

The spatial concentration and stability of crime in a South African township

G. D. BREETZKE

Author:

^aGregory D. Breetzke

Associate Professor, Department of Geography, Geoinformatics and Meteorology, University of Pretoria, Pretoria, 0002, South Africa (Tel: +27 12 420 4318; Fax: 0027 12 420 6385; E-mail: greg.breetzke@up.ac.za)

Abstract

The law of crime concentration at places motivates that a small number of locations are responsible for a disproportionate amount of crime. Research applying the law has largely been confined to the United States and Europe with much less known about spatial crime concentrations and their stability in less developed contexts, particularly in Africa. In this study we explore the spatial concentration of crime in a setting axiomatically different from the West, namely Khayelitsha, a township on the outskirts of Cape Town in South Africa. Specifically, we describe rape, robbery and assault concentrations in Khayelitsha from 2008 to 2015 and examine the extent to which these concentrations change over time. Similar to international research we found that crime in Khayelitsha spatially concentrates and that these concentrations are remarkably stable. Practical implications of these findings are discussed in the context of a historically unique post-apartheid South African spatial setting.

Keywords: crime concentration; crime stability; international crime; South Africa

Introduction

One of the central tenets of environmental criminology is that crime clusters in space (Brantingham and Brantingham, 1991). More recent longitudinal research has however shown that there is stability in spatial crime concentrations (see Weisburd *et al*, 2004; Braga *et al*, 2010; Groff *et al*, 2010; Andresen and Malleson, 2011). That is, not only does crime spatially concentrate in certain areas but that these concentrations are remarkably consistent over long periods of time. The historical antecedent of this work was Sherman *et al*. (1989) who mapped over 320,000 calls to police in Minneapolis over one year period and found that relatively few crime ‘hot spots’ produced the most calls to police, although the magnitude of concentration varied by offence type. According to the researchers, these concentrations raised pertinent

questions about the criminogenic nature of places as distinct from neighbourhoods. The development and proliferation of geographical information systems (GIS) coupled with advancements in the collection of crime data over the past twenty years has resulted in a plethora of studies examining the spatial concentration and stability of crime both at the macro- (neighbourhood) and micro- (street segment) level of analysis. Key among these studies is Weisburd *et al.* (2004) who examined the stability of crime concentrations at the street block level of analysis in Seattle, Washington. In their retrospective longitudinal study the researchers found that between four and five percent of street segments in the city accounted for 50% of crime incidents for each year over the 14 year study period (from 1989 to 2002). Later Weisburd *et al.* (2009) examined the concentration of crime incidents in which a juvenile was arrested and found that less than one percent of street segments accounted for one-third of all official juvenile arrest incidents over the same time period. Other notable studies include Groff *et al.* (2010) who replicated Weisburd's Seattle study but applied trajectory analysis to establish groups of places that follow similar crime trajectories over a 16 year study period. Rather surprisingly they found a number of instances where individual street segments had trajectories which were unrelated to their immediately adjacent streets. Lastly, Braga *et al.* (2010) examined the spatial stability of robbery in Boston, Massachusetts over a 29-year period and found that only 12% of street segments had one robbery incident over the study period, and that one-half of robberies in Boston occurred in roughly eight percent of street blocks. This body of work together with his own substantial analyses in a number of US and other cities lead Weisburd (2015, p. 133) to introduce the 'law of crime concentration at places' which states that 'for a defined measure of crime at a specific micro-geographic unit, the concentration of crime will fall within a narrow bandwidth of percentages for a defined cumulative proportion of crime.' (p. 138). While exact percentages may vary, the notion is that 50% of crime will

concentrate in between two and six percent of possible places, and that 25% of crime will concentrate in between one to four percent of places.

Unsurprisingly a plethora of studies have been forthcoming using the law of crime concentrations as a basis to examine spatial crime patterns in a number of countries including The Netherlands (Bernasco and Steenbeek, 2017), the United Kingdom (Rosser *et al*, 2017), Israel (Weisburd and Amram, 2014), Brazil (de Melo *et al*, 2015), and Canada (Andresen *et al*, 2017). The results of this growing body of work strongly support the central tenets of the law of concentration of crime at places, although questions remain about its applicability in less developed contexts. Indeed, as with most criminological theories, laws and axioms it is unknown if this law is applicable in an African context in general, and in a South African context specifically. This is important to ascertain as it provides a measure of academic credibility and generalizability to a law generally accepted by most environmental criminologists as becoming increasingly central to the theory of crime and place.

In this descriptive study we examine the spatial concentration of crime in one of South Africa's most crime-ridden township communities, Khayelitsha. Specifically, we describe rape, robbery and assault concentrations in Khayelitsha from 2008 to 2015 and examine the extent to which these concentrations are stable over time. The structure of the article is as follows. In the next section we provide a brief overview of Khayelitsha. The data and methods are outlined before the results are shown. The usefulness of spatial crime analysis lies not only in its ability to inform theory but also, and more importantly, to inform implementable and manageable policy and prevention initiatives. In the discussion and conclusion we use the results of our work to outline a number of tangible crime policy and prevention initiatives that can be developed and implemented by law enforcement agencies to reduce crime in these communities.

