

Criminality of place

Crime generators and crime attractors

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Crimes are created by the interactions of potential offenders with potential targets in settings that make doing the crime easy, safe and profitable (see, e.g., Clarke, 1992; Brantingham and Brantingham, 1993a and 1993b; Felson, 1994). Fear of crime is created by situations and settings that make people feel vulnerable to victimization (see, e.g., Fisher and Nasar, 1992a and 1992b; Nasar and Fisher, 1992 and 1993; Brantingham et al., 1995). The urban settings that create crime and fear are human constructions, the by-product of the environments we build to support the requirements of everyday life: homes and residential neighbourhoods; shops and offices; factories and warehouses; government buildings; parks and recreational sites; sports stadia and theatres; transport systems, bus stops, roadways and parking garages. The ways in which we assemble these large building blocks of routine activity into the urban backcloth can have enormous impact on our fear levels and on the quantities, types and timing of the crimes we suffer.

Although criminologists have argued this point in various ways for at least a hundred years (e.g., Ferri, 1896; Burgess, 1916; Shaw and McKay, 1942; Jeffery, 1971; Brantingham and Brantingham, 1993a and 1993b) it is only recently that large multi-purpose municipal data bases, in conjunction with police information systems, have begun to make it possible to actually explore how the juxtaposition of land uses and transport networks shapes the backcloth on which crime occurs. This paper attempts to set out some of the next steps in understanding the construction of the backcloth and its effects on crime. The model that will eventually emerge should provide us with a planning tool that will

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allow us to estimate the criminogenic and fear-generating potentials of different planning and development decisions in context in the way that traffic engineers can presently predict the potential of different land uses in generating car journeys. It will be based on a large-scale empirical analysis of crime data patterns of the sort that allowed Block et al. (1985) to estimate the victimization risks attached to hundreds of different occupations.

In such an undertaking it will also be important to remember that the sites, situations, or general socio-economic, demographic and media conditions that create fear may not necessarily relate to actual risks of victimization or patterns of crime. For example, it is well known that the elderly express high levels of fear of crime, but run low risks of actual victimization; teenagers and young adults generally express low levels of fear of crime, but run the highest risks of criminal victimization (Fattah, 1991). Note that places marked by darkness and isolation are generally feared as likely crime sites, but (with a few exceptions) tend to be relatively low-frequency crime locations (Brantingham et al., 1995). Introduction of higher levels of street lighting into high-fear locations appears in general to have little beneficial impact on crime levels (Atkins et al., 1991; Ramsay and Newton, 1991). Vandalism, litter and graffiti are known to make people feel uneasy, to raise their fears of crime in an area, but do not often constitute the territorial markers of actual crime hot spots (Ley and Cybriwsky, 1974; Skogan, 1988). The public view of 'crime' often turns out to be tied to the presence of noise, traffic, beggars, alcoholics and contact between groups of 'different' people as much as to criminal code events.

Crime may often be high in situations and sites where people feel safe and express little fear. This is predicted by Angel's (1968) target density model and by what is known about the environmental psychology of crime (Brantingham and Brantingham, 1993b). So, robberies are known to concentrate along busy shopping streets (Wilcox, 1973) where people generally express little fear. University crimes in general concentrate in high-activity areas such as the library or student union or dormitory laundromats where students say they feel safe (Brantingham et al., 1977; Brantingham et al., 1995). Car thefts and thefts from cars concentrate in and around parking lots where people feel their cars are safe (Poyner, 1992; Eck and Spellman, 1994; Fleming et al., 1994) or in exposed locations such as the street close to home where people feel their cars are safe (Clarke and Mayhew, 1994).

Both crime and fear may constitute problems at particular locations in space-time, of course. Such dual hot spots of crime and fear often occur

along the *edges* of 'entertainment' districts – 42nd Street in New York, or Granville Street in Vancouver, for instance. They occur in the danger zones half a block away from major transit stops (Brantingham et al., 1991). They occur on the edges or borders between neighbourhoods of distinctly different character and social status (Brantingham and Brantingham, 1975 and 1993b; Brantingham et al., 1977). They occur on major pathways and at major nodes where large numbers of potential offenders are brought together, through routine activities, with large numbers of potential victims and targets.

