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WHAT IS DIFFERENT ABOUT HIGH CRIME AREAS?

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This note reports secondary analysis of the 1982 British Crime Survey. It ranks sampling points by total crime experienced, and identifies differences between high and low crime areas. These differ in 'vulnerability', measured as the ratio of crimes to victims. This reveals that the number of victimizations per victim rises markedly as area crime rate increases. Thus a strategy of crime prevention which concentrated on the prevention of repeat victimization would focus on the most vulnerable people and places.

Some areas are chronically high in crime incidence. This is one of the original and enduring issues in criminology. Looked at in terms of offenders, high crime incidence may be attributed to a lot of offenders committing a few crimes each, or a few offenders committing many crimes each. An appropriate penal strategy depends upon knowing which applies. For example, the observation that a few offenders are responsible for many crimes has meant that incapacitation has been considered as a potentially attractive strategy (see Cohen 1986).

Just as a crime rate can be considered from a perspective which concentrates on offenders and their appropriate disposition, so it can be considered in terms of victims. Defining prevalence as the proportion of people who become victims and vulnerability as the number of victimizations per victim, then an area's crime incidence is a product (literally, in the arithmetical sense) of crime prevalence and vulnerability. In other words, just as an area may suffer much crime because of a few very active offenders or many less active offenders, so an area may suffer much crime because many people become victims once or because a few people are repeatedly victimized.

Knowing the reason for the differences between areas is of crucial importance for crime prevention strategy. Take two simple extremes: if high crime areas are so because the proportion of residents who become victims of crime is high, the problem of crime prevention is predominantly that of attempting to prevent a non-victim from becoming a victim. If high crime rates occur because of repeat victimization, crime prevention should correspondingly focus on preventing people who have already been victimized from being victimized again. In many ways, the latter is a less daunting prospect, notably because crime prevention effort may be focused on a smaller proportion of people and places.

Recognition of the phenomenon of multiple victimization and its significance for crime prevention strategy has developed over the last fifteen years (see Sparks *et al.* 1977; Sparks 1981; Forrester *et al.* 1988; Barr and Pease 1990). Yet the question of how

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multiple victimization contributes to area differences has not, to the authors' knowledge, been posed in the way in which we seek to do it here. This is not to say that there has been little secondary analysis of victimization surveys, and in particular the British Crime Survey; there has been a good deal. Previous analysis has concentrated on the role of personal or area characteristics, including lifestyle indicators (Gottfredson 1984; Hope and Hough 1988; Maxfield 1987*a*, *b*; Sampson and Groves 1989). The matter which we deal with is the simple, related, but separable one of the relative contributions that victim prevalence and repeat victimization make to area differences in crime experience. We report below a descriptive decomposition of area crime incidence, together with some statistical analysis, with the purpose of clarifying that issue.

Method

Data are taken here from the 1982 British Crime Survey[1] (see Hough and Mayhew 1983, Wood 1983). The 1982 Survey had an effective sample of 10,905 adults in England and Wales, interviewed between February and April 1982. Within the main questionnaire of the Survey, screening questions identified crime victimization experience since January 1981. Those questions catalogued all such experience to determine whether more detailed questions on crimes experienced should be asked using a 'victim form'. The screening questions are ideal for our purposes. They provide a convenient summary of all crime said to have been suffered, rather than the somewhat reduced set which is represented in the victim form of the Survey.[2]

Sampling took place in 238 of the 552 parliamentary constituencies in England and Wales (see Wood 1983). Metropolitan inner-city areas were deliberately over-sampled; otherwise constituency selections were made systematically with probability proportional to electorate. Within the selected constituencies, in one half of cases a ward was selected with probability proportional to electorate; in the second half two polling districts were selected, again with probability proportional to electorate. Every nth address of an elector was selected, starting from a random number less than n, to yield a total of sixty addresses per ward and thirty addresses per polling district. Within each address, the interviewee was chosen in effect randomly from among those aged 16 or over who were resident there.

The unit of analysis in what follows is a sampling point, of which there were 358. Each of these comprised either a ward or a polling district. For the present purposes, none of the weighting procedures devised for the Survey was employed. The implications of this will be discussed towards the end of this paper.

Area crime rates were considered in three forms: total crime, personal crime, and property crime. Personal crime here consists of those incidents where the victim came into direct contact with the criminal. By this definition, thefts from the person are classified as personal crime; however, thefts of, or damage to, unattended personal possessions are classified as property crimes. Attempted crimes are included.

