an increase in enrollment of roughly 10 students at public K-5 schools increases the burglary rate on that block by 1. Similarly, the probability effect shows that each additional student garners a .019 increase in the probability of a block without burglaries experiencing a burglary. Thus, it would take an enrollment increase of roughly 53 students for a block without burglaries to become a block with at least one burglary.
## Table 1
### Tobit Analysis of Burglary Rates per Block

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficient</th>
<th>Beta</th>
<th>Effect Above Limit</th>
<th>Probability Effect</th>
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<td><strong>Block level controls</strong></td>
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<tr>
<td>Percentage primary individuals</td>
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<td>.0649*</td>
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<td>.0919</td>
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<tr>
<td>Percentage female headed</td>
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<td>.0884</td>
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<td>Percentage older than 60 years</td>
<td>-.0013*</td>
<td>-.1068*</td>
<td>-.8764</td>
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<td>Percentage Black</td>
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<td>Percentage Hispanic</td>
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<td>Average owned housing value</td>
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<td>-.1060*</td>
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Note: N = 4747. Lemeshow Pseudo $R^2 = 18.45$.

*p < .05.
Similarly, of the adjacency variables, only primary adjacency to public K-5 schools was significant (.05), and the standardized effect shows it to be the least influential variable. The effect above the limit shows this factor, for blocks with burglaries, to increase the number of burglaries by .028 per additional student in the K-5 school to which the block is adjacent. This means that each additional enrollment of 36 students would, for primarily adjacent blocks already having burglaries, increase the burglary rate by 1. At the same time, the probability effect indicates that an additional enrollment of 200 students would increase the result in a block without burglaries becoming a block with at least one burglary. However, none of the other school enrollment or primary adjacency variables significantly predicted burglary. Likewise, none of the secondary adjacency variables were significant.

**Discussion**

Our analyses reveal that the presence of public elementary schools serving Grades K-5 is significantly associated with more burglaries on residential blocks. Moreover, primary adjacency to blocks with such schools also had significant effects, increasing burglaries on immediately surrounding blocks. However, no other schools had any effect on burglary rates. These findings are somewhat surprising in light of previous research. Although those studies were limited to high schools (Roncek & Faggiani, 1985; Roncek & Lobosco, 1983), we expected those school effects to remain significant across studies. In addition, previous research strongly supported the contention that middle schools may be focal points of criminal activity (Toby, 1983; Wilcox et al., 2005). Yet the current data and analyses support neither. Thus, the results reported here are generally counter to expectation.

Given the higher levels of guardianship present at elementary schools generally, why would public K-5 schools garner such increases in crime when other, more intuitively obvious schools do not? One possible reason for the difference is our focus on burglary alone rather than the UCR index crimes. Perhaps characteristics of the other offenses and their perpetrators lend themselves more readily to commission near high schools and middle schools. By the same token, the environmental characteristics of such schools may impede or preclude burglary but not other index offenses. Future studies might include all index offenses in analyses of school crime that encompass high, middle, and elementary schools to test for these possibilities.

Still, the characteristics of such schools that contribute to burglary must be isolated if additional directions for policy change are to be found. It is unclear from the data analysis why public schools serving Grades K-5 affect burglary but the other public elementary schools did not. Logically, because some of the grades served overlap, the overall environment, facilities, and activity levels should be comparable for all public elementary schools. Perhaps the difference is an effect of the sheer numbers involved because 67% of the public elementary schools are categorized as K-5 and the other categories each comprise 11% or less. It is also possible that the K-5 schools, being a more traditional grade range, are of older design making them more accessible to members of the general public than their newer counterparts as well as situated in the high-crime areas typically associated with most cities’ oldest neighborhoods.

Yet, beyond this, the data also show that the enrollment of these schools affects burglary rates. This is substantially different from previous work indicating that enrollment had no
effect (Roncek & Faggiani, 1985; Roncek & Lobosco, 1983). Here, the analyses reveal that larger enrollments of public schools serving Grades K-5 are associated with more burglaries for the blocks on which the schools are located as well as those directly adjacent to it. Given that the enrollment of only one school type has direct and adjacency effects suggests that there is something different about Cleveland public K-5 schools as compared to other Cleveland public schools. Some possibilities are already articulated above.