This array of possibilities means that it is important to understand the construction of the environmental backcloth and how its elements contribute to the choice of targets and target areas by offenders; and the development of fear on the part of individuals. Different land uses in different juxtapositions, arrayed in different ways on the transport network will have different potentials.

There are four broad types of urban sites that need to be considered: crime generators; crime attractors; crime-neutral sites; and fear generators.

Crime generators

Crime generators are particular areas to which large numbers of people are attracted for reasons unrelated to any particular level of criminal motivation they might have or to any particular crime they might end up committing. Typical examples might include shopping precincts; entertainment districts; office concentrations; or sports stadiums. In metro Vancouver these might include the downtown core; the Granville Island shopping and theatre district; the stadium complexes on False Creek; the Metrotown complex in suburban Burnaby. Major travel nodes, where many different travel paths and transit modes converge or intersect, can form crime generators. Bus interchanges, transit system stops, massive 'park and ride' parking lots can all become crime generators because of the volumes of people that pass through them.

Crime generators produce crime by creating particular times and places that provide appropriate concentrations of people and other targets (Angel, 1968) in settings that are conducive to particular types of criminal acts. Mixed into the people gathered at generator locations are some potential offenders with sufficient general levels of criminal motivation that although they did not come to the area with the explicit intent of doing a crime, they notice and exploit criminal opportunities

as presented (either immediately or on a subsequent occasion). Both local insiders and outsiders may be tempted into committing crimes at crime generator locations.

Crime attractors

Crime attractors are particular places, areas, neighbourhoods, districts which create well-known criminal opportunities to which strongly motivated, intending criminal offenders are attracted because of the known opportunities for particular types of crime. Examples might include bar districts; prostitution areas; drug markets; large shopping malls, particularly those near major public transit exchanges; large, insecure parking lots in business or commercial areas. The intending offender goes to rough bars looking for fights or other kinds of 'action'. The intending offender goes to red-light districts looking to solicit an act of prostitution; or, in the case of serial offenders, looking for a victim (Alston, 1994; Rossmo, 1994). The intending offender is drawn to a drug market area to deal in drugs. The intending offender is drawn to malls or stores with poor security arrangements looking for opportunities to shoplift. The intending offender is drawn to large, insecure parking lots looking for cars or car parts to steal.

Crimes in such locations are often committed by outsiders to the area. Strongly motivated offenders will travel relatively long distances in search of a target. (When insiders commit crimes in such areas, they may have previously moved to those areas because of their crime-attracting qualities; or, as in many cities, because poor areas are located near commercial areas thus creating many accessible targets near home.)

The attraction is created by an ecological label (Brantingham and Brantingham, 1991 and 1993b), often supplemented by the intending offender's personal past history, establishing that location as a known place to go for that kind of crime. As studies by Rengert (1994) and by Langworthy and LeBeau (1992a and 1992b) have shown, such crime-attracting areas can also *generate* other types of crime that are auxiliary or serendipitous by-products of the intending offender having been attracted to the area by the prospect of committing the primary crime.

Crime-neutral areas

There are also crime-neutral areas in most cities. Crime-neutral areas neither attract intending offenders because they expect to do a

particular crime in the area, nor do they produce crimes by creating criminal opportunities that are too tempting to resist. Instead, they experience occasional crimes by local insiders. Simple distance decay and pathway models can describe the geography of crime in such locations. The offence mix is different from the offence mix at either crime attractor or crime generator locations (Brantingham and Brantingham, 1994). It is important to note that areas are unlikely to be pure attractors or pure generators or purely neutral. Most areas will be mixed, in the sense that they may be crime attractors for some types of crime, crime generators for other types of crime, and neutral with respect to still other types of crime.