In what follows, the incidence rate is the number of crimes reported divided by the

[1] At the time of writing, similar analyses are being undertaken of the 1984 Survey and plans are in hand to repeat the study from the 1988 Survey.

[2] Not all crimes committed against a victim were recorded on the victim forms. This was partly because a maximum of four victim forms were completed per respondent (although one form can refer to a 'series' of incidents). Some alleged incidents may be discounted in the victim forms due to inconclusive evidence as to whether a crime actually occurred.

number of respondents: in other words, it is the average number of crimes per respondent. The number of crimes has been obtained by a simple aggregation of the numbers of occurrences reported by respondents in the main questionnaire. However, milk stolen from outside a dwelling has been omitted from our analysis.

The prevalence rate is the proportion of respondents victimized once or more. Finally, vulnerability is the number of crimes reported, on average, by each victim.

Based on total crime reported, sampling points were ranked from the one with the lowest crime incidence to the one with the highest. To obtain groupings of sampling points large enough to enable significant conclusions to be drawn, ranked sampling points were split into deciles, i.e. the 10 per cent of areas with the lowest total crime incidence, the 10 per cent with the next lowest, and so on up to the 10 per cent with the highest. All subsequent analysis was carried out by aggregating information to the decile level. Hereafter, whenever we refer to area, our figures are based on this decile aggregation.

Descriptive Results

The first, perhaps unsurprising, result was that the ordering of deciles for total crime was precisely reflected in the ordering for property crime and almost exactly for personal crime. The latter result is more notable, since personal crime is less common than property crime.

Taking the lowest decile as a base with a value of 100, Figure 1 presents the incidence rates in each decile for crimes against property and against the person separately. Re-scaling to a base of 100 has been undertaken to facilitate comparisons. The incidence of

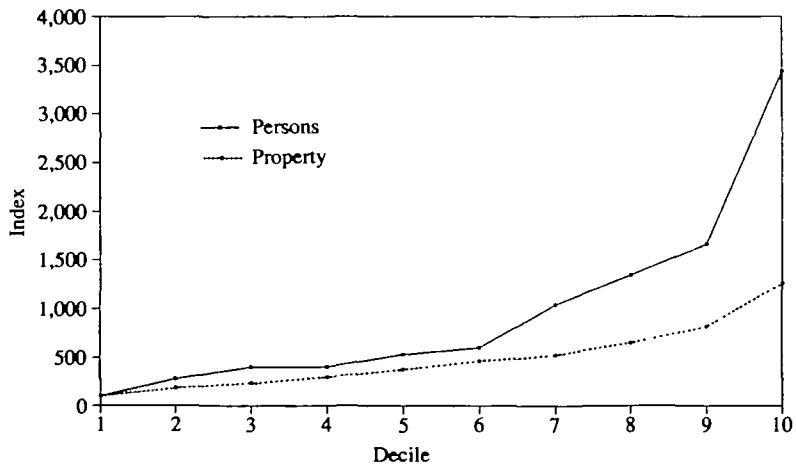

FIG. 1 Incidence of crime (base: decile 1 = 100)
Source: British Crime Survey 1982.

property crime exhibits approximate linearity up the seventh decile, after which the upward trend becomes steeper, in particular between the ninth and tenth deciles. Crime against the person increases more steeply from the sixth decile, dramatically so between the last two deciles. How that high incidence is reached in terms of prevalence versus vulnerability is a central question to be addressed.

The pattern is presented in the way judged to be most visually accessible in Figures 2 and 3. Again taking the lowest decile as 100, the two figures present the increase in prevalence and vulnerability respectively. (The reader's attention is drawn to the vertical scales of the two figures: different scales have been used to accommodate the differing rates of increase in prevalence and vulnerability over deciles.)

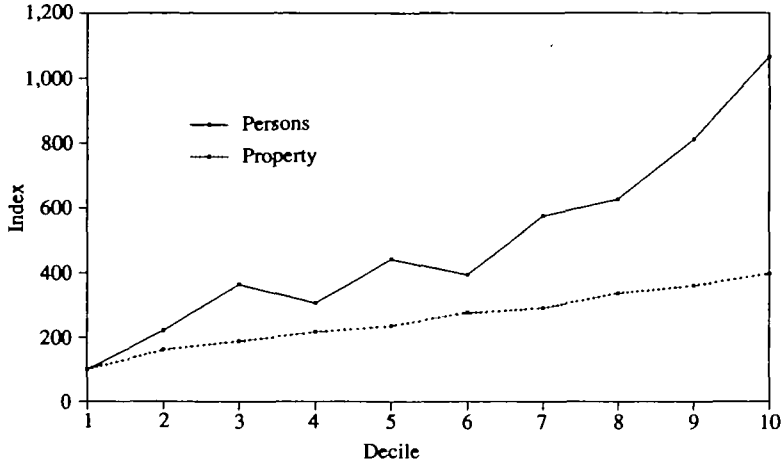

FIG. 2 Prevalence (base: decile 1 = 100)
Source: British Crime Survey 1982.

