Macro-Level Generators of Crime, Including Parks, Stadiums, and Transit Stations

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Introduction:

This chapter examines the occurrence of crime at particular places that bring together lots of people in time and place, namely macro crime generators. Examples of these include hospitals, parks, large transit stations and interchanges, entertainment districts and shopping malls. At these places, the spatio-temporal convergence of many people, including potential offenders and victims, generates multiple opportunities for crime to occur. However, crime is not necessarily a bi-product of the convergence of many people. First and foremost these places should be considered macro activity generators, locations where and times when large numbers of people congregate. In the current literature the distinction between an 'activity generator' and a 'crime generator' is not well developed, but as a starting point: land use that encourages a convergence of people at a particular time, but without crime, could be considered an activity generator; and, an activity generator that experiences high levels of crime could be termed a crime generator.

This chapter begins by defining crime attractors and crime generators, and explores the subtle difference between each of them. It then examines why crime hot spots and crime generators tend to co-exist, and considers the importance of scale in place based studies of crime. Following this is a discussion of the 'busyness' of crime generators, how the density of people, proximity of people, and interactions between people are all factors that influence crime opportunities at macro generators. It then explores how characteristics of place generators and attractors may vary between different crime types, for example comparing two macro generators, one for pick pocketing and one for assault. Crime generators are further influenced by what is near to them, and this chapter then moves on to discuss how the surrounding environs of a generator may also influence crime opportunities. Finally, the chapter attempts to draw these ideas together by reviewing current evidence of three case studies of macro generators, namely parks, large stadiums, and large transit stations. It concludes with some suggestions for future research direction.

There are two key theoretical concepts that underpin crime generators, namely routine activities theory and crime pattern theory. Routine activities theory (Cohen and Felson, 1979) suggests crime is likely when three factors converge: a suitable target; a motivated offender; and, lack of capable guardianship. Crime pattern theory (Brantingham and Brantingham, 1993) brings together routine activity theory and rational choice perspective (Cornish and Clarke, 1986) to explain the spatial distribution of crime events (for more discussion of these see Summers and Guerette; and Brantingham et al., this volume). Crime pattern theory contends that the spatial patterning of crime is non-random; clustered at particular places and times, often called crime hot spots. These concentrations are explained by the routine movement of people in their daily lives. They go to work, visit places of leisure and recreation, go to school or go shopping, and in crime pattern theory these locations of activity space are termed nodes. Indeed, when large numbers of persons congregate at these nodes they could be considered activity generators.

During journeys to and from nodes offenders travel along paths and this movement is bounded by edges. According to crime pattern theory offenders develop awareness spaces, and encounter and learn more about potential places to offend during these journeys and through time spent at activity nodes. The research suggests most crime happens near to an offender's awareness spaces. Here potential offenders, suitable targets and lack of guardians come together in situations favourable for offending. Using routine activity language, it is self-evident that generators bring many suitable targets into contact with one of more potential offenders. However, it is not clear why they do not encourage greater levels of suitable guardianship, whose presence discourages crime.

Defining and Distinguishing Between Crime Generators and Attractors

A number of research studies have explored how places may act as a crime generator and or crime attractor (Brantingham and Brantingham, 1995; McCord et al, 2007; Kinney et al, 2008; Kurland, Johnson and Tilley 2014; Newton, 2014). At the outset their meaning appears relatively straightforward; crime generators are 'places that are high in crime because they are exceptionally busy'; whereas, crime attractors are those known to offenders by reputation as 'places that contain many suitable crime targets without adequate protection' (Eck, Clarke and Guerette 2007). However, when drilling down further the distinction between the two is less clear. For example, a transit station is exceptionally

busy and pickpocketing may occur serendipitously under chance encounters, as many people are brought together in close proximity. However, an alternative possibility is that well-known opportunities exist for pick-pockets near transit stations, and offenders go there specifically, in the knowledge that there will be lots of suitable targets without adequate protection. Therefore it is useful here to revisit the original definitions of crime attractors and 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 stadium…Crime generators produce crime by creating particular times and places that provide appropriate concentrations of people and other targets… 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 (Brantingham and Brantingham, 1995, p7).*

> *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….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.., 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…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 (Brantingham and Brantingham, 1995, p8).*

Therefore, crime attractors and crime generators can both be conceived as small level or micro places, for example small to large individual facilities (See Madensen and Eck, this volume) such as a railway stations, bars and nightclubs, businesses, parks or hospitals; or alternatively meso to macro level places such as groups of facilities, entertainment districts

with a number of bars, central business districts, or neighbourhoods. The shared characteristics of these places are they have an 'appropriate' number of suitable targets for crime (persons or property) and one or more motivated offenders. However, the key distinction between the two is offender motivation; offenders who visit crime generators did not go to that place or facility purposely and for the explicit reason of committing a crime. The crime was generated by the presence of lots of suitable targets drawn together in close proximity. The offender also happened to be at that place at that time, and, the volume of people present created a suitable opportunity for them to act upon.

