

Connecting Environmental Cues to Commercial Burglary Concentrations: Combining Theory and Practice into a Blended Approach

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Introduction

Partnerships between the community and local law enforcement that are intended to resolve community crime issues, require accurate and detailed crime information. The direct result is that crime analysts are increasingly being asked to dissect the nature and dimensions of crime problems in order to inform intervention strategies. Although a wide variety of statistical and analytic techniques exist to examine crime problems, analysts are increasingly using GIS and mapping software to identify areas of crime concentration. While community-level exploration is useful, but it is only half complete. Crime mapping as currently practiced faces a number of methodological limitations that affect the utility of map interpretation.

Isolating areas wherein crime concentrates does not necessarily provide insight as to *why* crime clusters there. Generally conducted at the community or city-wide level, these data-driven analyses can allude to factors that may contribute to crime concentration; however, successful crime prevention strategies require a larger scale analysis to identify possible intervention points. Intervention strategies must be crime and situation specific (Clarke, 1997). This necessitates a more detailed micro-level analysis to uncover factors that produce or attract crime.

The problem is that detailed information about land use—at the user level—and environmental features are not currently available. Discussed below is the Blended Approach to crime analysis. This approach involves a multi-level process using a diminishing scale to zero in on crime problems. A more traditional geographically based crime concentration analysis identifies areas to study; and then, a truncated place intensive research methodology—that is driven by prior research and easily conducted by non-researchers—provides information about site level factors. The end product is a more thorough understanding of why crime concentrates in a particular area that can inform efforts to develop intervention strategies.

Current Application of GIS Technology

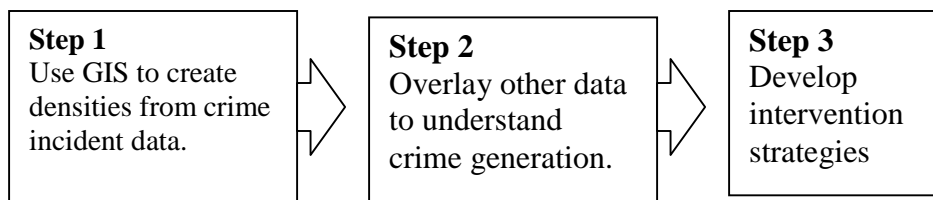
Increasingly crime analysts are being required to conduct problem diagnosis. Law enforcement agencies engaged in problem solving are discovering the utility of

georeferenced crime data; these data are important assets in developing crime prevention strategies. Crime analysts are asked to explore aggregated crime incidents by type, location, and time, in order to identify the nature and dimensions of crime problems.

Using GIS to examine crime events for patterns and trend, crime analysts typically examine crime concentration graphically. Techniques range from simple pin maps to kernel density functions. More advanced use of GIS technology involves overlaying density maps with other features from available data: school locations, malls, public housing tracts, and other activity nodes, to look for correlates with high crime concentrations. Those agencies with sophisticated data infrastructures combine various data, such as census information (population density and demographics) and land use, with advanced GIS applications (like network analysis) to assist in this process.

Once information is compiled on a series of maps, stakeholders from the community view the maps and brainstorm possible explanations for the patterns. Stakeholders review their collective experience with the area in question to generate a list of possible strategies. Interventions are proposed and implemented.

Figure 1. Traditional Approach to Community Crime Analysis



The fact that this approach neglects to include an evaluation process is an important concern; however, this is a matter to be discussed elsewhere. The point taken here is that this process fails to develop a clear understanding of why crime concentrates in a particular area.

Traditional geographically based crime analysis is subject to a number of important limitations:

1. Aggregate information in various spatial units is used as a proxy for neighborhood influences on deviant behavior.
 - Geographic boundaries are inconsistent and artificial.
 - Aggregates present continuous surfaces that obscure important variation.
2. Data and technological limitations.
 - Current data are not always available.
 - Files can be incomplete and may not exist in digital form.
 - Incompatibility across data storing and operating systems prevents serious data infrastructure issues.
 - Computer resources required to conduct analyses may be inadequate.
3. While GIS software is rapidly becoming user-friendly, they are also increasing their sophistication in terms of the analyses they can do; users may not understand the assumptions and limitations of the statistical techniques they use causing misinterpretation and misapplication.
4. Small scale analyses may be too broad to inform intervention strategies.