The study site

The township of Khayelitsha is located on the urban periphery of Cape Town, a city located in the Western Cape Province at the southernmost tip of South Africa. The township has a population of roughly 400,000 inhabitants, of which almost 99% are Black African. The history of Khayelitsha is fraught with violence and conflict. The township was artificially established by the former apartheid government in 1983; a late enforcement of the Group Areas Act of 1950. The Group Areas Act provided for the comprehensive racial segregation of South African cities and involved the forced removal of Black African families into predominantly outlying rural areas distant and distinct from the White urban core. The result was the creation of these so-called 'township' communities and the concomitant destruction of social capital and with it the sense of continuity, security and social control among Black Africans (Pinnock, 1984; Emmett, 2003). Writing about townships in the 1980s Chikane (1986) described them as typically characterized by widespread malnutrition, poor or non-existent health systems, ill-equipped and overcrowded schools, inadequate or non-existent social security, and high levels of unemployment. More than twenty years into democracy and Khayelitsha is still plagued by concentrated disadvantage. According to the most recent census in the country almost 40% of residents of Khayelitsha are unemployed while just under three-quarters of residents survive on less than R3, 200 (~US\$260) per month (Statistics South Africa, 2011). More than half of all dwellings are informal shacks with almost 40% of residents having no access to piped water and 25% of residents having no access to a flushed toilet (Statistics South Africa, 2011). Almost 10% of children under five are malnourished (Western Cape Provincial Government, 2013) while females head more than 40% of households (Statistics South Africa, 2011).

With regard to crime, the Khayelitsha police precinct is among the most violent of all 1138 police precincts in South Africa (South African Police Services, 2017). Over 40% of all crime committed in the township is violent which is above the national average of 34% (Western

Cape Provincial Government, 2015). Just under 8000 violent crimes were committed in Khayelitsha in 2015 including 146 murders; with the murder rate consistently over 80 per 100,000 residents, almost double the national average (Crime Hub, 2018). The lack of competent law enforcement in the township (as highlighted by O'Regan *et al*, 2014) has resulted in a surge in 'mob justice' and violent vigilantism incidents over the past decade (Super, 2016) exacerbated by a concomitant increase in gangsterism (Pinnock, 2016). The culmination of these events led to the formation in 2012 of a provincial commission of inquiry to investigate allegations of police inefficiency in Khayelitsha. It is within this context that the present study aims to shed further light on the generalizability of the law of crime concentration at places. In particular, it aims to answer the following two questions: Does crime concentrate spatially in Khayelitsha? And second, are these concentrations stable over time? To our knowledge, this is the first test and application of Weisburd's (2015) law in an African context.

Data and methods

Crime data for this study was obtained from the South African Police Services. These data contain information pertaining to the location and date of occurrence of crime in the Khayelitsha police precinct over an eight year period: 2008-2015¹. A separate sexual (rape), violent (assault) and property (burglary) crime type was extracted from the crime dataset to determine the extent to which the concentration and stability of crime is uniform across crimes with varying motives and operandi. Of course, it is well-known that crime is notoriously under-reported in South Africa (see Breetzke, 2006). According to the latest South African Victims of Crime Survey (2017) just over seven percent of households were victims of crime in the past year. Within this national context of high rates of crime victimisation, the Western Cape Province maintained the top position as having the highest percentage of households victimised by crime, at almost 10 percent. More worryingly, an independent survey of attitudes to policing

in Khayelitsha found that 41% of all respondents had personally been a victim of crime in the last year while only 40% reported the crime (O'Regan *et al*, 2014). Main reasons provided for the lack of reporting included a fear of repeat victimisation from the perpetrator/s, as well as a lack of trust in the police. Of course, it is difficult if not impossible to know the spatial variability of non-reporting to the police within Khayelitsha and how this could potentially impact the results. While unfortunate, the underreporting of crime is simply a reality in a number of less developed contexts with little possibility of recourse. The data is however official and the most spatially replete data available in the country by which to conduct analysis and draw inferences. Table 1 below contains a brief summary of the three crime types examined in Khayelitsha across SALs.

Table 1: Descriptive statistics of crime in Khayelitsha per SAL per year ($n = 254$)

	Min	Mean	Max	SD
Robbery	0	2.49	36.13	3.62
Rape	0	0.70	6.50	0.92
Assault	0	5.30	44.13	6.22

The spatial unit of analysis used is the small area level (SAL). This is the smallest unit of analysis that Statistics South Africa disseminates spatial information. There are 254 SALs in the Khayelitsha police precinct with each SAL containing 630 people on average. The number of people residing within an SAL varies considerably, as does the population density across the township (see Table 2).

Table 2: Descriptive statistics of the population in Khayelitsha per SAL ($n = 254$)

	N	Min	Mean	Max	SD
Population	159827	20	629.24	1603	256.12
Area (km ²)	9.32	0.01	0.04	1.90	0.13
Density (pop/km ²)	17148.82	43.23	34949.52	113518.49	18382.96

Of course, an obvious limitation of this data and approach is that a micro-geographic unit of analysis (i.e. the street segment or street block) was not used. We are well aware of the need, as outlined by Braga *et al.* (2017), for micro-spatial units of analysis such as street segments to be used to better understand the spatial patterning of crime; however in less developed contexts, such as the favelas in Brazil, and townships in South Africa, a substantial proportion of these areas are informal. In the more formal regions of the township there are delineated streets as would be common in developed countries; however in the more informal areas of the township there is no clearly defined street network and no street blocks per se making any inference regarding street level risk difficult to ascertain. In such a scenario it is virtually impossible to ‘snap’ crime data to a street segment or street intersection where none exists. Moreover, the accurate capturing of crime locations using address level data is extremely problematic when there is no formal residential address. Crime data in these areas are most often obtained using hand-held GPS devices. These difficulties are not however unique to South Africa with Mazeika and Kumar (2017) highlighting the lack of road network data in Jaipur, India as a limitation in their exploration of crime concentrations in that country. Most residents in the extremely dense informal areas in Khayelitsha use footpaths in between dwellings as a means of getting to and from locations. In areas with a high population density such as Khayelitsha, the surface area of the SAL are small, as the areas are based on a rough estimate of the number of households. So while the unit of analysis used in this study is an aggregate, the actual area under investigation is relatively small (mean SAL in Khayelitsha = 2.58 kilometres squared).