In contrast, at crime attractor locations, offenders visit places due to their reputation, were chances of successful offending are expected to be high, and place management, guardianship and other protective factors against crime are anticipated to be low. Crime attractors have an ecological label as being 'bad' areas, perhaps identified by an offender themselves directly, or indirectly the offender knows this place by reputation. Offenders are thus attracted to these places for the specific purpose of committing an intended crime.

Whilst many of the factors necessary for a crime are present at both generator and attractor locations, a motivated offender, suitable target, lack of guardianship, the ultimate distinction between a crime attractor and crime generator is the offenders motivation for going there. Did the place generate offending opportunities the offender was not acutely aware of, or were they attracted to it in the knowledge of likely success? At this stage it is important to consider that an offender's awareness of crime opportunity may evolve in several stages, based on first and subsequent visits to a place as they develop their awareness space. These steps may include: identifying a suitable location; spending time at that location and becoming more familiar with it; planning an offence, and finally committing a crime there. Thus it is entirely plausible that over time a macro generator of crime will evolve into a crime attractor.

Table 14.1 below sets out some of the key examples of crime attractors and generators found in the existent literature on criminality of place. Whilst this is not exhaustive, the fact that producing such a table was not as simple as expected at the outset demonstrates the difficulties in classing places as attractors or generators. The reasons victims, place managers or capable guardians visit activity nodes is generally fairly transparent, for example for leisure, tourism, recreation, or even work. However, the reason an offender travels to a crime attractor/generator is generally less well known. As Kurland, Johnson and

Tilley (2014) argue, '*empirical research that supports their'* (attractor/generator) *'classification…is not unequivocal. …it is difficult to estimate the influence of particular facilities on crime patterns, as the facilities…are always present in the environment, which precludes the use of experimental methods to examine their impacts'* (p7).

Bernasco and Block (2011) also suggest that one the distinguishing factors of crime attractors is that they have nearby cash economies, such as drug markets, betting shops, and pawn shops. This may impact on the ecological label placed on these by offenders, and why they may have a reputation for having both suitable targets (with cash) and lower forms of guardianship and place management. Therefore an additional feature of attractors, one that is perhaps not present at crime generators, is they have cash economies associated with them. Again the distinction can become blurred, for example when considering shopping precincts.

Table 14.1 Examples of potential crime attractors and generators

Examples of Potential Crime Generators	Examples of Potential Crime Attractors
Major Transport Nodes and Interchanges	Transport exchanges and their surroundings
Large Park and Ride Parking Lots	Insecure parking lots
Shopping Precincts/Malls	Local shopping malls
Entertainment Districts	Bar districts
Theatre Districts and Casinos	Pawn Shops/Brokers
CBD and business districts	Check Cashing Stores
Universities, Colleges and Schools	Prostitution areas
Recreation Centres	Hotels and Motels
Sports/Music Stadiums	Garage/Petrol/Gas store
Youth Clubs	Drug markets and halfway houses
Parks	Homeless Shelters
Hospitals	Pharmacy's and Drug Stores

Crime hot spots and scale of analysis

An important feature of crime attractors and generators is they often co-exist with crime hot spots. Whilst no common definition exists, crime hot spots can be considered areas that have a larger than average number of crime or disorder events, or where people have higher than average risks being a victim of crime (Eck et al, 2005). A defining feature of crime hot spots is that they are places that contain concentrations or spatial clusters of crimes. This spatial clustering is generally identified using crimes frequencies, so is based on a count of the total number of crimes. Hot spots are rarely based on crime rates, in other

words they are not standardised by the number of people present (Malleson and Andresen, 2016). The significance of this will be explored in more detail later in this chapter. In simple terms crime generators bring lots of people together in one place, and it is not surprising therefore this may result in several crimes being recorded at that locality. Thus crime hot spots (based on crime counts) emerge where many people congregate. Indeed crime generators and repeat victimisation are cited as two of the key drivers of hot spots (Short et al, 2008).

It has been suggested when a crime hot spot is found it should be classified as a crime generator or crime attractor (Clarke and Eck, 2005). However this perhaps causes confusion and ambiguity. Consider a hot spot classified as a crime generator. That crime hot spot may actually be the result of particular type of land use facility such as a transit station. Yet this transit station itself can also be termed a crime generator. The choice of language here is unhelpful as ultimately; a crime generator (transit station) creates a crime generator (hot spot). There is perhaps a need to revisit these definitions when classifying places as activity generators, crime generators, crime attractors and hot spots. Is a crime generator: an individual facility such as a transit station; an individual location such as a street intersection where a hot spot has formed; a group of facilities such as an entertainment district; or, a neighbourhood crime hot spot? Furthermore, is there a specific difference between an activity generator, a crime generator, and a crime hotspot when they all occur conterminously?

A crucial factor in classifying places as attractors and or generators is the unit of analysis, and here the use of the term ‘place’ is often vague. Place based crime analysis may be carried out at: the micro level, a street segment or intersection; the meso level, an entertainment district or CBD; or, the macro level, a neighbourhood or district (Weisburd, Bernasco and Bruinsma 2009). A generator will have a high number of crimes and high number of persons present relative to surrounding or nearby areas (Clarke and Eck, 2005), and this relationship will be present at all three of these scales (micro to macro). Thus, this chapter is not prescriptive as to what definitions or categories of place should be considered crime generators; but it does urge more thought at least when categorising places. More consideration is required of context and scale. When a place is classed as a crime generator, a key question is relative to what in the surrounding area.