Place Intensive Methodology

While the crime analysis process outlined above is useful and important, it is only half complete. Constructing effective crime prevention strategies requires analysts to forage deeper into the issue. A few scholars have proposed alternative research strategies that can overcome these deficiencies. Rosenbaum and Lavarkas (1995) suggest a concentrated survey approach wherein surveys are administered to a saturated sample. Maltz (1995) adopts Sampson's (1993) "dynamic contextualism" and "narrative positivism" and suggests a methodology that integrates archival data from public agencies to understand places. Situational Crime Analysis (Rondeau, 2000) advocates a mixed methodology, similar in nature to the User Analysis (Madden and Love, 1982), that incorporates various information gathering strategies—saturated surveys, archival records, structured observations, focus groups, interviews, safety audits, and a geographically based crime and demographic analyses—to identify distinctive features of the built environment and human use patterns. While unquestionably sound research strategies, these approaches generally require research backgrounds and resources that are not typically available to law enforcement personnel.

The Blended Approach

The Blended Approach (Bichler-Robertson and Johnson, 2001) involves a two-tiered research strategy for using GIS technology to examine crime problems when the purpose is to generate intervention strategies. This process begins by using GIS technology to identify crime concentration at the community-level. Community level analysis is important because identifying where crime concentrates and the features that appear to correlate with these areas of high concentration is an essential first step. Density analysis narrows attention to manageable areas within an agency's jurisdiction. Effective crime prevention requires that intervention strategies must be crime and situation specific (Clarke, 1997). This means that analysts must dig beneath community level patterns. The second stage of this process includes site analyses to examine situation specific features at the micro or contextual-level.

Community-level Analysis: Exploring Concentrations of Human Activity

The first process of the Blended Approach involves a community-level analysis with GIS technology and available data to identify concentrations of human activity in terms of street segments or parcels (Brantingham and Brantingham, 2000). Given the importance of micro-environmental features, the crime concentration analysis should employ a crime concentration function, like the Kernel Density function, with a 0.2 to a 0.5 mile radius. This analysis addresses two questions: 1) where does the crime of interest concentrate; and, 2) do these concentrated levels correspond to "hot" areas of related crime types?

Examining the spatial patterning of crime phenomena at the community-level is only part of this process. Delinquent behavior is shaped by legitimate, routine activities; thus, the next step is to examine community patterns. Routine structures of the workweek, seasonal shopping, and recreational behavior, affect the use of areas through the course of the day. The social landscape of areas fluctuate according to distinct timescapes, in turn, these factors influence the geography of crime (Brantingham and

Brantingham, 1995; Felson, 1998). Specifically, examining aggregated levels of behavior involves examining density themes in relation to known activity nodes, transportation features, land use, population demographics, and other available data. In sum, the community-level analysis has two primary purposes: (1) define the target area; and, (2) identify aggregated ecological patterns.

Contextual Analysis: Exploring Micro-environmental Features

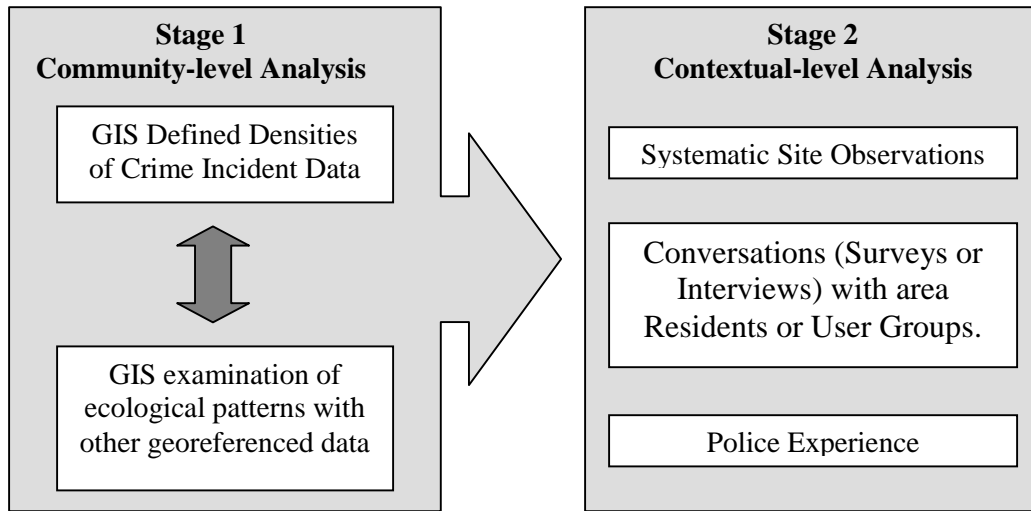
Contextual analysis involves an abbreviated site survey or User Analysis of hot street segments or parcels (Madden and Love, 1982; and Rondeau, 2000). These data gathering strategies involve conducting systematic observations of the area and how people use the space. Observations examine the built environment and its distinctive features that are identified by prior research as being factors influential to the concentration of the crime(s) in question. It should be noted that these distinctive features are crime specific. For example, prior commercial burglary research revealed five factors influencing target selection:

- isolation from other commercial buildings or residential dwellings,
- covered back alley access,
- easily liquidable merchandise (business type),
- close proximity to major road networks and not in close proximity to police and high levels of night activity, and
- lack of effective security measures such as dogs, on-premise security guards, and steal shutters.

Officers, crime analysts, or community partners can move through the areas systematically recording information, through notes and/or digital photographs, about these features. Using digital software and off the shelf mapping programs, these images can imported, linked or geocoded and can be added to traditional crime event data infrastructures. With a few additional resources, conversations (surveys or interviews) with residents, business owners or others frequenting the area, can provide additional information about micro-level factors influencing crime concentration. When these two sources of information are combined with police reports of events occurring in the area, analysts can identify why crime concentrates at the location in question.

There are two primary purposes to the contextual-level analysis wherein analysts explore micro-environmental features of the environment associated with the area of high crime concentration: these analyses are done to diagnose the problem; and, inform intervention strategies. To accomplish these tasks, information must be collected and analyzed that identifies features that generate and attract crime. Crime generators are defined as areas that produce crime by creating times and places that provide appropriate concentrations of people and targets in settings conducive to specific crimes whereas, crime attractors draw people who know about crime opportunities in the area (Angel, 1968; Brantingham and Brantingham, 1995).

Figure 2: The Blended Approach to Crime Analysis



Combining both analytic stages of the Blended Approach generates a more complete illustration of the issue at question and the factors that cause the problem. From this foundation, more effective intervention strategies may be developed. For example, the crime analyst for Dover Township, NJ elected to examine commercial burglary. As is typically done in most other agencies, the crime analyst examined the frequency of calls for service at commercial addresses. Commercial burglary appeared to concentrate along major thoroughfares. This information was used to deploy security efforts; however, the analysis did not stop here.

Upon further examination of a year's worth of commercial burglary events, it appeared that crime was not concentrated at the larger shopping areas including the indoor mall; in fact, the areas with greater commercial density suffered from a rather small percentage of the burglaries. Site visits to all commercial burglary locations revealed an interesting pattern. The observational data showed that the commercial burglary incidents occurred most often on major thoroughfares, in areas that were isolated from residential areas, had few visible security devices, and had limited visibility of the entrances at night.

Once the site level factors are included in the analysis, it becomes easier to devise intervention strategies that are more effective. Insufficient patrol of the area is not the cause of the crime concentration; thus, increased deployment or altered deployment of patrol officers is unlikely to resolve the crime problem. Instead, target hardening, zoning and landscaping strategies are more likely to prevent future commercial burglaries.

Conclusion

Examining crime incident data and conducting observations or gathering detailed micro-level data for a community can be too expensive and time consuming to do on a regular basis; however, by targeting areas of high crime concentration with the Blended Approach, the task becomes less cumbersome and more focused. The Blended Approach suggests community efforts should begin with the Community-level analysis to determine where crime concentrates. Then, further analysis on a Contextual-level is required to

identify possible reasons why crime is so concentrated in that area. The Contextual-level analysis is a place intensive examination of various environmental characteristics including transportation stops, natural walkways, debris, graffiti, security measures, neighborhood upkeep, signs or the lack of signs, types of businesses, and other characteristics.

It is apparent through crime incident data and past research that crime and place are related; however, beyond a handful of scholars, few have addressed how to gather detailed site-specific data about micro-level neighborhood characteristics in an efficient way that can be explored with GIS technology. The Blended Approach allows police and communities to identify the hot street segments and analyze them accordingly. This approach is flexible in its methodology and useful for developing crime prevention strategies that can affect factors that generate or attract crime.

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