Fear generators

Fear of crime is complex. There are many types of fear, but they seem overall to be related to five broad categories:

- direct fear of another person;
- fear of being alone;
- fear at night, in the dark;
- fear in unknown areas;
- fear of encounters with 'scary' people.

Fear of crime is a general fear of being attacked, of suffering some physical harm, of suffering an intrusion that destroys privacy and dignity. It is not generally tied to a concern for property loss. Fear is enhanced by:

- personal physical vulnerability: people who because of age or lack of strength feel much more at risk of harm if attacked, feel much more fearful;
- lack of control over the situation: people who feel at risk in a situation but feel they cannot do anything about it are much more fearful. This is why subway trains are so scary: a passenger cannot be sure who might get on at the next station; and if someone scary gets on, there is no help and no escape until the next station.

Fear is greater with higher perceived vulnerability, more isolation from 'known' people, less control of what is happening or might happen. Fear is higher for a potentially vulnerable person when alone in public space with no sure knowledge of what is around, when necessary pathways cross those of others seen as 'potential attackers' or when there are signs that there are 'problems' – Wilson and Kelling's (1982) broken windows, Skogan's (1988) indicators of incivility such as litter and graffiti – in the area.

Nodes, paths, edges and land uses

Nodes

People commit offences close to the central places (nodes) in their lives: their homes; the places where they work; school; their favourite recreation sites; their normal shopping centres. People are also victimized close to the central places in their lives: their homes; the places where they work; school; their favourite recreation sites; their normal shopping centres (Brantingham and Brantingham, 1991). Both individual and aggregate crime patterns cluster around offender and victim nodes and along the principal pathways between them. Property offenders – robbers and burglars – commit nearly all of their offences in the awareness spaces defined by the nodes and paths of their routine activities (Maguire, 1982; Rengert and Wasilchick, 1985; Gabor et al., 1987; Wright and Decker, 1994). The same appears to be true of serial rapists (Canter and Larkin, 1993; Alston, 1994) and serial killers (Rossmo, 1994). People tend to share many of their life nodes. Thousands of people shop at the same malls, work in the same office complexes, change buses at the same interchanges, go to the same sports stadia, go to the same cinemas, etcetera. The mixture of uses at such nodes, and the exact ways they are clustered together in the built environment can go a long way to determining whether particular nodes are crime attractors, crime generators, fear generators or crime-neutral spots. Moreover, some uses may have additive or even multiplicative effects if they are clustered together.

Nodal concentrations of crime appear both in research using objective, Euclidean measures (Capone and Nichols, 1976; Sherman et al., 1989) and in research using cognitive images or non-Euclidean measures (Carter and Hill, 1979; Brantingham and Brantingham, 1981). This is so because the character of the built environment, the clustering of land uses and the temporal routines of daily life cluster nodes, channel movement and force a convergence of uncountable individual path potentials into a limited number of actual paths between nodes (Chapin, 1974; Lowe and Moryadas, 1975; Whyte, 1988). The character of actual paths can be measured in a variety of ways.

The criminogenic characteristics of activity nodes are sometimes increased by the types of activities carried out at them or by the particular high-risk users (e.g., teenagers, or motorcycle gangs, or alcoholics or drug users or singles intent on meeting new people) who frequent them. For instance, people may go to a bar simply to drink, but

if it is a bar where many people become drunk it is likely to experience a lot of assaults. People who go to such bars with no prior intent may nevertheless be swept up into fights.

Paths

Paths are critically important in shaping routine activities, everyday life and special events as well. Paths determine where people go and what they learn about the city. People spend long hours in routine paths, travelling to and from work, school, shopping, entertainment. Paths determine where people search for criminal targets and where people are victimized.