Density, proximity and busyness

In the above discussion, a crime generator was noted as a place that is 'exceptionally busy'. In order for a place to be considered busy, it needs to bring lots of people together in a confined space. The size of a place is therefore a key factor in 'busyness'. However, size is only one of several important variables. A range of factors should be considered including: how many people are present (volume); the number of people relative to the size of the space, for example how many people within a ten square meter radius (density); how close together these people are (proximity); and, perhaps most importantly, for how long they are in close proximity (level of proximate interaction). The latter two issues have been afforded limited attention in the literature, perhaps best explained by difficulties in measuring these concepts (Solymosi, Borrion and Fujiyana 2015). However, there have been some attempts to measure the relationship between person density and crime.

Angel's (1968) study postulated that street robbery was more likely to occur at intermediate levels of pedestrian traffic, rather than places with low or high crowd densities. Translated into the language of routine activity theory, when pedestrian traffic is sparse, there are too few suitable targets to attract offenders; when it is high many guardians are present to intervene. Angel postulated that a 'critical intensity zone' existed at which street robbery was most likely. Clark, Belanger and Eastman (1996) tested this relationship by examining daily ridership on subway stations, but, contrary to Angel's hypothesis, found station robbery inversely correlated to passenger density.

However, subway stations are perhaps a unique environment. Compared to above ground situations, underground stations have limited entry and escape routes. For offenders additional effort is required to visit underground stations that do not form part of their routine activities. The study found chances of robbery at subway stations increased when fewer people were present. This is perhaps reflective of the limited escape opportunities underground, compared to above ground situations. Therefore density alone is not predictive of crime. Additional consideration should be given to the design and layout of a place, including how open and accessible it is, and levels of visibility and surveillance.

An additional hypothesis on the relationship between crowd density and crime is described by Loukaitou-Sideris (1999). This contends that beyond Angel's first critical intensity zone, as places get busier, serious robbery and violence offences become less likely. However, as crowd density increases further, a new critical zone is reached. At this point, other offences emerge such as minor theft and pick-pocketing in what is termed a 'second critical intensity' zone. Thus, in high density crowds, the presence of more people does not serve

to increase capable guardianship. Instead it acts as a barrier to detection, giving anonymity to offenders, reducing visibility, limiting the likelihood of offenders being spotted or identified, thus increasing offender's opportunities to commit theft undetected. This may explain in part why a crime generator, with lots of people present, does not necessarily equate to better guardianship.

The literature on macro generators of crime tends to focus on places that are fairly large in size. The general principle here is that as a place gets bigger it can accommodate more people, which it could be argued will increase crime opportunities and in turn crime levels. However, the size and capacity of a place are not necessarily directly related to 'busyness' and crime opportunity. Indeed, as discussed above the proximity of people and the frequency and length of their interaction are key ingredients in opportunity for crime, and, the extent to which potential guardians can intervene. The function of a place or facility is also critical here. For example, compare a transport interchange, shopping mall, and park. They all have different opening hours, peak times, pedestrian flow management policies, and, staffing levels, which may all impact on crime opportunity.

The opening hours of macro crime generators will impact on crime opportunity. Shopping centres are busier at holiday times and on Saturdays. Transport stops and stations have peak hours during the morning and late rush hour periods. Pick-pocketing levels are higher during afternoon peak times than they are during morning peaks (Ceccato and Uittenbogaard, 2014; Newton, Partridge and Gill, 2015,a,b). Around school closing time there is an early afternoon peak time, and then a secondary afternoon peak when people finish work. At weekends different peak times emerge. Sports stadiums and music festivals have more sporadic opening hours, dictated by the events they host. Therefore it is important to think beyond how large, and indeed even how busy a place is. A range of factors may impact on the density, availability, and concentration of targets for crime. These issues are explored later in this chapter for three different types of macro crime generators; transport interchanges; stadiums; and parks.

Crime attractors, crime generators and crime type

The above discussion also raises an additional question, namely when considering places as attractors and or generators of crime, what types of crime are commissioned at these locations. Are some crime types more likely at crime attractors and others at crime generators? In Table 14.1 it was evident that it is difficult to classify places as crime generators or crime attractors. Transport interchanges and parking lots are good examples

of this. A key feature of places often overlooked in the literature on crime attractors and generators is that, as stated in their original conception, places are rarely mutually exclusive to these categories. Indeed, they 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 still with respect to other types of crime.* (Brantingham and Brantingham, 1995, p9)

Consider three very different crime types, pick-pocketing, assault, and criminal damage. The first is more likely in very crowded environments, the second in more intermediate crowd densities, and the latter when fewer people are present. Accepting the principle in the literature that busy places are indicative of crime generators, it could be argued certain crime types more prominent at quieter times, such as those against property, do not occur at crime generators. However, what happens when criminal damage happens at a transit station around or just after closing time when few guardians are present. Can crime generators only be considered so during busy periods? Are these place then crime attractors at off peak times? These arguments do not hold if an offender happens to be at a crime generator by chance, at the end of the day under serendipitous circumstances. There are a number of possible scenarios here. Firstly, a place may be a generator for different crime types at different times of the day. Conversely it may be an attractor for different crime types at different times of the day. Thirdly, it even be may be an attractor for one crime type at certain times and a generator for another crime type at different times of the day.

