

# How efficiently can we target prolific offenders?

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## ABSTRACT

*This report looks at the magnitude of crime perpetrated by the most active offenders in a particular police area and places it in the context of a research programme which seeks to integrate and render locally useful the major findings of applied criminology. The results are contrasting. In terms of all crime, the group of offenders nominated did not appear to contribute substantially to levels of crime. The level of burglary did not bear any relationship to the availability of nominated burglars. The volume of vehicle-related crime (unlawful taking, theft of and theft from a*

*motor vehicle) did vary according to the number of nominated offenders available.*

*Breaking down to neighbourhood level, only one area displayed a relationship between levels of vehicle crime and the availability of nominated offenders to commit crime. Furthermore, there was some evidence that this group accounted for a component of other crime types, namely burglary and criminal damage. Two areas failed to produce any meaningful relationship between nominated offenders and crime levels.*

*The results have major implications for the mechanism used to nominate prolific offenders and the resources used to target such individuals. It is argued that refinement and local application of the kinds of analysis described here would be of great utility in shaping offender-targeting practices.*

## INTRODUCTION

Applied criminological research has converged in the last 20 years or so to yield three robust conclusions:

- crime is highly concentrated in terms of place (see, eg, Hirschfield and Bowers, 2001);
- a disproportionate amount of crime is experienced by a small segment of the population (see, eg, Farrell and Pease, 1993) and;
- a small proportion of offenders commits a large component of crime (see, eg

Blumstein, Cohen, Roth and Visser, 1986).

While these assertions are incontestable in the aggregate, their usefulness has been limited as a result of the neglect of two things:

- the linkages obtaining between the three basic assertions;
- demonstration of the useful applicability of the three assertions in local contexts.

The research strategy, which informs the work of the present authors, calls for advance on both fronts. While the empirical work reported in this brief paper is restricted to the second category of neglect of the third assertion, the strategic context will be touched upon here.

### **HOT SPOTS, CHRONIC VICTIMS AND PROLIFIC OFFENDERS**

Some recent research has begun to clarify the associations between the three assertions. Johnson, Bowers and Hirshfield (1997) showed the association between areal hot spots and chronic victimisation of the same households. Everson (2000) outlines the linkage between prolific offenders and repeatedly victimised households, and Gill and Pease (1998) between prolific robbers and repetition of offences against the same target. The operational police significance of this line of work lies in optimising deployment of policing and community safety resources. If, for example, hot spots are hot because of rates of repeat victimisation within them, policing and community safety actions are prudently directed towards victimised individuals or households within hot spots. In so far as hot spots are hot because of high rates of one-off victimisations, analyses of structural aspects of place have priority. If repeat victimisation against the same individual targets is the

work of prolific offenders, as Everson's work and that of Matthews, Pease, and Pease (2001) suggest, detection of repeat victimisations allows prolific offenders to self-select, ie detection resources applied to previously victimised places or people would yield disproportionate benefit. Such an approach has the additional advantage of avoiding the potentially oppressive targeting of individual offenders.

### **THE LOCAL DEMONSTRATION OF GENERAL TRUTHS**

To what extent do the three general assertions inform local policing in the UK? Many forces have mapping facilities which permit spatial hot-spotting. One can be sceptical of the usability of many of the resulting maps (Townsend and Pease, 2002), although attempts to use such maps optimally have been made (see, eg, Chainey, 2001). Many forces claim to have put repeat victimisation research to work (Laycock, 2000), but one may be sceptical of the generality of this, given the persistently poor capacity of police crime-recording systems to identify repeat victimisation (Pease, 1998). The insight that a minority of offenders commits the majority of offences is already routinely reflected in policing practice, although one may be excused for thinking this results from its direct recognition by police officers, rather than having been gleaned from the criminological literature. This recognition is reflected in the regular compilation of lists, as police targets, of offenders judged particularly active. The practice is widespread, and the research briefly reported here assesses one basic command unit in one police force area.