Because paths are so important, street networks, traffic and transit patterns strongly influence the distribution of crimes (Bevis and Nutter, 1977; Beavon et al., 1994). Offenders who live close to one another tend to travel in the same direction toward the sites where they commit offences. Nodal crime sites such as a city centre bar district, a shopping mall, or a secondary school tend to attract offenders from many different directions (Costanzo et al., 1986). This pattern is very similar to the more general pattern of movement in relation to more mundane activities such as shopping. Criminal events cluster near major traffic arteries and near major intersections between arteries (Wilcox, 1973; Duffala, 1976; Bevis and Nutter, 1977; Alston, 1994; Beavon et al., 1994). Crime hot spots often centre on subway exits, bus stops, and freeway exits (Fink, 1969; Maguire, 1982; Brantingham et al., 1991), but are often restricted to times at which specific levels of traffic flow are generated.

Neighbourhood traffic permeability appears to have a substantial effect on neighbourhood crime rates (Bevis and Nutter, 1977; White, 1990; Beavon et al., 1994). The theoretical model that predicts crime and offender patterns also predicts that *victimization* patterns will be tied to the *victim's* routine paths and activity nodes. Although not researched to the same degree as the offender's journey to crime, the available literature seems to provide empirical support for this theoretical prediction. Research into the crime mobility triangles defined by the victim's residence, the offender's residence and the crime site shows that victim movement patterns are often as important in determining where and when a crime occurs as offender movement patterns (Rand, 1986; Burgess, 1925a and 1925b).

This makes particular sense when it is remembered that studies in the victim precipitation tradition (Fattah, 1991), in the lifestyle tradition (Hindelang et al., 1978) and the self-report tradition (Gabor, 1994) all

indicate that potential victim/potential offender status is a fuzzy set (McNeill and Freiburger, 1993), not a dichotomy. The movement patterns of both potential offenders and potential victims must be considered in understanding crime aggregate patterns, because it is often not certain which is which until criminal events unfold.

Criminal events should occur where offender and victim activity spaces intersect. The *aggregate* patterns of high-probability criminal event zones in some particular place such as a city, a neighbourhood or, as Felson (1994, p. 134) notes, smaller places such as a factory, an office complex, a shopping mall or a housing estate, will be defined by the topological product of the activity spaces of the set of potential offenders and set of potential victims.

Edges

The environment is full of physical and perceptual edges, places where there is enough distinctiveness from one bit to another that the change is noticeable. At an extreme, the land bordering on a river is an edge; the houses behind a commercial strip development and the businesses on the strip form a perceptual edge. Parks have edges. Residential areas have edges. Commercial areas have edges. Land use zoning and transport planning frequently work in tandem with the result that major roads follow perceptual edges between different types of areas. Major roads themselves can constitute an edge.

Edges can be considered in terms of physical barriers; or in terms of the strong cognitive images created by paths with diverse land uses on either side of a road (Lynch, 1960); or in terms of the limits of perceptual comfort felt by outsiders entering unknown areas (Sacks, 1972; Reppetto, 1974; Brantingham and Brantingham, 1975; Carter and Hill, 1979; Rengert and Wasilchick, 1985; Cromwell et al., 1991; Wright and Decker, 1994). They can also be considered as areas of potential territorial conflict between different groups or land uses (Shaw and McKay, 1942; Suttles, 1968).

The areas around edges often experience high crime rates (Shaw and McKay, 1942; Suttles, 1968; Brantingham and Brantingham, 1975 and 1978; Brantingham et al., 1977; Herbert and Hyde, 1985; Walsh, 1986). Edges may create areas where strangers are more easily accepted because they are frequently and legitimately present, while the interiors of areas may constitute territories where strangers are uncomfortable and subject to challenge. Edges may also contain mixes of land uses and physical features – crime generators and attractors – that concentrate

criminal opportunities. This seems particularly likely on edges formed by major roads, which tend to concentrate large numbers of businesses and high-density residential blocks (Beavon et al., 1994).

Of particular importance are the spatial and temporal edge effects relating to crowds and to high-activity areas. Many of the crimes that occur at high-activity locations such as sporting arenas or commercial centres, or that occur at high-activity times such as store closing or bar closing, in fact occur at the edges of the high-activity location or high-activity time. Crimes cluster on the street near the subway station or bus stop, at the edge of the normal waiting area (Shellow et al., 1974; Levine and Wachs, 1985; Brantingham et al., 1991). Crimes often cluster in the alley behind a strip of shops (Wilcox, 1973). Robberies in Oakland, California have been shown to cluster on the fringe of parking lots and in the temporal edge half an hour after closing time in the commercial areas when most people have already departed (Wilcox, 1973). Angel (1968) has also conducted an interesting analysis of crime clustered on activity and temporal edges in Oakland.