As an example, consider a bar or night club. At peak times jostling and bumping, violent assault and sexual groping may be problematic (intermediate to high densities of people), and towards the end of the evening when there are lower densities of patrons other offences such as sexual assaults, attempted rape and rape may be more likely. This may be an issue near to the premise rather than inside it. Offenders may attempt to intercept victims as they leave a bar and travel home. Thus, a bar or nightclub which at peak times is considered a crime generator for disorder and violence, may become an attractor for other crime types such as sexual assault towards the end of the evening as people start to make their way home.

Alternatively, for crimes such as criminal damage, arson and graffiti, the targets are property not people. The presence of people as informal guardians may deter crime. Therefore crime against property rather than persons is perhaps more likely at crime attractors, or near to crime generators around or during closing times when fewer people are present. This could also be the case for theft from, and theft of vehicles. At crime generators during peak times, a place may have many cars but also guardians. Thus opportunities to offend may increase nearer to closing time. This demonstrates how there are a number of inter-related factors that make distinguishing attractors and generators problematic. Table 14.2 provides further examples of how facility type, crime type and person density all interact in the crime opportunity, and how this relates to the generator and attractor properties of place.

Table 14.2 Facilities, densities of persons and attractor/generator properties of place

Crime Type	Facility	Level of Crowd Density	Attractor or Generator
Disorder	Park at quiet time	Low	Attractor
Disorder	Sports event or shopping mall	High	Generator
Sexual Assault (rape)	Park at quiet time	Low	Attractor
Sexual Assault (groping)	Station at peak time	High	Generator
Criminal Damage and Arson	Park at quiet time	Low	Attractor
Theft of/from car	Unsecured car park outside rail station	Low	Attractor
Assault	Train station late at night	Low	Generator
Assault	Nightclub	High	Generator or Attractor
Robbery	Shopping Centre	Intermediate	Attractor
Theft from person	Bag snatch at shopping mall	Intermediate	Attractor or Generator
Drug Dealing	Park or Open Market	Intermediate	Attractor
Pick-pocketing & petty-theft	Train Station	High	Generator

The environs of crime attractors and generators

Places and facilities such as those presented in Table 14.1 cannot be considered in isolation, they also interact with their surrounding environment. A number of studies have examined crime prevalence in the vicinity of crime attractors and generators, for example near to bars (Ratcliffe, 2012), transport stations (Newton and Ceccato, 2015), and parks (Groff and McCord, 2011). One question is the extent to which macro generators of crime influence crime nearby. Several studies have found a distance decay effect; crime is greatest near to a facility, and as you move further away from it the level of crime is generally reduced. This suggests macro crime generators have greatest influence on their nearby surroundings, and this impact reduces as you move further way from it.

However, this relationship is not always straight forward. Several studies have found a spatial lag, whereby crime reduces in the immediate vicinity of a facility. Then as you move slightly further away, crime increases. As you continue to move further away from the facility, crime reduces according to the expected distance decay function. Explanations are that immediately outside of these facilities several targets may be present, but these environments are also protected by place managers and capable guardians. Therefore, with the exception of perhaps pick-pocketing and violent assaults in highly crowded environments, crime does not happen immediately outside these macro generators.

However, macro crime generators are unlikely to influence crime levels on their own. Other facilities and land uses surrounding macro generators will also impact on crime. Groff and McCord (2011) explored the effect of nearby land use on parks, comparing residential, commercial, and mixed land use. They found nearby mixed land use to moderate the impacts of crime generators by providing nearby eyes on the street and offering potential guardianship near parks. Bowers (2014) describes how facilities may act as radiators or absorbers, either pulling in (absorbing) offenders and victims in the surrounding area into that facility, or by radiating (pushing out) crime from that central locality to the surrounding environs. Her findings suggest risky facilities, which perhaps can be classed as a crime attractor rather than generator, tend to provide more of a crime radiator function. A question not yet explored in the literature is whether macro facilities, perhaps crime generators, serve to act as absorbers or radiators. Indeed, as a facility increases in size, does it become more of an absorber or a radiator?

An alternative scenario here is that places may contain more than one attractor or generator in close proximity, thus they may actually compete, both for offenders and targets. One possibility is that a crime attractor actually takes offenders away from other nearby crime attractors. Alternatively, two attractors in close proximity may actually serve to bring more people to a place, thus increasing crime. In the spatial economics and marketing literature, these two opposing spatial effects are referred to spatial agglomeration and spatial competition (Bernasco and Block, 2011). An entertainment district could have two or three bars classed as crime attractors. However, these may actually be part of the wider night-time economy setting made up of several bars, which as a whole is categorised as a crime generator. Here crime attractors exist within a larger macro crime generator. Indeed, places may actually have a mix of both attractors and generators, resulting in highly complex interactions.