However, perhaps the convergence of the aforementioned factors explains why only these elementary schools significantly predict burglary. For example, current criminal justice policies show heightened sensitivity to the particular vulnerability to crime of schools and the students they serve. In many jurisdictions, registered sex offenders are prohibited from living near or even coming within 1,000 feet of a school (Farkas & Stichman, 2002; Levenson & Cotter, 2005). Likewise, drug trafficking and “drug possession with intent to distribute” offenses generally carry enhanced penalties if they are committed within 1,000 feet of a school or involve the use of a minor in the commission of the offense (Engen & Steen, 2000). These policies, invoked at different stages in the system, succinctly illustrate that schools are a considerable draw for various offenders. Simply, their student populations represent potential victims, clients, and/or recruits. Thus, the larger the school enrollment, the more attractive the school will be. Moreover, younger children are less likely than their older counterparts to be used as witnesses (Bruck, Ceci, & Hembrooke, 1998; Hutcheson, Baxter, Telfer, & Warden, 1995) or sanctioned for illegal acts (Kurlychek & Johnson, 2004). Thus, from the perspective of the offender, the younger the child involved the better. This would make elementary schools an even more attractive target.

To illustrate this complex potential mechanism, we focus on a drug offender example. Given the known association between drug and property crime (Farabee, Joshi, & Anglin, 2001), drug offenders might kill the proverbial “two birds with one stone” by burglarizing homes in the immediate vicinity of these schools while waiting for their young student targets to emerge. Thus, the increase in burglaries associated with the presence of a K-5 elementary school is explained by the convergence of the offender’s criminal strategy with his or her routine activities. This interpretation fits well with the current findings and the tenets of Routine Activities Theory.

Alternately, the larger the school enrollment, the more extensive the student recreation areas will be so that they can accommodate the student body. These will include not only the requisite equipment (swings, slides, etc.) but also large courts and fields for sport. The more expansive and diverse these playground facilities, the greater draw they will be for a wider variety of persons. This will be especially so in the out-of-term months or during times when the school is closed (the evening or at night), making such schools an activity node virtually independent of their primary function.

In contrast, the grounds of middle and high schools generally do not have the same features of interest. Playground facilities are absent from both. Instead, they mainly have only empty sports fields or locked stadiums that are of limited entertainment value outside their specified purpose. Moreover, given that they serve larger areas than elementary schools, middle and high schools are generally more remote than locally based elementary schools, making them much less attractive as recreational facilities (especially for youths who do not yet have access to automobiles). Finally, depending on the age of the facility, many of these schools do not have the large grounds for play or sport directly adjacent to them.
Rather, students may have to travel some distance after school to meet for sport or team practice. All of these characteristics can serve to explain why middle and high schools are not associated with increased burglaries; they are not activity nodes independent of their primary function.

In addition, there are several reasons why persons unrelated to the primary function of a K-5 school might come to it after hours. In a positive view, neighborhood parents with small children might bring them to play on the convenient equipment in daylight hours over the summer and on weekends. As a less encouraging possibility, school alumni (of various ages) from the surrounding area may be drawn to the familiar site to pass time in assorted ways ranging from innocent nostalgic play to clandestine amorous encounters to underage smoking or alcohol consumption to taking illicit drugs. Naturally, the larger the enrollment, the more former students the facility will have and the greater this population will be. Similarly, area homeless might be attracted to school playgrounds, employing the equipment and structures as makeshift nighttime shelters. On a bleaker note, local drug dealers and prostitutes might come to the grounds during late hours to ply their trade under the cover of darkness and the facilities provided. This latter possibility would naturally draw the clientele of these entrepreneurs to the site and its immediately surrounding area.

Each of these possibilities has implications for aspects of Routine Activities Theory. The positive activities would serve to increase guardianship in and around the school during daylight hours. Conversely, the negative ones would not only decrease guardianship but also simultaneously increase the presence of motivated offenders. This latter possibility may do much to explain the current findings. Simply, parties to the more harmful activities might, either before or after doing what they came to the school to do, engage in burglary. Drug addicts might look for means of supporting their habit, taking any opportunity that presents itself, including burglarizing a neighboring home. Teens, bored after their clandestine or illicit excursion to the school, might take similar opportunities to burgle nearby residences as a thrill-seeking endeavor.