While edges sometimes identify an open-access space, they may also identify territorial limits or boundaries that separate areas of high and low crime rates. Ley and Cybriwsky (1974) and Taylor (1988) have shown how graffiti serve as territorial markers for groups of urban teenagers, defining the limits of their normal activity spaces. Suttles (1968) showed how complex territorial cues at neighbourhood edges can sometimes form buffer zones between neighbourhoods that reduce social conflict and crime for those areas.

Sometimes the edges between different types of neighbourhoods can form psychological and perceptual barriers that deflect external offenders (Brantingham and Brantingham, 1975; Wright and Decker, 1994). While offenders invariably identify rich neighbourhoods as good locations for hunting targets, they consistently commit crimes in neighbourhoods they personally know well or that are very similar in physical, social and economic characteristics to their home neighbourhoods (Repetto, 1974; Rengert and Wasilchick, 1985; Cromwell et al., 1991; Wright and Decker, 1994). Edges may also form psychological barriers that keep neighbourhood insiders locked within the neighbourhood as well as keeping outsiders out of the area. When this happens, most local crime will be committed by insiders. Offenders will be much harder for neighbourhood watchers to identify. As neighbourhood insiders, they will not stand out against the local environmental backcloth. This leads to a consideration of crimes committed by local area insiders and outsiders.

Land uses

Local land use policies that physically cluster or disperse uses that are attractive to particular types of people can be analyzed to help predict where common forms of crime are most likely to occur and to help explain why crime rates are high in one part of a city and low in another. Housing patterns, shaped by market forces, public policy, and personal choices, cluster people of similar social background together.

The juxtaposition between land uses can affect the crime rates of entire neighbourhoods (Rengert, 1988). Some juxtapositions can expose potential targets in one area to large numbers of potential offenders in an adjacent area and create high inter-area crime rates. Some juxtapositions between different types of land uses can form criminogenic zones in which offenders can operate with relative freedom from scrutiny (Brantingham and Brantingham, 1975; Rhodes and Conly, 1981). Such zones of anonymity often occur along or near arterial and collector roads, reinforcing the criminogenic character of major paths and further concentrating crime on them.

Illustrations of approaches to the problem

Crime nodes: Burnaby

One way of approaching the problem of building a sufficient understanding of the crime risks associated with different urban forms and structures is to begin with a mapping of crime occurrence patterns, then looking to see what sorts of crime generators and crime attractors might be present. So many generators and attractors are clustered in city centres by design that they pose a much more difficult task to address. To illustrate the approach here, we have elected to look at the municipality of Burnaby, one of the largest and most densely populated suburbs in the greater Vancouver region.²

Figure 1 (p. 16) depicts criminal code offences known to police in Burnaby in 1991. Three major crime peaks are labelled. (The patterns are essentially identical when rates are plotted.) Each represents a collection of crime generators and crime attractors.

Peak 3 shows the effect of a crime generator, a major bus interchange. This bus interchange, which connects three major municipalities, is

² We are indebted to Jonathan Alston who gathered the site data reported in this illustration.

located in what is principally a residential neighbourhood with few additional crime generators or crime attractors nearby. The neighbourhood itself is relatively low-income and high-density. More than a third of the criminal code offences reported to the police in the neighbourhood (37%) occur within 500 metres of the bus interchange. There is no secondary school, no teenage attractor such as a video game arcade or recreation centre within reasonable walking distance. At the far edge of the neighbourhood, about a kilometre and a half away along the major highway that traverses the area, there is a notorious bar reputed to attract criminals.