Macro generators and mega-facilities

Very large macro crime generators perhaps cannot be considered as a single facility. It may be more appropriate to consider them as several individual facilities. Good examples here are out of town shopping malls, large transit interchanges, or even university and college campuses. Whilst each of these has a primary function, for example retail at the shopping mall, and travel at the interchange, these 'super-facilities' also contain a range of other businesses. Shopping malls may contain cinemas, restaurant and food areas, or even children's entertainment centres. Train stations often contain shops and other retail outlets, and restaurants and bars that serve alcohol. Should these macro generators be considered as single facilities when they contain multiple premises? These mega facilities may offer multiple types of activity spaces, have multiple owners, and, multiple place managers. Indeed it is plausible they even have their own internal activity nodes and paths. Their accessibility may occur on several levels. For example there may be one or more entrances to the main facility, such as the shopping centre. Beyond this but within the main facility, there may then be secondary entrances and exits, to individual facilities located inside these larger macro facilities.

Parks are a good example of this. They may contain: playing fields; children's play areas; restaurants or cafés; tennis courts, and basketball courts. Each of these could be classed as a facility within a larger super-facility and the activities at each may conflict or even compete. The park may be a crime generator, bringing lots of people together at it. However, within the actual park itself there may be smaller subsets or components that

actually have a reputation as a place to offend, such as an individual kiosk within a park. Thus there may be mini crime attractors present within a larger crime generator.

Measuring crime attractors and generators

It was stated previously that the key distinguishing features between a crime generator and attractor is the offender's motivation for visiting it. However, the reason an offender travels to a particular location to commit crime is frequently unknown. Indeed the offender's identity may never be established. As an alternative, Clarke and Eck (2005) suggest comparing crime numbers (frequencies or counts) with crime rates (per 100 persons, per 100 vehicles for example) to distinguish between attractors and generators. They suggest generators have many crimes and also many people, thus they have a high crime count and a low crime rate. By comparison, crime attractors have many crimes but compared to crime generators fewer targets, thus they have high crime numbers and high crime rates (Table 14.3).

Table 14.3: Comparing crime numbers and rates at attractors and generators

	Number	Rate
Crime Generator	High	Low
Crime Attractor	High	High

Whilst this is a useful starting point, there are some limitations to this. One of the key difficulties is calculating appropriate denominators to establish crime rates; for example violence per 1000 people, or theft from car per 100 cars. Crime rates are often based on residential census data, yet by their nature crime generators are not reflective of residential populations. They are dynamic activity spaces likely to contain more visitors than the number of people who live there. Indeed, offenders may travel considerable distances to visit crime attractors. There have been some studies that have attempted to calculate alternative population denominators for crime rates, including the use of ambient population data (Malleson and Andreson 2015, 2016), alternative denominators of transport crime (Newton, Partridge and Gill, 2014a), and using sport stadium attendances (Kurland, Johnson and Tilley, 2014). However, obtaining reliable information on crime rates using population denominators at crime generators is challenging.

It is also problematic to establish a measure of busyness of a place by time of day. Macro generators have peak times that vary by day of week, and hour of the day. For example, at

transit stations during school days there is: a morning peak time of work and school users combined; an afternoon school closing peak; and a secondary and slightly later end of workday peak time. Any calculation of crime rates needs to account for these temporal variations. However, despite the difficulties in establishing appropriate denominators, in the absence of information on offender's motivations for travelling to a crime site, comparing crime counts and rates is a useful tool for distinguishing between attractors and generators.

This chapter has outlined the key distinctions between crime attractors and crime generators and demonstrated the difficulties in quantifying attractors and generators. It has shown how the relationship between a macro generator's size, density, busyness, and the interactions and proximity of people present there, all influence levels of crime. It also demonstrated how the function of a facility, the time of day, and crime type, all bring further complications to this interaction. The choice of unit of analysis was also shown to be of paramount importance when examining crime attractors and generators. Some of these complexities are now examined further through reviews of existing literature on three case studies of macro crime generators, namely parks, stadiums, and transit stations.

Macro Crime Generator Example One: Parks

The crime attractor/generator characteristics of neighbourhood parks have been empirically examined in detail (McCord et al, 2007; Groff and McCord, 2011). They have a number of unique features. They are publicly owned and can be viewed as contested spaces. For example, they may contain several activity generators such as recreation centers, pools, playground, and basketball courts which act as competing spaces. They can also contain low levels of natural guardianship. Indeed, as stated by the Groff and McCord they are 'owned by all but controlled by none'. A contrasting argument (Jacobs, 1961) is that parks could be viewed as neutral spaces. Whether they are then classed by local residents as amenities or nuisances depends upon their design. For example they could be considered 'a well-used dynamic space' or 'one that is neglected and dangerous'.