In our method we first provide descriptive statistics of robbery, rape and assault in Khayelitsha over the eight year study period and then calculate the percentage of small areas that account for 25%, 50%, 75% and 100% of crime in the township. In order to measure the degree to which crime is spatially concentrated in the same small areas over the eight year

period a simple filtering process was undertaken. This involved rank-ordering each small area for each crime over each year. Small areas that were in the upper quartile of crime for each year were extracted and filtered year-on-year to produce the number of small areas that were consistently in the upper quartile for crime over the whole study period. This simple but effective approach also allows for the identification of areas that persistently experience high crime levels over the eight years.

Results

Tables 3-5 show the descriptive statistics of robbery, rape and assault in Khayelitsha over the eight year study period. A total of 17,266 crimes were committed across these three categories; including 5059 robberies, 1430 incidents of rape and 10,777 assaults. Immediately noticeable among these data is the lack of a consistent trend in year-on-year crime levels from 2008 to 2015. Crime fluctuates across all categories, in some instances drastically from year to year but not uniformly across crime types. For example, rape and assault increase from 2009 to 2010 while robbery decreases; similarly, robbery and assault increase from 2010 to 2011 but rape decreases. Another observation common across all crime categories is the fact that crime has increased over the study period with a 25% increase in robbery; an 18% increase in rape, and a 25% increase in assault. Much has been made of the so-called ‘crime drop’ in the international literature (see van Dijk *et al.* 2012; Knepper, 2012; Farrell, 2013). The notion here is that crime has significantly declined in most advanced countries over the past two decades, a consequence of improved and more security (see Farrell, 2013). In fact, Tseloni *et al.* (2010) suggests that the crime drop could be a global phenomenon although their reliance on the International Crime Victims Survey (ICVS) to make this assertion has obvious limitations. According to official statistics released by the SAPS crime has also decreased overall in South Africa over the past ten years although researchers question the veracity of these claims (see Gould *et al.* 2014)

notably the way in which statistics are captured and reported (Breetzke, 2006). Of course, national crime statistics mask local variations and the findings presented here indicate that crime has increased dramatically in Khayelitsha from 2008 to 2015. In these three crime categories and in this police precinct there has been no drop in crime. Further deliberation and analysis is warranted to determine whether these increases are confined to this particular region and/or province of the country.

Table 3: Descriptive statistics of robbery per 1000 population in Khayelitsha per small area ($n=254$)

Year	Count	Min	Mean	Max	SD
2008	607	0	4.06	189.00	15.42
2009	580	0	3.55	59.09	6.82
2010	492	0	2.93	57.59	5.51
2011	507	0	3.07	62.20	5.63
2012	595	0	4.14	100.00	10.06
2013	709	0	5.22	104.65	12.00
2014	820	0	5.62	142.36	13.04
2015	759	0	4.98	134.15	11.69
Total	5059	0	33.58	691.39	59.92

Table 4: Descriptive statistics of rape per 1000 population in Khayelitsha per small area ($n=254$)

Year	Count	Min	Mean	Max	SD
2008	153	0	0.99	25.25	2.62
2009	165	0	1.12	24.39	2.65
2010	203	0	1.29	16.87	2.57
2011	192	0	1.09	20.60	2.43
2012	180	0	1.31	60.98	4.45
2013	169	0	1.19	31.25	3.22
2014	188	0	1.26	20.83	2.73
2015	180	0	1.17	36.59	3.00
Total	1430	0	9.42	182.93	16.03

Table 5: Descriptive statistics of assault per 1000 population in Khayelitsha per small area ($n=254$)

Year	Count	Min	Mean	Max	SD
2008	1236	0	8.62	231.71	23.53
2009	1155	0	7.99	121.95	14.25
2010	1180	0	7.50	125.65	12.36
2011	1232	0	7.69	112.44	11.66
2012	1434	0	9.43	146.34	16.73
2013	1428	0	10.42	197.67	22.16
2014	1565	0	11.14	270.83	23.76
2015	1547	0	10.89	292.68	22.26
Total	10777	0	72.93	743.90	89.51

Table 6 outlines the percentage of SALs that account for various percentages of crime in Khayelitsha over the study period. The results presented here are somewhat similar to the international literature which has generally found high concentrations of crime occurring in a relatively few number of locations. Indeed, previous research has shown how between three to six percent of places produce roughly half of all crime (see Weisburd *et al.* 2012; Andresen *et al.* 2017). In Khayelitsha, year-on-year between 6.7% and 9.1% of SALs produced 50% of rape; between 5.1% and 12.2% of SALs produced 50% of robberies; and between 7.5% and 15.8% of SALs produced 50% of assaults. Assault is the most dispersed crime type followed by robbery then rape. This consistency across all categories of crime and throughout the eight years under investigation would seem to support the law of concentration of crime at place although the percentages observed are marginally higher than those found in other contexts. Similar concentrations are found when examining where 25% of crime is located. Indeed, just eight small areas in Khayelitsha were responsible for a quarter of rape occurrences in 2008; this decreases to just five small areas in 2011, and increases again to seven small areas in 2015. Robbery is slightly more dispersed but still extremely concentrated in a few small areas with between three and nine small areas responsible for a quarter of robberies year-on-year over the study period; and between six and 14 small areas responsible for a quarter of all assaults. Again,