### **HOW USEFUL IS LOCAL OFFENDER TARGETING?**

The focal issue here concerns whether the general observation that a minority of

offenders commits a majority of offences is translated into *local* crime reduction associated with the incapacitation of nominated prolific offenders. If there is such a reduction, offender targeting as currently practised is well founded. If it is not, alternative means of offender targeting, such as offender self-selection as described above, becomes more attractive.

The practice whereby police officers nominate prolific offenders may be imperfect for four basic reasons

- the offenders selected for targeting are not prolific;
- offenders not selected for targeting are prolific;
- offenders' rates of offending vary across time;
- rates of co-offending are high, so that the imprisonment of one of three people who offend together will have little effect in so far as his co-offenders continue in his absence.

The way we chose to test the issue involved determining how many days per month each of these nominated offenders was free and how many were spent incarcerated (ie unable to commit offences). For example, if 10 offenders are nominated during a particular calendar month, their aggregate days of freedom will vary between zero (all nominated offenders locked up throughout the month) and 280–310 (no nominated offender locked up, the range of numbers corresponding to the number of days in the month concerned). Months with greater amounts of imprisonment should exhibit lower levels of crime. The shape of the curve linking the two variables is of interest. In principle, it can reveal the number and proportion of all offences committed by other than targeted offenders, as well as the number of offences each offender-day of liberty costs the community.

In an exploratory unpublished study in West Yorkshire, concentrating on domestic

burglary, the data were presented as in Figure 1.<sup>1</sup> This shows that, in the small area investigated, the number of monthly burglaries per burglar at large was consistently around five, suggesting that each month of freedom of the average nominated burglar 'cost' the area five burglaries. Readers surprised at the smallness of this number of burglaries should be aware that the area was small, and active burglars within the area would also be active on its margins, thus raising the total number of prevented burglaries. A more superficial study of a larger area showed monthly prevented burglaries per incarcerated nominated offender to run at three times this level.

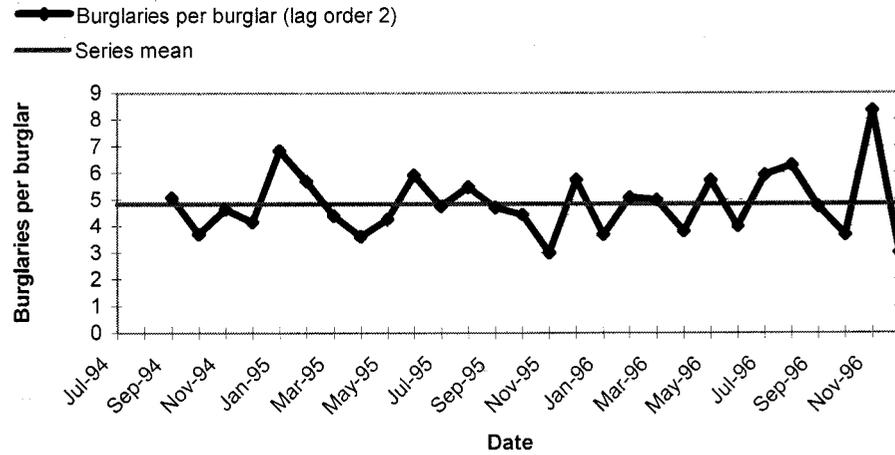
The West Yorkshire exploratory study provides 'proof of concept'. The present paper takes the work further.

The study site is a police basic command unit within an English police force. For the purposes of anonymity it will be referred to as Sector A, comprising sub-areas A-D.

## DATA

Active offenders were nominated by police intelligence officers: burglars ( $N=13$ ) and auto offenders ( $N=33$ ).<sup>2</sup> Arrest dates, remand type and dates and custodial sentences were scrutinised. We looked at this information, alongside crimes recorded, for the period 1 January 2000 to 1 October 2001 — 19 months in all. This information was not easily obtained. There did not seem to be a consistent opinion as to which of the various information systems would be the most appropriate to use. Part of this invariably is a result of the overlapping advantages and disadvantages of each system. For example, the in-house crime recording system is very good for offences committed within the force jurisdiction, but does not contain information on offences committed elsewhere. The Police National Computer (PNC) contains offences within and without force boundaries,

Figure 1  
Burlaries per burglar at  
large July 1994–Dec  
1996



but a time lag exists for PNC. It was decided to use the in-house information system as it contained information on court appearances, bail conditions and sentencing not present in PNC.