Groff and McCord (2011) hypothesised that neighborhood parks act as crime generators, by bringing lots of people together and increasing crime in the area. Their findings support this hypothesis. They examined parks in Philadelphia and found them to have a higher crime rates than the rest of the city. They did not identify a straight forward distance decay

effect. Crime actually reduced immediately near to parks, then increased in subsequent buffers before gradually reducing again further away from the park. They suggest that parks serve as crime generators and this pattern was driven by more than just a few 'bad' parks. However, they also found that the number of activity generators within a park to be important. Parks with higher numbers of activity generators tended to have more legitimate users attracted to them, and had less crime than those with fewer activity generators.

Moreover, the study found that the type of activities that occurred in parks, as measured by activity generators, further influenced crime rates. Those with a more diverse mix of activity generators had lower levels of crime. Some activity generators, for example sports fields and courts used for organised sporting activities, tended to have lower crime levels. The authors suggest this is due to the presence of more legitimate users at the park. This supports the possibility that parks can be viewed as neutral areas, but the design of parks, and mix of activity generators, and characteristics of the surrounding environment will all influence levels of crime. Mixed land use around the park, measured by the activities available, appeared to moderate crime rates. The likely explanation offered is that of efficacy, the notion of there being more 'eyes on the street '. Therefore, lower levels of crime are associated with more people using the park legitimately throughout the day.

An issue not explored in this study was the difference between daytime use, when more legitimate users will be present, and night-time use, when the park is effectively closed (no activity generators present). It was not clear if access to parks is restricted at closing times. Furthermore, it did not consider actual crime rates at the parks. Indeed a possible limitation of this study is that activity generators were used as a proxy measure for park usage. The research found neighbourhood parks act as a macro crime generator, and moreover; this is moderated by park size; by the number and types of activity generators; by the land use in surrounding environs near to the park; and, these all impacted differently on each crime type. Parks can be considered predominantly as a daytime activity node. The opening hours of parks are substantially different from the next two crime generator types to be discussed, stadiums, and transit stations.

Macro Crime Generator Example Two: Stadiums

Two papers, Montolio and Planells (2015), and in particular Kurland, Johnson and Tilley (2014) have attempted to test whether stadiums act as crime generators. The first examined Barcelona Football Stadium in Spain, the second Wembley stadium in London, the UK. Both found evidence to support the macro generator hypothesis. These facilities are very different to parks as their usage is episodic. They only open on a fraction of all days at specific times, during football matches and other events such as music concerts. For most of the week these facilities are closed and hypothetically at this time they are crime neutral.

Both studies compared crime during event days with non-event days. The first paper compared home football matches (in Barcelona), away football matches (not in Barcelona) and control days. The second compared match days (football matches) with comparable non-match days, and event days (concerts) with comparable non-event days. Both examined two different crime types, broadly speaking theft and violence offences. The first paper used residential population to devise crime rates, although a clear limitation is this is not reflective of populations generated at stadiums during football matches. The second used a measure of the ambient population combined with attendance figures to try and estimate more accurately street population on match days and event days and comparable days to calculate more accurately crime rates.

The Wembley study tested three possible hypotheses for stadiums, in that they are; mostly a crime attractor; mostly a crime generator; and, they are simultaneously a crime generator and crime attractor. They found during match and events days, although the total number of crimes (volume) increased, the overall crime rates per person were lower. This suggests the overall risk to the population reduced during events and matches. This higher crime count but lower crime rate during events, in accordance with the Clarke and Eck's hypothesis, suggests stadiums are more likely to episodically generate crime than attract offenders. A range of possible reasons postulated to explain this include the use of appropriate place management and informal guardianship that takes during match and event days, including increased presence of policing (both uniform and non-uniform), management of footfall and pinch points, public announcements and other strategies in place.

Both studies found increases in theft rather than violence during match days. Thus, whilst the evidence supports the hypothesis stadiums act as crime generators (high crime count, low crime rate) they also offers some backing for the 'second critical density' hypothesis. Opportunities for pick-pocketing in large crowds are much higher during match days and event days compared to violence, especially around match start and end times. In the Wembley study a greater proportion of theft offences (80%) happened during the daytime on match days (before 6.00pm when football matches were played, which typically occur mid-afternoon) than compared to non-match days (50%). Whilst there are limitations in the spatial and temporal accuracy of the data available, both papers demonstrate how the capacity of a facility, its usage (as attendance varied and on some match days this was considerably bigger than others), the timing of the event, and type of event, all influenced levels of crime and to some extent moderated the generator characteristics of stadiums.

The episodic nature of crime at stadiums can be summarised perhaps through a number of stages or sequences: early as crowds gather; just before an event as crowds get very busy; during the events peak when crowds are at their maximum; later as crowds start to disperse and stragglers exist; and non-event times when facilities are closed and few people are present. These levels of busyness influence crime rates, and indeed at each of these stages, opportunities for theft and violence will be different; the notion of first and second critical density zones. A different type of generator examined next is transit stations, which are open more regularly and less episodic than stadiums, and also have different peak times to that of neighbourhood parks.

Macro Crime Generator Example Three: Transit Stations

One type of facility to have been afforded perhaps the most attention around the idea of generators and attractors and crime are transit stations, stops and interchanges (Newton, 2014; Newton and Ceccato, 2015). These are very different to parks and stadiums. Stations have rhythmic human activity, with passenger flows that systematically vary. For example, there are peak and off-peak periods during the daytime, and off peak night time periods. Usage also varies on weekdays and weekends, on school days and non-school days, and for different seasons.