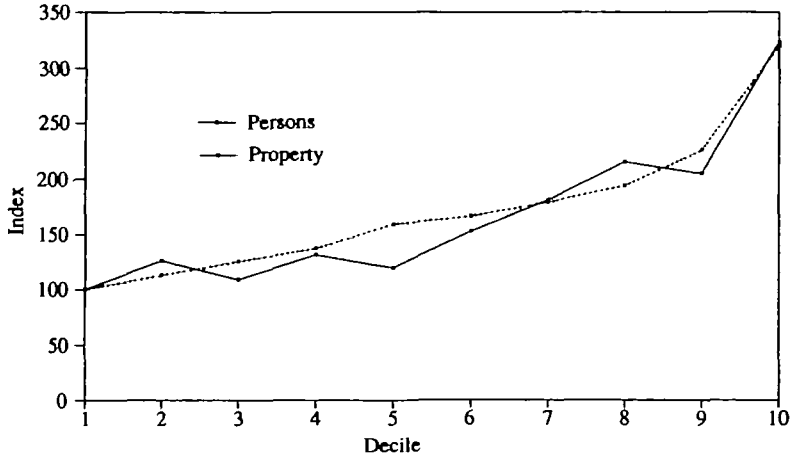

FIG. 3 Vulnerability (base: decile 1 = 100)
Source: British Crime Survey 1982.

The feature which emerges most dramatically from Figure 2 concerns the prevalence of offences against the person. This is around eleven times as large in the worst (highest) decile than in the best (lowest) decile. Making the same comparison for property crimes, prevalence is around four times as large. The vulnerability of victims with respect to both personal and property offences is slightly more than three times as high in the worst as in the best area (see Figure 3). In other words, when people are victimized, they experience about three times as many crimes on average in the highest crime areas compared to the lowest.

Returning briefly to Figure 1, the values there represent the multiplicative interaction of prevalence and vulnerability. Thus, for example, the incidence rate for personal crime in the highest crime decile is more than 34 times that of the lowest. Figures 2 and 3 decompose this, with prevalence being about eleven times and vulnerability about three times the low crime area rate. On the other hand, prevalence and vulnerability make roughly equal contributions to the less dramatic increase in property crime incidence demonstrated in Figure 1.

The most prominent distinguishing characteristic of the high crime area when compared with the low crime area, therefore, is the relatively widespread extent of personal victimization. While property crime gets worse in the high crime area, what gets very much worse is the probability of any citizen falling victim to a personal crime. More specifically, a person is about four times as likely to experience one or more property crimes in the highest crime area compared to the lowest; they are, however, about eleven times as likely to be a victim of personal crime. This is, of course, not to say that the likelihood of falling victim to a personal crime is as high as the likelihood of experiencing a property crime. It is not. But neither is it to say that the pattern observed means that multiple victimization is not extensive enough to allow for focused crime prevention efforts.

Statistical analysis

As already discussed, Figures 2 and 3 show observed prevalence and vulnerability by decile. These values are reported once again in Tables 1 and 2; here, however, they are not re-scaled to a base of 100. In addition, these tables present expected prevalence and vulnerability figures for all areas. Expected prevalence represents the anticipated proportion of people who would be victims if the victim of each crime were selected randomly. Expected vulnerability is then obtained as the average number of crimes that the randomly chosen victims would experience. Both of these expected values take the number of crimes in a decile, and hence the incidence, as given. Note that since the expected vulnerability figures are derived from the expected prevalence ones, we apply a statistical test for the difference between observed and expected only to the prevalence rates. (Statistical details are contained in the appendix.)