Table 6: Percentage of small areas that account for 25%, 50%, 75% and 100% of crime in Khayelitsha (2008-2015)

	Rape				Robbery				Assault			
	25%	50%	75%	100%	25%	50%	75%	100%	25%	50%	75%	100%
2008	3.15	8.27	18.50	33.46	1.18	5.12	17.72	53.94	2.36	7.48	20.87	73.62
2009	2.76	9.06	19.69	35.83	3.15	11.02	25.98	62.60	3.54	13.39	30.31	76.38
2010	2.36	7.09	16.93	36.61	2.36	9.45	23.62	56.30	3.15	12.60	31.10	77.17
2011	1.97	7.09	15.75	34.25	3.15	10.63	24.80	57.09	3.94	11.81	30.31	80.31
2012	2.76	7.87	16.14	31.89	2.76	10.24	25.98	65.35	3.94	12.99	29.92	80.31
2013	2.36	6.69	14.57	30.71	2.76	9.06	24.02	67.32	3.54	11.42	27.56	77.95
2014	2.76	7.48	18.11	36.61	2.76	9.06	25.20	70.08	3.54	12.20	29.13	81.89
2015	2.76	7.48	16.54	34.25	3.54	12.20	27.95	66.14	5.51	15.75	35.04	83.46

these findings are largely similar to the results of previous research including Weisburd and Amram (2014) who found that just 0.9% of street segments in Tel Aviv-Jaffa were responsible for a quarter of crime and Weisburd *et al.* (2012) who found that one percent of street segments included roughly 23% of crime in Seattle. Again, the percentages in this study are marginally higher than those found elsewhere. One notable point of difference between these results, and most US cities, is the varying extent to which locations in Khayelitsha have no crime. In the case of rape, roughly 65% of possible locations have no recorded incidents over the eight year study period; this is also remarkably consistent. However in the case of robbery this percentage decreases with only 46% of small areas recording no robberies in 2008 and only 30% of SALs recording no robberies in 2014. Rather disturbingly the percentages decrease substantially for assault with only 16% and 18% of small areas recording no incidences of assault in 2014 and 2015 respectively.

The results of the 'filtering' analysis are shown in Table 7. Based on the results 63 small areas were in the upper quartile for rape in 2008. Of those 63 small areas only 29 small areas were also in the upper quartile for rape in 2009. Of those 29 small areas, 16 were also in the upper quartile for rape in 2010 and so forth. Across the eight years, only five small areas were consistently in the upper quartile for rape. Collectively, those five small areas are responsible for almost 12% of *all* rape committed in Khayelitsha over the whole study period ($n = 176$). In terms of robbery, only 11 small areas were consistently in the upper quartile for each year over the eight years, while only eight small areas were consistently in the upper quartile for assault. This indicates that although crime is spatially concentrated in Khayelitsha these concentrations spatially vary from year to year with very few small areas exhibiting high crime rates consistently over the eight years.

Table 7: Percentage of the same small areas in the upper quartile of crime for Khayelitsha from 2008 onwards

	Rape	Robbery	Assault
Base year: 2008	25 (<i>n</i> = 63)	25 (<i>n</i> = 63)	25 (<i>n</i> = 63)
2008-2009	11.42 (<i>n</i> = 29)	13 (<i>n</i> = 33)	11.81 (<i>n</i> = 30)
2008-2010	6.30 (<i>n</i> = 16)	8.66 (<i>n</i> = 22)	7.48 (<i>n</i> = 19)
2008-2011	5.12 (<i>n</i> = 13)	6.30 (<i>n</i> = 16)	6.69 (<i>n</i> = 17)
2008-2012	3.54 (<i>n</i> = 9)	5.51 (<i>n</i> = 14)	4.33 (<i>n</i> = 11)
2008-2013	2.36 (<i>n</i> = 6)	5.12 (<i>n</i> = 13)	3.54 (<i>n</i> = 9)
2008-2014	1.97 (<i>n</i> = 5)	4.72 (<i>n</i> = 12)	3.15 (<i>n</i> = 8)
2008-2015	1.97 (<i>n</i> = 5)	4.33 (<i>n</i> = 11)	3.15 (<i>n</i> = 8)

Discussion

There is a general perception in South Africa that crime is ubiquitous (see Gwala, 2007; Rautenbach, 2013; Olivier, 2014). The results of this work largely contradict this with most crime in Khayelitsha spatially concentrated in a relatively low number of small areas despite the township as a whole being among the most violent in the country. These findings reinforce the spatially skewed distributions of crime commonly found in countries outside the US including Bangladesh (Dewan *et al*, 2013); India (Mazeika and Kumar, 2017); Ghana (Appiahene-Gyamfi, 2002); Israel (Weisburd and Amram, 2014); and China (Liu *et al*, 2016). Moreover, the law of concentration of crime in places was largely supported in a South African context. That is, crime across all three categories were disproportionately located in a relatively few number of locations. At least in this study, the law of crime concentration broadly holds true. This is an important finding as it demonstrates, for the first time in an African context, that crime spatially concentrates at percentages comparable with mainly US-based studies giving the ‘law’ a measure of credibility in contexts outside the West. Another notable finding from this study was the fact that these spatially-skewed crime concentrations were consistent over time. Indeed, between 5-15% of small areas contained 50% of all crime incidents year-on-year. Later findings however indicated that the location of these crime concentrations

change over time. For example, only five small areas in Khayelitsha were consistently in the upper quartile for rape over the eight years indicating that so-called problem neighbourhoods rise, fall and change location, at least in Khayelitsha.