Peak 2 combines the effect of a major bus interchange with other crime attractors and crime generators, in this case a major shopping mall. The immediate neighbourhood also features a major recreation centre, a public library, a variety of fast-food restaurants, and a number of youth-oriented businesses within easy walking distance of the bus interchange and mall entrance. Much of the neighbourhood is high-rise, high-density residential development. The mall itself includes a multi-screen budget cinema, a video arcade, and a food fair. More than one-fourth (27%) of all crimes reported to the police in the neighbourhood occur within 250 metres of the bus interchange/mall entrance that forms the centre of this high-crime node.

Peak 1 shows the effect of combining a large list of crime attractors and crime generators. It combines the largest shopping mall in British Columbia with a major bus interchange and a metro station. The mall includes two multiplex movie theatres, several food courts, video arcades, restaurants and franchise hamburger shops, and a casino. Close by are some bars with reputations as criminal attractors. The combination of large-volume destinations, intersections of major transit routes, juvenile-attracting destinations, and crime attractors support the highest crime rate in the municipality.

Figure 2 (p. 16) shows the distribution of total complaints to the Royal Canadian Mounted Police in Burnaby's policing District 2 during 1994 by policing atom. District 2 forms the northeast quadrant of the municipality and includes peak 2 from figure 1 as well as Simon Fraser University. Note that, consistent with findings from a recent campus victimization survey (Brantingham et al., 1995), the university does *not* form one of the significant crime hot spots in District 2 despite the fact that it has a large number of students who travel to campus by bus each day. The university's relative isolation on top of a small mountain, surrounded on all sides by wilderness park, largely removes it from the activity spaces of

Figure 1: Burnaby Criminal Code calls 1991

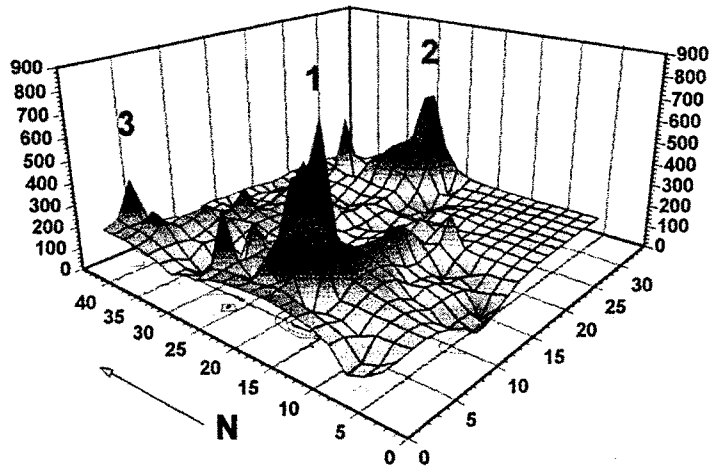
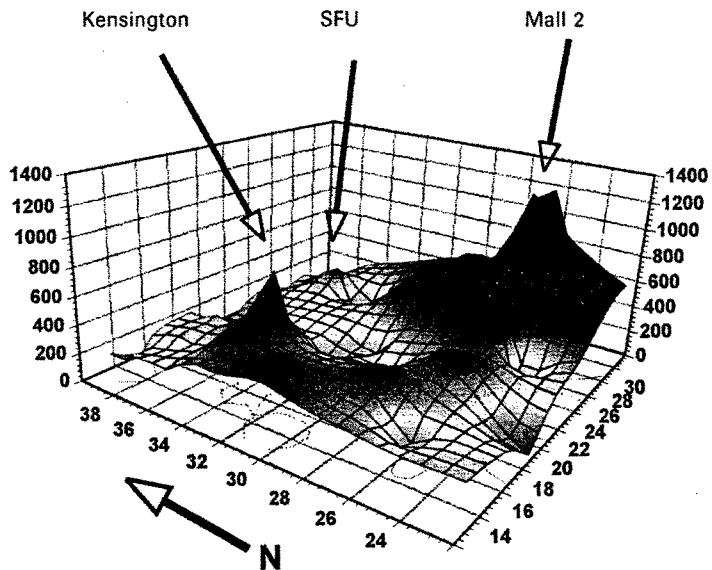


Figure 2: Burnaby District 2 total complaints 1994



most campus outsiders, including most potential outsider offenders.