We find that observed and expected prevalence rates differ significantly from each other for almost all deciles, and do so more dramatically the worse the crime experience of the area. That is, consistently fewer people are victimized than would be anticipated if crime were random; indeed, as a proportion of the expected prevalence, the actual rate tends to decrease as the crime rate rises. Since the incidence rate is taken as given for this analysis, fewer victims implies that those victimized must suffer crime more

TABLE 1 *Actual and Expected Value Comparisons: Property Crimes*

Decile group	Prevalence			Vulnerability	
	Observed	Expected	*p*-value	Observed	Expected
1	0.1286*	0.1500	0.0270	1.2632	1.0830
2	0.2065**	0.2559	0.0001	1.4313	1.1545
3	0.2409**	0.3177	0.0000	1.5866	1.2028
4	0.2784**	0.3833	0.0000	1.7353	1.2605
5	0.2999**	0.4522	0.0000	2.0060	1.3304
6	0.3548**	0.5252	0.0000	2.0986	1.4176
7	0.3741**	0.5707	0.0000	2.2591	1.4809
8	0.4315**	0.6520	0.0000	2.4447	1.6181
9	0.4618**	0.7325	0.0000	2.8538	1.7993
10	0.5085**	0.8714	0.0000	4.0314	2.3524

Notes:
1. The *p*-value relates to testing whether or not the actual prevalence rate is significantly different from that expected under random victimization.
2. * denotes significantly different from expected at the 5 per cent, but not the 1 per cent level. ** denotes significantly different from expected at the 1 per cent level.
3. Significance tests are applied only to prevalence rates; see text for discussion.

TABLE 2 *Actual and Expected Value Comparisons: Personal Crimes*

Decile group	Prevalence			Vulnerability	
	Observed	Expected	*p*-value	Observed	Expected
1	0.0164	0.0192	0.2614	1.1765	1.0092
2	0.0362*	0.0524	0.0100	1.4865	1.0267
3	0.0596	0.0738	0.0314	1.2857	1.0384
4	0.0500**	0.0745	0.0010	1.5455	1.0387
5	0.0723**	0.0971	0.0026	1.4125	1.0515
6	0.0643**	0.1092	0.0000	1.7975	1.0585
7	0.0942**	0.1815	0.0000	2.1250	1.1030
8	0.1027**	0.2286	0.0000	2.5263	1.1349
9	0.1331**	0.2746	0.0000	2.4118	1.1686
10	0.1745**	0.4849	0.0000	3.8000	1.3674

Notes:
1. The *p*-value relates to testing whether or not the actual prevalence rate is significantly different from that expected under random victimization.
2. * denotes significantly different from expected at the 5 per cent, but not the 1 per cent level. ** denotes significantly different from expected at the 1 per cent level.
3. Significance tests are applied only to prevalence rates; see text for discussion.

frequently. For the worst decile, once someone falls victim to personal crime, an average of three further such victimizations will occur during the year. Much the same is true for property crimes.

Once again, the most striking comparison concerns personal crime. In the highest crime decile, only about a third of the expected number of victims actually suffer crime: therefore, victims experience, on average, nearly three times as many crimes

as expected with random victimization. We have already commented on the increase over deciles in the observed prevalence rate for personal crime (shown in Figure 2). Table 2 brings out a different aspect of this: the actual increase in prevalence over deciles is, in fact, a great deal less than expected with random victimization.

With fewer people than expected victimized, our results in Tables 1 and 2 show the importance of multiple victimization. This means that the probabilities strongly support those among the police who put in place prevention of detection aids after a first victimization: a number of further crimes are likely soon to be attempted (see Polvi *et al.* 1990). The focus on the prevention of repeat victimizations becomes more potentially profitable the worse the incidence of crime in an area. Of course, the practical problems involved in mobilizing such communities presents the real challenge. None the less, the data presented in this paper demonstrate clearly the scope for the prevention of repeat victimizations in such crime-ridden areas.

Discussion and Conclusions

On a purely descriptive level, the data presented here are of interest. Rates of property crime incidence rise dramatically in the worst compared with the best areas; the components, prevalence and vulnerability, each contribute roughly equally to this increase. Rates of personal crime rise even more dramatically, with prevalence here rising much faster than vulnerability. However, despite the spectacularly greater prevalence of personal victimization, these victims suffer between three and four times the number of offences of low crime areas; they also suffer about three times the number of offences compared with random personal crime. This high rate of mutiple victimization means that the prevention of such repeat crimes is an exercise with some appeal.

The prevalence observed in high crime areas implies that a strategy of preventing repeat crimes would require many first-time victims to be focused on every year. On the other hand, the high number of repeat victimizations means that investment in such a programme would more predictably address future events, compared both with other kinds of intervention in high crime areas and with similar initiatives in low crime areas. Additionally, such a strategy would mean optimal resource utilization, a prime concern in times of scarce policing resources.