Implications for policing

The fact that crime concentrates in a relatively few locations in Khayelitsha has important implications for policing. First, police resources should be used to geographically target high-crime micro locations where the risks of crime are the greatest in order to have the maximum benefit. So-called ‘hot spot’ policing involves increasing police presence at places in which crime concentrates and has been found to be a successful policing strategy to address crime in a variety of contexts (for a review, see Telep and Weisburd, 2016). Current policing in the township has been described as ‘policing by chance and luck’ (O’Regan *et al.*, 2014, p. 375) with basic crime pattern analysis non-existent and police officers relying instead on intuition and past practice when on patrol. This lack of intelligence-led policing can result in crackdowns on certain known ‘problem’ sectors in the policing precinct which can result in short-term crime reductions in these areas but also crime displacement as the overarching social and economic conditions that gave rise to the crime increase in the first place are neglected. To our knowledge there has been no studies investigating crime displacement in South Africa but a plethora of international research has shown that even if crime is displaced due to hot spot policing overall crime in targeted and proximate areas are reduced (see Braga *et al.*, 2012; Johnson *et al.*, 2012). In fact, when examining both smaller and larger geographical units, the spatial displacement of crime is still fairly unlikely (Telep *et al.*, 2014), so this type of policing strategy in high crime neighbourhoods in Khayelitsha would most likely lead to an overall reduction in crime. In truth a similar type of zero-tolerance or ‘saturation’ policing strategy has previously been sporadically employed by the SAPS in high risk neighbourhoods throughout

the country. The cornerstone of this approach involves the deployment of police en masse into high crime areas. This type of militarised policing has however had limited success with the main issues being its unsustainability given the limited resources of the SAPS coupled with the unwillingness and/or inability of other government departments to deliver meaningful and sustainable development interventions at the necessary scale in identified high crime areas (Lamb, 2018).

Second, and related to the above, the results of this research suggest that a problem-orientated approach to policing in the township could be adopted that aims to analyse the locations of high crime concentrations in the township in order to develop effective response strategies. Indeed, with the current international movement towards problem-orientated policing (Ratcliffe, 2016), it is imperative that law enforcement agencies not only record crime incidents at increasing finer levels of spatial resolution; but analyse the resultant data and use the intelligence garnered from this analysis to guide policing efforts. From a policy perspective, knowing where the risk of criminal victimization in Khayelitsha is greatest can influence a range of policy measures such as the timing of police directed patrol strategies, whether to install and/or improve street lighting in certain parts of the township, and inform whether certain regions of the township need to invest in surveillance cameras.

Finally, community-oriented policing programmes could be implemented in neighbourhoods with a high crime concentration in Khayelitsha in order to improve citizen satisfaction and perceptions of police legitimacy in the township. While these programme may not necessarily reduce crime in affected areas (see Sherman and Eck, 2002; Weisburd and Eck, 2004) it would give these residents an opportunity to engage with the police and provide input on the underlying social issues that are likely to be precipitating crime, disorder, and fear in their communities. As briefly noted earlier, Khayelitsha has been the focal point for a recently concluded Commission of Inquiry undertaken by the Western Cape Provincial Government.

The Commission was appointed to investigate allegations of police inefficiency in the township as well as the breakdown in relations between the local community and the police. A community orientated policing programme specifically targeting high crime communities could potentially improve trust in the police and help rebuild a relationship that is severely strained (O'Regan *et al*, 2014).

Implications for crime prevention

Crime is a daily reality for many South Africans but contrary to popular opinion crime is not insidious and everywhere. Our study has shown that crime is spatially concentrated in a relatively few neighbourhoods even in an overall high crime context. As such, reactive and proactive crime prevention efforts should focus on these locations (which are largely known), and focus on addressing neighbourhood-level risk factors for crime (which are also largely known) in order to for crime, of all types, to be measurably reduced. The current crime prevention policy framework of the SAPS typically operates at three levels: operational, tactical, and strategic. In operational terms, policy directives should be aimed towards assisting operational personnel in identifying specific and immediate crime concentrations and also in providing investigative leads. Knowing that crime spatially concentrates in Khayelitsha can inform a number of operational actions that are undertaken by law enforcement agencies in South Africa. For example, visible police units can be guided to specific locations in order to undertake routine patrols, set up roadblocks, and checkpoints and stop-and-search operations. Indeed, effective co-ordination of visible policing, including conducting foot and vehicular patrols and searches, are vital in crime prevention. One of the numerous allegations levelled against the SAPS by the community during the Khayelitsha Commission hearings was the lack of visible policing in the township in general, and in informal high-crime areas of the township in particular (O'Regan *et al*, 2014). The results of this study suggest that these patrols can be

geographically targeted in a relatively low number of locations in order to have the maximum benefit. This is especially important in police precincts like Khayelitsha which are severely under-resourced (O'Regan *et al.*, 2014).