The time taken to collect the data was substantial. The systems used were never designed for large extractions of data and needed to be interrogated case by case. In many cases this meant viewing and recording details of every screen of each charge. Very few of the nominated individuals had been arrested fewer than ten times and it was not uncommon for successive adjournments to prolong the court process by several months. The point here is that while the police, Youth Offending Teams (YOTs) and the courts are interested in this type of work there are currently few resources for intensive data collection.

**METHOD**

The remainder of the analysis is performed as follows: for each month, two quantities are calculated, the number of days offenders spent at liberty and the number of applicable crimes committed. This was completed for each month and for each crime type (all crime, burglary, Theft of Motor Vehicle

(TOMV), Unlawful Taking of Motor Vehicle (UTMV), Theft From Motor Vehicle (TFMV)) for each applicable offender group (burglary and autocrime). For the purposes here we treated remand on bail in the same way as days at liberty, but this will change in later analyses.

Once every month was calculated, a scattergram was plotted to display the relationship between the amount of liberty and the volume of crime. The nature of this relationship was quantified by calculating a line of best fit between the two variables.

**RESULTS**

The first scattergram contains the result of all crime in Sector A versus all nominated offenders' liberty.

Each point represents a month, and its position corresponds to the amount of freedom experienced by the entire group of 46 nominated offenders and the level of crime recorded in that particular month. Figure 2 is thus a summary of the crime-liberty link over the period in question.

The line of best fit has a gradient close to zero, indicating that the liberty of the people nominated does not unduly influence crime volume. In other words, the level of