On Stockholm's Underground in Sweden, Ceccato and Uittenbogaard (2014) found: crime was more prevalent during winter months when the Underground was used more intensely

due to the cold weather outside; during daily peak hours stations with 'hiding spots' were often targeted by offenders (possible attractors); during off-peak hours the more crowded stations generated/attracted more offenders; and, during peak hours and holidays, stations with cash machines (ATMs) and dark corners tended to be associated with violence, whereas vandalism was concentrated at less populated stations. While the above research did not separate the possible individual impacts of generators and attractors, there are two key papers that have. Newton and colleagues did so using data for pick pocketing on the London Underground (Newton, Partridge and Gill, 2014a,b) while Irvin-Erickson and La Vigne (20151) examined a range of crime types on the Washington DC Metro.

The London study examined factors that might be associated with an increase or reduced risk of pickpocketing both inside a station, and in its surrounding environment. It found a combination of factors together, and not in isolation, impacted on pick-pocketing rates. Factors associated with an increased risk of theft included: those that encouraged congestion of passengers (lifts and waiting rooms) and increased levels of accessibility and access; higher theft levels in surrounding environs; stations that were identified as crime attractors (high theft counts and high theft rates); and, stations with high levels of tourist use. Factors associated with a reduced risk of pick pocketing included those likely to decrease anonymity, increase potential guardianship and offender detection. Examples here included higher levels of staffing, personal validators, shop rentals, and more domestic buildings nearby. Additionally stations with more platforms enabled passengers to be dispersed more evenly throughout the station to avoid congestion. Terminus stations (end of line) were associated with lower levels of risk than those in the centre of the network, which were better connected and more accessible. Better connected stations also experienced more crowded conditions during the afternoon rush hour (from work to home) than the morning rush hour (from home to work).

The authors developed an attractor-generator index to compare specific attractor and generator combinations by different times of the day, splitting this into six time periods across the day. Examples of the index include stations that had: high theft counts but low theft rates for all time periods ('generator at all times'); high theft counts and high theft rates for all time periods ('attractor at all times'); intermittently high theft counts and rates (sometimes attractor); and low risk of theft counts and rates (neutral). The only significant variable found in the model to be associated with pickpocketing was 'attractor at all time

periods'. This supports the hypothesis that stations with higher risk of pickpocketing were more likely to be a crime attractor rather than generator.

In the USA, Irvin Erikson and La Vigne modelled crime generating and crime attracting characteristics of stations on the Washington Metro for robbery, larceny, aggravated assault, and disorderly conduct. They examined time of day using the categories: peak hours; off-peak day hours; and, off-peak night hours. They proposed two variables as indicators of crime generators. The first was the connectedness of stations to the rest of the transit network, with highly connected stations more indicative of crime generators. The second was station accessibility; more accessible stations were considered representative of crime generators. Three variables were presented as indicative of crime attractors: the remoteness of a station from the CBD; the socio-economic status (SES) of the surrounding area, and the prevalence of other crimes at the station (those not considered above).

The authors used a negative binomial regression analysis to model these attractor and generator principles. They found that as with previous studies, 'that stations assume different nodal and place-based crime-generating and crime-attracting characteristics, but also these roles vary for different crimes and different times' (pp11). More specifically they found highly connected stations acted as a generator for larcenies and disorder at peak hours, and robberies at non-peak times. Stations with high levels of accessibility were generators for robberies and larcenies at non-peak night hours and remote stations attracted larcenies during peak hours and disorderly conduct during off-peak night hours.

There are two important spatial and temporal influences here, between daytime and night-time off peak hours, and between stations at the centre and edges of the network. Consistent with Newton, Partridge and Gill (2014b) and Cecatto and Uittenbogaard (2014), larcenies were associated with peak hours at connected stations in the centre of the network. At end of line stations disorder was associated with off-peak night hours. At centre stations at peak times, high levels of connectedness and accessibility are associated with generator characteristics of stations (Irvin-Erikson and La Vigne, 2015) for larcenies and other crimes. However for the specific case of pick-pocketing, Newton, Partridge and Gill (2014b) argue that stations in the centre of the network that are also popular with tourists, have high levels of theft counts and theft rates, are likely to act as crime

attractors. There may be discrepancies here between how offenders use the London Underground and Washington DC Metro which cannot be examined using the data available in these studies.

All three papers (Ceccato and Uittenbogaard; 2014, Newton, Partridge and Gill, 2014b; and Irvin Erikson and La Vigne, 2015) found that at subway stations crime is highly influenced by both the accessibility of the stations, the characteristics of the station itself, and the features of the immediate environment surrounding the station. Moreover, on the transport network, crime generator and or attractor characteristics are highly influenced by both type of crime and time of day.

Conclusions and Further Research

This chapter has attempted to clearly distinguish crime generators and crime attractors. The key difference identified is the offender's motivation for visiting a place. Crime attractors are places with a 'bad' reputation and the offender travels there explicitly for the purpose of committing a crime. Crime generators are places were lots of people congregate, and this convergence of people enables serendipitous opportunities for offenders who happen to also be at that place.