Tactically, policy directives should involve an evaluation of information and factors directly relevant to the prevention of crime. The intelligence garnered from knowing where certain types of crime concentrate can be used to guide operational policing units to specific locations and individuals linked to criminal activities, potentially leading to the arrest of suspects and suspicious persons. Indeed, just as crime concentrates so too do offenders. A recent review of offender concentrations by Martinez *et al.* (2017) found that crime is concentrated among offender locations. Locally, Breetzke and Horn (2006) also show how offenders concentrate in high crime communities in Tshwane, a city in the central Gauteng province of South Africa. It seems reasonable to assume that a similar co-concentration of offenders and crime would exist in Khayelitsha.

From a strategic perspective, the SAPS (under the auspices of the South African government) aim to address the underlying 'root' causes of crime in the country. The SAPS and other role players that are responsible for specifically addressing these long-term solutions to crime can utilise the understanding of crime concentrations to highlight various underlying factors affecting crime, its occurrence and measure ways to address them. This will most likely involve exploring crime phenomena at finer spatial scales in an attempt to outline geographically targeted long term strategies.

Ideally a focused deterrence approach is followed which focusses on the implementation of an appropriately blended strategy of law enforcement, community mobilisation, and social service actions in the prevention of crime (Kennedy, 2008). A recent review of focused deterrence strategies by Braga *et al.* (2018) found that most implemented strategies resulted in

a statistically significant, albeit moderate reduction in crime although none of the studies they reviewed were conducted in Africa.

In a recent review of studies examining what works in crime prevention Weisburd *et al.* (2017) note that not all crime prevention programmes, policies and practices work and that criminologists, practitioners, and policy makers must carefully survey the evidence to identify effective programmes. From a South African perspective, very few crime prevention programmes have been implemented and even fewer empirically assessed making the identification of crime prevention programmes for areas such as Khayelitsha difficult, if not impossible. One area of crime prevention, namely situational crime prevention, has however been implemented in Khayelitsha over the past decade. Situational crime prevention (SCP) measures are defined here as those that aim to prevent crime by reducing opportunities for offending and increasing the effort and risk for offenders (Clarke, 1995). The situational crime prevention initiative in Khayelitsha involved the upgrading of the townships infrastructure and has been credited with bringing about a 24 to 33 percent reduction in some areas (Turner, 2013) although its ability to effect long term reduction in crime in the township has been brought into question.

Conclusion

In a recent editorial Braga *et al.* (2017) summarised contemporary empirical and theoretical developments in ‘place-based’ criminology. Their main focus was ‘to advance the empirical study of the law of crime concentration at places’ (p. 422) by highlighting important empirical questions related to key elements of the law as put forth by Weisburd (2015). One of the most important questions posed was whether the law of crime concentration was truly generalizable to other contexts. While the spatial concentration and stability of crime is a quality acknowledged in Western cities, it is not clear whether this is true in contexts outside the West,

particularly in Africa. Indeed, in a recent systematic review of 44 studies that empirically examined crime concentration at place, not one study emanated out of Africa (see Lee *et al*, 2017). We believe that in doing this research we have provided a number of answers to the empirical questions posed by Braga *et al*. (2017). First, this study demonstrates that crime across three different categories in South Africa spatially concentrates at the micro-geographic unit of analysis providing initial support to Weisburd's law of crime concentration in an African context. As previously mentioned the units of analysis employed in this study are considerably smaller than those used by Weisburd *et al*. (2004) and others and this is a notable limitation of our findings. Despite this however, previous research has shown how spatial crime concentrations are remarkably consistent across varying units of analysis across a diverse set of contexts (see de Melo *et al*, 2015; Andresen *et al*, 2017) so it is reasonable to assume that similar spatial crime concentrations would be found if future studies could possibly analyse crime at a finer unit of analysis in the township. More research is also needed to determine whether these findings are generalizable to other cities in the country and indeed to other countries on the continent. From a South African perspective, future analyses could attempt to replicate this study in a more urbanized context and as a result use the street segment and/or street block as the unit of analysis although gaining access to geocoded crime data in the country is an ongoing challenge. There is also a desperate need to gain a better spatial understanding of crime in informal under-policed township communities thereby making that a priority research area for the SAPS. Second, the study has demonstrated that the spatial concentrations of crime observed are stable over time. Despite some minor fluctuations crime was consistently concentrated in a few number of small areas throughout the eight year study period. It was also found however that very few small areas were consistently in the upper quartile for crime over the eight year period indicating that these crime concentrations may vary temporally. A deeper understanding of the root social and structural causes of crime in

township communities is required to potentially explain these findings. We believe that the results presented here, whilst preliminary, are sufficiently valuable enough to merit further detailed investigation; and that they provide an important platform for future criminology of place research in South Africa particularly related to crime concentrations and stability.

Notes

- 1 The 'Greater Khayelitsha reporting area' consists of three police precincts: Khayelitsha, Harare, and Lingeletu. We only had access to police data for the Khayelitsha policing precinct. The total population in the Khayelitsha policing precinct is just under 160,000.