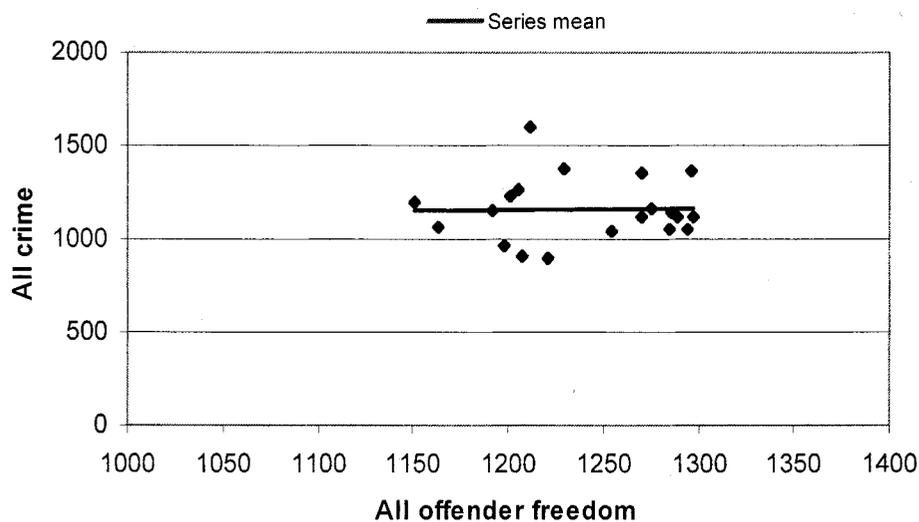


Figure 2  
All offenders' freedom  
compared to overall  
crime level

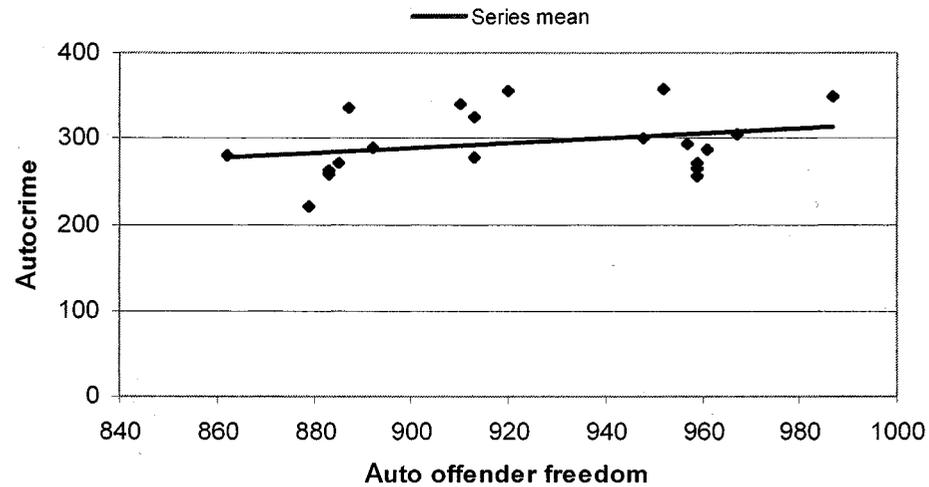
crime seems independent of their availability to offend. To express this differently, the equation for the line of best fit tells us that if all 46 individuals were to be in custody for an entire month, the crime level would be 1,038 recorded crimes. On the other hand, if all 46 were out and about for an entire month, the crime level would be approximately 1,177 offences. This assumes that the line of best fit is precise, an overly optimistic view given the scatter. Clearly factors other than the liberty of the nominees are important in driving crime rates.

Repeating the analysis for nominated burglars only (Figure 3), there is similarly little indication that the nominated burglars contribute disproportionately to burglary levels. The gradient of the line of best fit is flat, indicating that the incarceration of these individuals has little impact on the level of burglary. Using the equation of the line of best fit as a guide, if all 13 were locked up for a month, about 160 burglaries would be recorded. If these people were all free for an entire month, we would expect about 170 burglaries to be recorded, a contribution of about 6 per cent by 13 individuals.

Figure 3 shows the relationship between nominated autocrime offender availability and the level of vehicle crime (meaning all TOMV, UTMV and TFMV incidents). The results for autocrime offenders are different from the burglary and aggregate pictures. There is a positive gradient for this scattergram, the magnitude of which indicates that an offence will be committed for every three days each offender is free. The impact of this on overall figures is dramatic. If the 33 nominated offenders were locked up for a month, the number of vehicle crimes recorded in Sector A would be just under 30 — for an entire month. At the other end of the spectrum, if each of those individuals were out and about for the whole 30 days, the total number of vehicle crimes would exceed 300 per month, a massive 90 per cent contribution by 33 individuals.

The fact that 90 per cent of Sector A's vehicle crime is possibly attributable to 33 individuals should be treated with caution. This is probably an overestimate of the total effect because the range of offender freedom days is 860 to 990 days, a small component (approximately 13 per cent) of the

Figure 3  
All autocrime offenders' freedom compared to vehicle crime level



1,007 days that is maximally possible. If a greater range offender liberty were available, the estimates of the nominated group's impact would be considerably more accurate. In addition, the 90 per cent estimate is based on extrapolating the line of best fit well outside the range of the data used to produce the linear regression estimates.

One contributory factor in the narrow offender liberty range may be that three-quarters of nominated autocrime offenders were aged less than 18, a stumbling block in terms of custodial sentencing. In very few instances were offenders sentenced to secure accommodation, despite 'failing to appear' being a common feature of the court process. Individuals with a history of bail absconding or arrested on a warrant were frequently remanded on bail. Given the lack of remand in custody and custodial sentences for autocrime offenders, it is remarkable that their contribution to vehicle crime levels is as high as it is.

The line of best fit in Figure 3 does not appear to describe the data well. The considerable variation in crime levels (and the lack of it for offender freedom) may produce a line of best fit that is poor.<sup>3</sup> In other words, the 90 per cent contribution by the

nominated offenders is almost certainly overstating the case. It is a quirk of the method and the data that has produced this figure. While it is difficult to be precise about the size of the nominated offender contribution, it is unlikely that their impact would be anything but substantial.

To investigate further, we decided to take each of the sub-areas that nominated offenders (sub-area A, sub-area B and sub-area C) and examine offender-crime relationships. Due to data issues, only 2001 crime data were available; we aggregated to the week. In other words, the amount of offender freedom and crime per week were calculated for the three neighbourhoods.

Correlations were computed for a variety of crime types to determine whether offender freedom was related to crime level.