Mall 2 was identified as Peak 2 in figure 1. It is the dominant crime locus in District 2. In 1994, as in 1991, the location combined a series of generators and attractors – a bus interchange, low-end shops and budget cinemas in the mall, fast-food outlets adjacent, as well as an adjacent recreation centre – that supported high levels of crime.

Kensington is a different kind of crime locus. It is a smaller, local shopping centre anchored by a large supermarket and a government liquor store with many smaller shops and fast-food restaurants in the complex. It is adjacent to a park and to the largest high school (senior secondary school, for adolescents aged 14-18) in the municipality. It is located on one of the major commuter highways running through the municipality. Although there is a local bus stop, there is no major bus interchange at this location. There is no video arcade, and few businesses that specially cater to adolescents. There is no bar nearby. The effect here – a combination of a local shopping centre and a high school and the movements between them – generates a local crime peak within District 2. This peak shows as a smaller peak adjacent to peak 2 in figure 1.

A ridge of slightly elevated crime levels can be seen running from Kensington to Mall 2, following the principal pathway between them. This pathway skirts the base of the small mountain on which university is located. As a major pathway, the route of least resistance between these crime generator destinations itself becomes a crime generator. Note that both figure 1 and figure 2 also show some areas, interspersed with the crime peaks and ridges, that exhibit very low crime rates. These are the crime-neutral areas where there are no crime attractors and no crime generators. Crimes occur in such areas, but in low frequency and low concentration.

Crime rates by land use: Cambridge, 1971

Another approach to understanding crime attractors and crime generators and how they fit together is to analyze the distribution of crimes across different types of land uses. We illustrate this approach with some old data from Cambridge, England.

During the early 1970s we had an opportunity to obtain 1971 crime data for the City of Cambridge from the Cambridgeshire police. These data recorded crimes known to the police according to a standardized land use classification scheme. We were able to develop a data file describing the land use at each address in the city in 1971 by merging information

from several sources: business use records maintained by the Department of Environmental Health to enable sanitary inspections under various statutes; commercially published city directories; the 1971 Cambridge telephone directory; and some county records. By separately collecting address level data on burglaries known to the police, we were able to make of estimate of the known burglary rates for a large number of land use types. Table 1 shows the results rank-ordered by 1971 rates per 100 land uses in that category.

The two most frequently burgled land uses were sports (and other) clubs and youth clubs. These uses had clear crime generator characteristics: they pulled in huge numbers of people in the ordinary course of doing business so that they fit into the activity and awareness spaces of large numbers of people. At the same time, their clientele tended to fit the demographic profiles – young, male, lower income – of potential offenders. A micro-analysis of which clubs were most frequently burgled and which were not against the backdrop of the transport patterns of the time would be very interesting. Note that the two next most burgled uses, restaurants and laundries, are also high traffic uses that can be expected to be to be found in many people's activity and awareness spaces. They also feature alcohol, and are likely to have cash from evening operations stored on the premises at night.

At the other extreme are ironmongers, doctors' offices, college hostels, pubs and tailors' shops. Some, such as the ironmongers' shops, are unlikely to contain much that would be attractive to burglars. Others, such as tailors and college hostels have a very specialized clientele and are likely to fit into only a few people's routine activity spaces, even in a college town. The low burglary rates experienced by pubs is somewhat surprising to North Americans since their cognates, bars and taverns, seem to be criminogenic everywhere in North America (Roncek and Pravatiner, 1989; Roncek and Maier; 1991; Verma, forthcoming 1995). Few North American bars, however, have resident owners in the way that pubs in Cambridge had 25 years ago. Things might be different in Cambridge now. We also suspect that doctors' offices would run a higher risk in North America since they might be thought to house a variety of drugs in their dispensaries.