This chapter contends that more consideration should be afforded to the concept of places considered as attractors and generators, and moreover it is essential to consider the scale and context, in other words why a place is an attractor or generator relative to what nearby. The use of terms such as hot spots and activity generators in conjunction with the generator attractor language needs further thought. Places were people converge that do not experience crime should perhaps be termed activity generators or even crime neutral activity generators, and activity generators with high crime levels can then be considered crime generators. A hot spot may be driven by crime attractors and or crime generators, but the phrase a hot spot attractor or hot spot generator is perhaps less useful and complicates our understanding. It is the underlying land use or use of land that generates crime opportunity or attracts offenders, and subsequently crimes, which then creates hot spots, rather than the other way around.

The environs of crime generators were also shown to be highly relevant to crime levels. Crime is influenced by both characteristics of crime generators themselves, and features of

the surrounding environment. Size is perhaps relevant here. Indeed, one question might be: as a generator becomes larger, does it have greater influence on its surrounding environs, and vice versa, as it becomes smaller, do its environs have a greater influence? The length of opening hours may also be relevant to this, both at generators and nearby. Do places with longer opening hours have more of an impact on crime than those that are open sporadically, and how does this interact with premise size and premise busyness?

There are specific challenges evident in quantifying attractors and generators. In the absence of specific knowledge as to why an offender visited a place, crime counts and crime rates in an area offer some insight; generators have high counts but low rates, and attractors have high counts and high rates. However, the challenge is gathering appropriate information on population denominators to calculate rates. It is also paramount to break this down by time of day, relating to the usage of places at different times of day. Indeed, the size, function, opening hours, density, proximity, and length and nature of interactions between people make such measures highly complex. Further to this, crime type and busyness interact, as conditions optimal for pick-pocketing are very different to those for robbery, criminal damage or violence. This in part explains why places are rarely pure attractors or pure generators, but often a mix or combination of the two. Indeed one offender may be attracted to a particular location to commit a crime, and another offender may commit a crime at the same place and time but be there by chance.

This begs the question does it matter whether a place is identified as a crime attractor or crime generator. Perhaps the ultimate test should be the crime prevention implications. Should the prevention choices at attractors be any different to those at generators? This offers a potential avenue for further research. The Brantinghams contend that one possible important issue for prevention is spatial displacement (Guerette and Bowers, 2009). The Brantinghams hint that if a place is a pure crime generator, the introduction of situational crime prevention measures is unlikely to result in greater levels of crime displacement. If it is an attractor, crime neutral site or mixed attractor-generator some displacement is possible. Here further research is clearly warranted.

This chapter has identified two theoretical issues to be explored further. At crime generators, why does the presence of more people not equate to greater levels of capable guardianship. This in part is answered by the idea of first and second level critical density. Thus criminal damage, robbery, and pick-pocketing are more likely at very different crowd

densities. Indeed, an interesting area for future studies is the extent to which the busyness of a place helps or hinders the role of capable guardianship (both informal and formal) for different types of crimes in different settings and environments.

A second question is the relationship between generators and an offender's awareness spaces. If it is accepted that offenders generally increase their familiarity of an area during their daily routines, then what happens when they are at a crime generator and meet an unforeseen opportunity for crime? How familiar with that area do they need to be in order to activate their criminal readiness, and to be confident of doing so without detection and with sufficient reward? This raises a further question. Over time to what extent do crime generators transform to become crime attractors, as increased familiarity, and perhaps a change in ecological labels results in a reputational change? One possible new research methodology that could be useful to examine this is agent based modelling (Birks and Elfers, 2014). Indeed, many of the research questions posed in this chapter could be avenues for simulation models to examine offender choices, and how they interact with possible attractors and generators, and how these may change over time.

Future developments, especially societal and technological change may also influence the formation of crime generators and attractors. For example there have been some recent moves towards the notion of anti-crowds at places. Places people visit may have optimal conditions for enjoyment, thus if a place is too quiet there is no atmosphere and the social experience is reduced. If it is too busy then this also impacts on levels of enjoyment, due to jostling, bumping, or long queues. Restaurants and bars are examples of this, as is shopping on Christmas Eve or during New Year sales. Indeed in Amsterdam a recent mobile phone app called 'avoid the shopping crowds' provides live information on when to avoid shops that are too busy, and optimal times to go. It even provides historical data on average store traffic. If there is a growth in the idea of 'anti-crowd' establishments then how will this impact on offending.

Technological advances may also impact on crime generators and attractors. For example new technologies have introduced the possibility of cyber pick-pocketing, whereby offenders use card readers to wirelessly steal cash from credit cards which have a 'contactless' payment facility. Whilst these are currently rare, this may add another modus operandi to a pick-pocket's arsenal, but could also change the optimal crowd density for

pick-pocketing. Again this may alter the landscape of crime generators and attractors, as new attractor locations for cyber pick-pocketing may develop, not only to steal cash but also valuable data such as people's identity information.

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