Table 1 shows some interesting findings. The amount of freedom of sub-area C's nominated offenders appears to have a negative relationship with levels of crime (except for criminal damage). This means that as offender freedom increases, the level of crime goes down — clearly conflicting with the premise of prolific offending.

In sub-area B, the freedom of auto offenders has mixed correlation scores. For some

**Table 1: Correlations for offender availability vs crime levels<sup>a</sup>**

<i>Crime type</i>	<i>Sub-area A offender freedom</i>	<i>Sub-area B offender freedom</i>	<i>Sub-area C offender freedom</i>
Stolen cars <sup>b</sup>	0.306	-0.002	-0.055
TFMV	0.169	0.141	-0.353
Burglary	0.110	-0.033	-0.235
Criminal damage	0.185	0.063	0.169
Violence	0.127	-0.095	-0.131
Theft	-0.129	-0.240	-0.315
Total vehicle crime <sup>c</sup>	0.241	0.064	-0.341

Notes: a Crime levels used pertain to sub-areas only

b TOMV + UTMV

c Stolen cars + TFMV + veh. interf. + crim. dam. of veh. + dangerous driving

crime types — stolen cars, burglary, violence and theft — a negative score was calculated and for others — TFMV, criminal damage and total vehicle crime — the score was positive. While consistent scores were not necessarily expected, some associated crimes — stolen cars and TFMV — displayed opposite signs.

Sub-area A was the exception. Apart from the crime classification of theft, all crime types displayed positive correlations. This means that if the group of nominated offenders were taken off the street for a period of time, reductions in virtually all crime types would occur.

To summarise Table 1, it appears that sub-area C and sub-area B's nominated offenders do not account for a disproportionate amount of crime. This probably means they do not represent the most prolific offending group for these areas or that they commit crimes outside their neighbourhood. On the other hand the offenders nominated for sub-area A do account for a non-trivial amount of crime, particularly vehicle crime offences, which makes sense given they were nominated as vehicle crime offenders.

To quantify the amount of crime nominated offenders in sub-area A contribute to that area's crime, a similar approach to the aggregate example was used. We determined the line of best fit and calculated the level of crime at the extremes of offender availability (absolute freedom and absolute incarceration). The results are presented in Table 2.

The first column of Table 2 is the number of days of liberty per offender per week that would result in the increase/decrease of the associated crime type by one — calculated as the reciprocal of the gradient of the line of best fit. In other words to reduce the incidence of stolen cars by one, one member of the nominated list would need to be made unavailable to commit crime for just under two days (1.68).

The second column of Table 2 shows the magnitude of each crime type the nominated group account for based on the extremes of availability. This was calculated using the line of best fit and the extreme points of the days of liberty. For four of the five crime types, the volume of crime at absolute incarceration was negative — a situation that does not translate in reality. In these cases we have assumed that the entire

**Table 2: Impact of nominated offender group on sub-area A's level of crime**

<i>Crime type</i>	<i>Number of liberty days/ offender/week required to alter by one offence</i>	<i>Percentage of crime attributed to nominated offender group</i>	<i>R<sup>2</sup> statistic</i>
Stolen cars	1.68	100	0.094
TFMV	3.29	100	0.029
Burglary	7.35	56	0.012
Criminal damage	3.82	100	0.034
All vehicle crime	0.95	100	0.058

crime problem is influenced by the availability of the nominated group. It seems likely that the nominated group does contribute a substantial volume of crime in sub-area A. For similar reasons to those listed in the aggregate picture, the impact of this set of individuals on crime levels is overstated.

The last column is the percentage of the data that is described by the line of best fit. These scores indicate how reliable the line of best fit is for predicting changes in crime levels based on changes in offender availability. Generally speaking, the line of best fit does not perform well. The best score was for stolen cars (0.094), but its magnitude could not be considered substantial. This suggests that, while there is a relationship, the calculations in the first and second columns of Table 2 have wide margins of error.