References

- Andresen, M.A. and Malleson, N. (2011) Testing the stability of crime patterns: implications for theory and policy. *Journal of Research in Crime and Delinquency* 48(1): 58–82.
- Andresen, M.A., Linning, S.J. and Malleson, N. (2017) Crime at places and spatial concentrations: Exploring the spatial stability of property crime in Vancouver BC, 2003–2013. *Journal of Quantitative Criminology* 33(2): 255–275.
- Appiahene-Gyamfi, J. (2002) An analyses of the broad crime trends and patterns in Ghana. *Journal of Criminal Justice* 30(3): 229-243.
- Bernasco, W. and Steenbeek, W. (2017) More places than crimes: Implications for evaluating the law of crime concentration at place. *Journal of Quantitative Criminology* 33(3): 451–467.
- Braga, A.A., Hureau, D.M. and Papachristos, A.V. (2010) The concentration and stability of gun violence at micro places in Boston, 1980-2008. *Journal of Quantitative Criminology* 26(1): 33-53.
- Braga, A.A., Papachristos, A. Hureau, D.M. (2012) Hot spots policing effects on crime. *Campbell Systematic Reviews* 8: 1–96.

- Braga, A.A., Andresen, M.A. and Lawton, B. (2017) The law of crime concentration at places: Editors' introduction. *Journal of Quantitative Criminology* 33(3): 421–426.
- Braga, A.A., Weisburd, D. and Turchan, B. (2018) Focused deterrence strategies and crime control: An updated systematic review and meta-analysis of the empirical evidence. *Criminology & Public Policy* 17(1): 205-249.
- Brantingham, P.J. and Brantingham, P.L. (1991) *Environmental Criminology 2nd Ed.* Prospect Heights, IL: Waveland Press.
- Breetzke, G.D. (2006) Geographical Information Systems (GIS) and policing in South Africa: A review. *Policing: An International Journal of Policing Strategies and Management* 29(4): 723-740.
- Breetzke, G.D. and Horn, A.C. (2006) Crossing the racial divide: a spatial-ecological perspective of offenders in the City of Tshwane Metropolitan Municipality, South Africa. *GeoJournal* 67(3): 181-194.
- Chikane, F. (1986) Children in turmoil: The effects of unrest on township children. In: S. Burman and P. Reynolds (eds.), *Growing up in a Divided Society*. Johannesburg: Ravan Press, pp. 333-344.
- Clarke, R.V. (1995) Situational crime prevention. *Crime and Justice* 19: 91–150.
- Crime Hub. (2018) Institute for Security Studies Crime Hub, <https://issafrica.org/crimehub>, accessed 22 February 2018.
- de Melo, S.N., Matias, L.F. and Andresen, M.A. (2015). Crime concentrations and similarities in spatial crime patterns in a Brazilian context. *Applied Geography* 62: 314-324.
- Dewan, A.M., Haider, R. and Amin, R. (2013) Exploring crime statistics. In: A.M. Dewan and R. Corner (eds.), *Dhaka Megacity: Geospatial Perspectives on Urbanisation, Environment and Health*. The Netherlands: Springer, pp. 257-282.

- Emmett, T. (2003) Social disorganization, social capital and violence prevention in South Africa. *African Safety Promotion Journal* 1: 4-18.
- Farrell, G. (2013) Five tests for a theory of the crime drop. *Crime Science* 2: 5
<https://doi.org/10.1186/2193-7680-2-5>.
- Gould, C., Burger, J., & Newham, G. (2014). The SAPS crime statistics: what they tell us and what they don't. *South African Crime Quarterly* 42: 3-12.
- Groff, E.R., Weisburd, D. and Yang, S-M. (2010) Is it important to examine crime trends at a local "micro" level? A longitudinal analysis of street to street variability in crime trajectories. *Journal of Quantitative Criminology* 26(1): 7–32.
- Gwala, B. (2007) *Debate on the democratic alliance motion*,
<http://archive.ifp.org.za/Speeches/070607bsp.htm>, accessed 22 February 2018.
- Johnson, S.D., Guerette, R.T. and Bowers, K.J. (2012) Crime displacement and diffusion of benefits. In: B. C. Welsh and D. P. Farrington (eds.), *The Oxford Handbook of Crime Prevention*. New York: Oxford University Press, pp. 337–353.
- Kennedy, D.M. (2008) *Deterrence and Crime Prevention: Reconsidering the Prospect of Sanction*. London, United Kingdom: Routledge.
- Knepper, P. (2012). An international crime decline: Lessons for social welfare crime policy. *Social Policy and Administration* 46(4): 359–376.
- Lamb, G. (2018) SAPS stuck in vicious cycle of crackdown policing,
<https://www.news24.com/Columnists/GuestColumn/squeeze-stamp-stabilise-saps-vicious-cycle-of-crackdown-policing-20180611>, accessed 25 June 2018.
- Lee, Y-J., Eck, J.E., O, S. and Martinez, N.N. (2017) How concentrated is crime at places? A systematic review from 1970 to 2015. *Crime Science* 6: 6 <https://doi10.1186/s40163-017-0069-x>