Note that there are a number of land uses that are not treated in this table. Most are omitted because they experienced no known burglaries during the year. No one, for instance broke into any of the town's many museums and libraries in order to steal paintings or rare books. Some uses are omitted because while they had high burglary rates there were very few of them: hospitals are a case in point. Some uses were not

Table 1: Crime rates per 100 uses, Cambridge 1971

type of land use	rate
sports or other club	89.29
youth club	50.00
restaurant	30.43
laundry	21.62
off-license	20.83
scrap yard	20.00
general business office	19.53
government office	18.18
boutique, ladies' dress shop	16.67
department store	16.67
garage, filling station	16.38
post office	14.29
other shop	14.25
church	14.10
warehouse, wholesaler	13.16
hotel	13.04
radio, television, electrical appliances	11.94
photographic shop	11.54
chemist	8.82
workingman's club	8.33
grocer, baker, butcher, supermarket	7.79
jeweller	7.69
shoe shop	7.12
bank	4.45
YMCA	3.85
newsagent, tobacconist, confectioner	3.33
ironmonger, blacksmith	2.70
doctors' office, dentists' office	1.90
college hostel	1.72
public house	1.61
tailors, menswear	1.61

addressed in the 1971 police data set – primary and secondary schools most notably.

The point of this exercise is to suggest that it is now possible to conduct such analyses in many cities in North America and Europe. A bank of such studies, for many different types of crime, could begin to give us the base for estimating the criminal victimization risks associated with different types of land uses.

New directions for research

We think that a research programme expanding on the considerations set out in this paper could lead to the development of an empirical tool for estimating the criminogenic impact of planning decisions. Such a tool would allow police and town planners to estimate the likely increase in calls for police services (and consequent need for increased police and other criminal justice system personnel and resources) inherent in all kinds of planning decisions: changes in businesses operating out of a specific address; individual site redevelopments; large new developments such as green field housing estates and shopping centres; traffic reroutings and changes to transit services; relocation of institutions such as hospitals or schools; and so forth. To accomplish this we suggest several parallel lines of research which we plan to expand or begin in Vancouver, and which we hope other scholars will undertake in other cities.

First, we plan to expand the scope of our crime-mapping exercises to cover much larger parts of the Vancouver metropolitan area, and to expand coverage over time. High-crime nodes identified through the mapping exercises will be subjected to micro-analyses to determine land use mixtures, path placements, and clientele. Activity patterns at each site will be studied. This should provide us with a better understanding of crime generators and crime attractors.

Second, we plan to merge police and planning data bases to begin constructing crime risk tables by land use in Vancouver. This will, of course, involve some extensive data purification and clarification exercises along the way.

Third, we plan to explore the situational characteristics of high and low-risk establishments within particular use categories. Location on transport networks, position on neighbourhood edges and location with respect to large nodes such as schools and shopping malls will receive particular attention.

Fourth, we plan to conduct formal juxtaposition analyses that look at particular uses in conjunction with other, different types of uses. Is a bar, for instance, more likely to experience problems if it is situated adjacent to other bars, or if it is instead surrounded by theatres and restaurants, or if it is located in the middle of a residential neighbourhood? In Vancouver it is possible to explore the current pattern, but it is also possible (in at least some communities) to view things over time by utilizing various business licensing data bases. This has the effect of creating many different natural experiments from

which it may prove possible to draw very strong conclusions.

Fifth, we hope to conduct potentiation analyses that look at the spatial and temporal crime fields created by crime generator and crime attractor nodes. This is an expansion of work that was begun by Marcus Felson in his piece on predicting crime at any point on the city map (1986). Research by our students has already demonstrated that major roads in Vancouver have criminogenic fields that reach out approximately half a kilometre on either side (Weigman and Hu, 1992). We have shown that one large Burnaby mall has an apparent criminogenic field as well (Brantingham and Brantingham, 1994). We suspect that it may be possible, eventually, to develop criminogenic field estimates for many different crime generators and crime attractors. The goal of all this will, eventually, be to merge the findings from these studies into a data base that can provide police and town planners with a tool for estimating the criminogenic consequences of their normal planning decisions.

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