In testing both sets of above propositions, future statistical research might take the burglary time of day (Coupe & Blake, 2006) as well as the overall levels of street crime (e.g., prostitution, drug crime, etc.) on blocks close to the schools into account. Qualitative site observations at various times of day might also be undertaken to further explore these possibilities. In addition, given the above, school layout might play a key role in the aforementioned activities. Although closed grounds are traditionally considered crime preventive (Clarke, 1983), they might also facilitate it. For example, closed gates generally will preclude the law-abiding parents or groups of friends from entering school property to engage in the positive, guardianship-promoting activities. However, visitors with more questionable motives may not be deterred by such barriers, particularly if the surrounding walls or fences are damaged, short, easy to climb, and/or provide ready cover for illicit activities. Therefore, a school with a fenced yard could simultaneously have a diminished legitimate activity level (in comparison to schools without fenced grounds) as well as a potentially increased illegitimate activity level. Because on-site visitation was not possible for this research, this potential influence could not be adequately addressed and our above interpretations remain speculative.

Regardless, our results not only provide support for Routine Activities Theory but also have policy implications. Although the statistically significant school variables were the least influential, they are one of the most easily controlled. For example, change in one control
variable, such as owned housing value or racial heterogeneity, would be not only time-consuming but also quite difficult to orchestrate. Conversely, if local school boards lowered the maximum enrollments of public elementary schools, thereby reducing the expansiveness of facilities required, burglaries in the immediate vicinity of schools would be expected to drop proportionally.

Furthermore, with recent studies indicating the effectiveness of specific preventive patrol in reducing offenses at criminal hot spots, such efforts might be concentrated on public elementary schools serving Grades K-5. Although this intervention may be effective during the school peak-activity times such as student arrival and departure times, given the additional possibilities discussed above, it may also be especially successful for off-peak hours as well. Regardless, such patrol should not be limited to the school itself but instead should encompass the surrounding areas as well, specifically the primarily adjacent blocks. This research demonstrates a definite need for future investigation of this possibility as well as potential interaction effects between preventive patrol and decreased enrollment.

Yet, like many studies, this research suffers from limitations. Some might argue that the age of the data is one of them. However, as previously noted, the issues examined are not inherently restricted by time (see J. Cohen, Gorr, & Singh, 2003; Roundtree & Land, 2000; Velez, 2001; all of which use data of the same age or older). Like the previous authors, we believe that our findings highlight an important area for future theory, research and policy. Our analytical strategy (e.g., the use of Tobit to estimate the effect of school enrollment over burglary) is innovative and the patterns uncovered have direct implications for police strategy regarding elementary schools and their surrounding areas as burglary hot spots.

Despite this, there are other limitations of concern. Because data measuring other, non-residential uses on the residential city blocks were not available, we cannot directly address the effects of other land uses on residential blocks. Thus, the presence and possible influence of other potential hot spots (e.g., bars, nightclubs, etc.) in close proximity of the schools cannot be taken into account. Likewise, the effect of a school’s street location cannot be controlled. Simply, in accordance with Routine Activities Theory, the more roads that lead to a location, the more likely it is to be victimized. Similarly, the type of road on which a school is situated may also have an effect (busy thoroughfares might produce more criminal incidences than quieter, less used streets). Future research might use traffic count data in an attempt to control for this possible influence.

Another possible limitation stems from the use of primary and secondary block adjacency to determine the spatial extent and distribution of the burglary pattern in relation to schools. Because the size of city blocks is not uniform, in some instances, primary and secondary adjacent blocks on one side of a school are small physically whereas those on the other side are substantially larger. Thus, the proximity of the school to the secondary adjacent block is directly dependent to the size of the primary adjacent block. For the sake of simplicity, we applied primary or secondary adjacency respectively to any block that touches the block with the school or any block that touches a primary adjacent block. However, irregular shapes and sizes of blocks can result in some being defined as secondary adjacent that are further from the target block than other blocks that are closer but are not primary or secondary adjacent blocks according to the definition. In some cases, the block where the school is located covers a substantial area and is irregularly shaped, a problem compounded when the school is located on the edge of the block. Although students (and
others) may be able to travel directly across the schoolyard portion of the block, the distance from the school to the primary adjacent block on the other side is substantial. As a result, the distance between them might diffuse the school effects on this primarily adjacent block.

In addition, the percentage of students who ride the bus to school may also vary by school type. The effects of this factor, which is present for all public schools, are unknown as data concerning bussing are unavailable for the years and city in question—although its salience may decrease as students reach the minimum driving age. A related concern is the possible decrease in the number of students walking to school as they advance through grade levels. Only high school students will have personal access to automobiles for transportation. Junior high school children may have access to bicycles, skateboards, and so on. These factors may expand the sphere of influence of the schools or, conversely, might remove potential offenders from the vicinity of the school to other nodes of activity and suitable targets. Yet, like previous concerns, no information on this is available and exploring this possibility is beyond the scope of the current research.