- Liu, D., Song, W. and Xiu, C. (2016) Spatial patterns of violent crime and neighborhoods characteristics in Changchun, China. *Australian and New Zealand Journal of Criminology* 49(1): 53-72.
- Martinez, N.N., Lee, Y-J., Eck, J.E. and O, S. (2017) Ravenous wolves revisited: A systematic review of offending concentration. *Crime Science* 6:10
<https://doi10.1186/s40163-017-0072-2>.
- Mazeika, D.M. and Kumar, S. (2017) Do crime hot spots exist in developing countries? Evidence from India. *Journal of Quantitative Criminology* 33(1): 45-61.
- O'Regan, C., Pikoli, V., Bawa, N., Sidaki, T. and Dissel, A. (2014) Towards a safer Khayelitsha: The report of the commission of inquiry into allegations of police inefficiency and a breakdown in relations between SAPS and the community in Khayelitsha, <http://www.khayelitshacommission.org.za/>, accessed 22 February 2018.
- Olivier, B. (2014) Crime: There is something rotten in the state of South Africa. Retrieved 31 March, 2017 from <http://thoughtleader.co.za/bertolivier/2014/10/27/crime-there-is-something-rotten-in-the-state-of-south-africa/>.
- Pinnock, D. (1984) *The Brotherhoods: Street Gangs and State Control in Cape Town*. Cape Town, South Africa: David Philip.
- Pinnock, D. (2016) *Gang Town*. Cape Town, South Africa: NB Publishers.
- Ratcliffe, J.H. (2016) *Intelligence-Led Policing* (2nd edition). London: Routledge.
- Rautenbach, A. (2013) Crime fiction in South Africa: The history, the hype and the “genre snob” debate, <http://www.litnet.co.za/crime-fiction-in-south-africa-the-history-the-hype-and-the-genre-snob-debate/>, accessed 22 February 2018.
- Rosser, G., Davies, T., Bowers, K.J., Johnson, S.D. and Cheng, T. (2017) Predictive crime mapping: Arbitrary grids or street networks? *Journal of Quantitative Criminology* 33(3): 569-594.

- Sherman, L.W., Gartin, P.R. and Buerger, M.E. (1989) Hot spots of predatory crime: Routine activities and the criminology of place. *Criminology* 27(1): 27–55.
- Sherman, L.W. and Eck, J.E. (2002) Policing for prevention. In: L.W. Sherman, D. Farrington, B.C. Welsh, and D.L. MacKenzie (eds.), *Evidence Based Crime Prevention*. New York: Routledge, pp. 295-329.
- South African Police Services. (2017) SA Crime stats, <https://www.saps.gov.za/services/crimestats.php>, accessed 22 February 2018.
- Statistics South Africa. (2011) *Main place*, http://www.statssa.gov.za/?page_id=4286&id=328, accessed 22 February 2018.
- Super, G. (2016) Volatile sovereignty: Governing crime through the community in Khayelitsha. *Law & Society Review* 50(2): 450-483.
- Telep, C.W. and Weisburd, D. (2016) Policing. In: D. Weisburd, D.P. Farrington and C. Gill (eds.), *What Works in Crime Prevention and Rehabilitation: Lessons From Systematic Reviews*. New York: Springer, pp. 137-168.
- Telep, C.W., Weisburd, D., Gill, C., Vitter, Z. and Teichman, D. (2014). Displacement of crime and diffusion of crime control benefits in large-scale geographic areas: A systematic review. *Journal of Experimental Criminology* 10(4): 515–548.
- Tseloni, A., Mailley, J., Farrell, G. and Tilley, N. (2010) Exploring the international decline in crime rates. *European Journal of Criminology* 7(5): 375–394.
- Turner, F. (2013) City says violence prevention efforts working, but activists sceptical, <https://www.groundup.org.za/article/city-says-violence-prevention-efforts-working-activists-sceptical/>, accessed 25 June 2018.
- van Dijk, JJM, Tseloni, A, & Farrell, G (Eds.). (2012) *The International Crime Drop: New Directions in Research*. Basingstoke: Palgrave Macmillan.

- Victims of Crime Survey. (2017). Statistics South Africa,
http://www.statssa.gov.za/?page_id=1854&PPN=P0341, accessed 25 June 2018.
- Weisburd, D. (2015) The law of crime concentration and the criminology of place.
Criminology 53(2): 133–157.
- Weisburd, D.L., and Eck, J.E. (2004). What can police do to reduce crime, disorder, and fear?
The ANNALS of the American Academy of Political and Social Science 593(1): 42–65.
- Weisburd, D., Bushway, S., Lum, C. and Yang, S-M. (2004) Trajectories of crime at places:
 A longitudinal study of street segments in the City of Seattle. *Criminology* 42(2): 283–
 322.
- Weisburd, D., Morris, N.A. and Groff, E.R. (2009) Hot spots of juvenile crime: A
 longitudinal study of street segments in Seattle, Washington. *Journal of Quantitative
 Criminology* 25(4): 443–467.
- Weisburd, D., Groff, E.R. and Yang, S-M. (2012) *The Criminology of Place: Street Segments
 and our Understanding of the Crime Problem*. New York: Oxford University Press.
- Weisburd, D. and Amram, S. (2014) The law of concentrations of crime at place: the case of
 Tel Aviv-Jaffa. *Police Practice and Research* 15(2): 101–114.
- Weisburd, D., Farrington, D.P. and Gill, C. (2017) What works in crime prevention and
 rehabilitation: An assessment of systematic reviews. *Criminology & Public Policy* 16(2):
 415-449.
- Western Cape Provincial Government. (2013) Regional Development Profile City of Cape
 Town, https://www.westerncape.gov.za/.../dc0_city_of_cape_town_ke_6_dec_2013.pdf,
 accessed 22 February 2018.
- Western Cape Provincial Government. (2015) Crime Stats 2015 – Khayelitsha violent crimes
 still a threat to safety, [https://www.westerncape.gov.za/news/crime-stats-2015-
 %E2%80%93-khayelitsha-violent-crimes-still-threat-safety](https://www.westerncape.gov.za/news/crime-stats-2015-%E2%80%93-khayelitsha-violent-crimes-still-threat-safety), accessed 22 February 2018.