Several qualifiers about the results are in order. The trend of overstating the impact of the nominated group has been discussed previously. The method employed here does not allow for: (a) individuals who reside outside the sector but commit offences within, (b) the fact that time-at-liberty scores were calculated using in-house information sources so that the impact of nominated individuals going away on holiday, say, was not accounted for, (c) offenders who have never been convicted or subject to incarceration and (d) co-offending (the

crime rate of the group may not be influenced by a member's absence).

## CONCLUSIONS

It has been shown that, in the main, there is little evidence that the group of nominated individuals contributes disproportionately to the level of crime in Sector A. The autocrime offenders nominated from sub-area A are the exception. The obvious next step is to try to identify the most prolific offenders in an empirical manner. In practice this would involve determining which group of people from the universe of offenders contribute most to the level of crime while at liberty. An algorithm could be developed that includes or excludes particular individuals based on how closely their liberty coincides with high crime levels.

Clearly offender targeting in most of the area studied, for crime generally and for burglary, is imperfect. The approach taken here, it is argued, should become a matter of routine to see how much we can improve targeting. Becoming a police target is not a matter to be taken lightly, and there is a strong argument that it be done as fairly and as sparingly as is consistent with the aims of crime reduction and the preservation of human rights. It may be that, even when optimised, offender targeting is intrinsically crude. We believe that the work reported

here should be developed, but that, in parallel, alternative methods of targeting, involving the selection for targeting of circumstances associated with prolific offenders (offender self-selection) should be sought.

#### NOTES

- (1) Professor Graham Farrell, University of Cincinnati, collaborated in this research.
- (2) The numbers of nominated individuals were arrived at thus: the intelligence officers nominated 13 burglars. Auto-crime offenders were nominated roughly ten each for sub-area A, sub-area B and sub-area C, with an extra three for sub-area B. Sector A has a relatively small burglary problem compared to vehicle crime.
- (3) The  $R^2$  score reveals that this is true. The line of best fit only accounts for about 8% of the variation. A better score (13%) was achieved for TOMV vs autocrime offender freedom, but this is still quite low.

#### REFERENCES

- Blumstein, A., Cohen, J., Roth, J. A., & Visher C. A. (1986). *Criminal Careers and Career Criminals*. Washington DC: National Academy Press.
- Chainey, S. (2001). Combating Crime through Partnership: Examples of Crime and Disorder Mapping Solutions in London, UK. In A. Hirschfield and K. Bowers (Eds), *Mapping and Analysing Crime Data: Lessons from Research and Practice*. London: Taylor and Francis.
- Everson, S.P. (2000). *Repeat Offenders and Repeat Victims: Mutual Attraction or Misfortune?* Unpublished PhD thesis, University of Huddersfield.
- Farrell, G., & Pease, K. (1993). *Once Bitten, Twice Bitten: Repeat Victimization and Its Implications for Crime Prevention*. Crime Prevention Unit Paper 46. London: Home Office.
- Gill, M., & Pease, K. (1998). Repeat Robbers: How Are They Different? In M.Gill (Ed.), *Crime at Work: Studies in Security and Crime Prevention*. Leicester: Perpetuity Press.
- Hirschfield, A., & Bowers, K. (Eds.). (2001). *Mapping and Analysing Crime Data: Lessons from Research and Practice*. London: Taylor and Francis.
- Johnson, S.D., Bowers, K., & Hirschfield, A. (1997). New Insights into the Spatial and Temporal Distribution of Repeat Victimization. *British Journal of Criminology*, 37, 224–241.
- Laycock, G. (2000). Hypothesis-based Research: The Repeat Victimization Story. *Criminal Justice: The International Journal of Justice and Policy*, 1, 59–82.
- Matthews, R., Pease, C., & Pease, K. (2001). Repeated Bank Robbery: Theme and Variations. In G. Farrell and K. Pease (Eds) *Repeat Victimization*. Monsey NY: Criminal Justice Press.
- Pease, K. (1998). *Repeat Victimization: Taking Stock*. Crime Detection and Prevention Paper 90. London: Home Office.
- Townesley, M., & Pease, K. (2002). Hot Spots and Cold Comfort: The Importance of Having a Working Thermometer. In N. Tilley (Ed.), *Analysis for Crime Prevention*. Monsey NY: Criminal Justice Press.