**Conclusions**

This research examined whether schools and their enrollments affect burglary rates for the block with the school and those blocks directly adjacent to it. Net of other relevant factors, the presence and enrollment of public elementary schools (serving Grades K-5, ages 5 through 10 years) significantly increased the probability of burglaries on the block with the school and those immediately surrounding it. Although further exploration of the relationship between burglary and public elementary schools is needed, the current results have clear policy implications. Targeted patrol to the areas immediately surrounding such schools at various times of day should significantly decrease their burglary rates. The compelling findings of the current study warrant additional research in the areas outlined as well as on its generalization to other locales. Clearly, more closely examining the relationship between the presence of elementary schools and burglary rates has the potential to yield significant dividends and merits further attention. It is hoped that the current research will be the first of several such endeavors.

**Notes**

1. In the United States, population need determines school location. However, because property taxes fund many schools, some argue that the population composition of a given district can affect the quality, type, and number of schools in that district. For the current data, a *t* test for independent samples was conducted to determine whether the variables used in the later analyses had any association with school location. The results indicate that these values do not differ significantly between residential city blocks with schools and those without them.

2. It is important to note that, the convenience the facilities offer does not provide a community. It simply regulates interactions between people, in general, and, more specifically, between potential victim and offender (Felson, 1987).

3. These are any burglaries (residential, to the school plant or commercial) that occurred on residential blocks.

4. Using 1980 and 1990 telephone directories, we compiled a preliminary listing of Cleveland area schools. From this, we conducted a telephone survey to verify the address of each school, the grade levels served and discern which schools were public or private (and if private, any religious affiliation). 280 schools were subsequently
identified. We crosschecked this listing with the Ohio Department of Education information to verify both the
schools’ location within city limits as well as its presence throughout the data span. This resulted in a reduced
listing of 193 schools with 127 public and 66 private, with the balance dropping out because they either were
not within Cleveland city limits or they were not actually serving students during the years covered (despite the
telephone directory listing).

5. It is important to note that race and ethnicity are not synonymous terms. Race is a biological factor associated
with physical characteristics. Ethnicity, on the other hand, concerns cultural factors. Thus, an individual can be
racially White but ethnically English, Irish, American, and so on (Hawkins, 1987).

6. Racial heterogeneity measures deciles of Black/non-Black heterogeneity. This is relevant because group
dominance can become more ambiguous as racial proportions become nearer to equal, possibly promoting conflict
(Stolzenberg, D’Alessio, & Eitle, 2004). Here, distinct from percentage Black, heterogeneity is defined as the
actual percentage of Black population when the percentage is less than 50%. When the percentage is more than
50%, the racial heterogeneity measure is 100 minus the actual percentage of the Black population. The Variance
Inflation Factor (VIF) and Condition Index tests indicated no collinearity between these or any other variables
included in the model

7. Were such information available, incorporating it would entail employment of multilevel modelling tech-
niques because the offender and block levels are distinct units and levels of analysis. Moreover, aggregating
offender characteristics to the block level would necessarily result in loss of information at the offender level
and biased results (Raudenbush & Bryk, 2002; Robinson, 1950).

8. The left-bounded nature violates one assumption of ordinary least squares (OLS) regression, necessitating
the use of Tobit, which not only adjusts for the non-normal distribution of burglary (McDonald & Moffitt, 1980;
Tobin, 1958) but also provides more accurate measures of the effects of schools on burglaries in the surrounding
areas (see Roncek & Maier, 1991). This technique is ideal for our city block analysis because more than 10% of
the blocks (512) do not have this crime.

9. We did not use dummy variables for school presence or proximity because the decomposition of Tobit
effects into probability effects and effects above the limit is impossible for dummy variables (Roncek, 1992).
The decomposition depends on being able to compute a first-order partial derivative, which is not possible for
dummy variables. However, the Tobit coefficients are similar to regression coefficients in that they indicate the
association between the dependent variable, burglary, and the independent variable being examined. Similarly,
the standardized Tobit coefficients are like the beta weights of regression in that the absolute value of their size
ranks the independent variables by importance. In addition, like Logit, if the standardized effect goes above 1
it is not an indicator of a problem with multicollinearity. This is merely an artifact of nonlinear models.

10. This is calculated using the difference in the log likelihood multiplied by negative two divided by the
log likelihood of the intercept only model times –2 (Menard, 1995).

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