The nature of the sampling of the Survey means that the shape of the curves presented here may not be representative of areas generally, because inner cities are over-sampled. If inner-city areas are high in crime incidence, then we have a larger proportion of high crime areas than we would without over-sampling (and vice versa if they are low in crime incidence): this influences where the dramatic rise of the incidence curve begins, but not its basic shape. Therefore, the inner-city over-sampling does not affect the major conclusions of this research; nevertheless, replication on other data and in other ways would be valuable.

Our approach has an advantage over much previous analysis of the British Crime Surveys in that it does not require possibly pejorative statements about people and their lifestyles: we simply address the pattern of crime over areas, with no necessary reference to victim blame. In other words, our approach avoids the thorny problem of whether victims 'cause' crime through their lifestyle or other characteristics.

References

BARR, R., and PEASE, K. (1990), 'Crime Displacement', in M. Tonry and N. Morris, eds., *Crime and Justice*. Chicago: University of Chicago Press.

COHEN, J. (1986), 'Research on Criminal Careers: Individual Frequency Rates and Offence Seriousness', in A. Blumstein *et al.*, eds., *Criminal Careers and Career Criminals*, vol. 1. Washington, DC: National Academy Press.

FORRESTER, D., CHATTERTON, M. R., and PEASE, K. (1988), *The Kirkholt Burglary Prevention Demonstration Project, Rochdale*, Crime Prevention Paper no. 13. London: Home Office.

GOTTFREDSON, M. R. (1984), *Victims of Crime: The Dimensions of Risk*, Home Office Research Paper no. 81. London: HMSO.

HOPE, T., and HOUGH, M. (1988), 'Area, Crime and Incivilities: A Profile from the British Crime Survey', in T. Hope and M. Shaw, eds., *Communities and Crime Reduction*. London: HMSO.

HOUGH, M., and MAYHEW, P. (1983), *The British Crime Survey: First Report*, Home Office Research Study no. 76. London: HMSO.

KENDALL, M. G., and STUART, A. (1977), *The Advanced Theory of Statistics*, vol. 1, 4th edn. London: Charles Griffin & Co. Ltd.

MAXFIELD, M. G. (1987*a*), 'Lifestyle and Routine Activity Theories of Crime: Empirical Studies of Victimization, Delinquency and Offender Decision Making', *Journal of Quantitative Criminology*, 3: 275–82.

—— (1987*b*), 'Household Activity, Routine Activity and Victimization: A Comparative Analysis', *Journal of Quantitative Criminology*, 3: 301–20.

POLVI, N., LOOMAN, T., HUMPHRIS, C., and PEASE, K. (1990), 'Repeat Break and Enter Victimisation: Time Course and Crime Prevention Opportunity', *Journal of Police Science and Administration*, 17: 8–11.

SAMPSON, R. J. (1987), 'Personal Violence by Strangers: An Extension and Test of the Opportunity Model of Predatory Victimization', *Journal of Criminal Law and Criminology*, 78: 327–56.

—— (1988), 'Local Friendship Ties and Community Attachment in Mass Society: A Multilevel Systematic Model', *American Sociological Review*, 53: 766–79.

SAMPSON, R. J., and GROVES, W.B. (1989), 'Community Structure and Crime: Testing Social-Disorganisation Theory', *American Journal of Sociology*, 94: 774–802.

SAMPSON, R. J. and WOOLDREDGE, J. D. (1987), 'Linking the Micro- and Macro-Level Dimensions of Lifestyle-Routine Activity and Opportunity Models of Predatory Victimisation', *Journal of Quantitative Criminology*, 3: 731–93.

SPARKS, R. F. (1981), 'Multiple Victimization: Evidence, Theory, and Future Research', *Journal of Criminal Law and Criminology*, 72: 762–78.

SPARKS, R. F., GLENN, H., and DODD, D. J. (1977), *Surveying Victims*. London: Wiley.

WOOD, D. S. (1983), *British Crime Survey: Technical Report*. London: Social and Community Planning Research.

Appendix: Statistical Methodology

Denote the respondents in an area, or decile, as $i = 1, \ldots, N$. Then, for the type of crime being analysed (property or personal), we define two variables:

$$V_i = \begin{cases} 1 \text{ if respondent } i \text{ is a victim} \\ 0 \text{ if respondent } i \text{ is not a victim} \end{cases}$$

and C_i, number of crimes suffered by respondent i. Consequently, $C_i=0$ if $V_i=0$, while $C_i>0$ if $V_i=1$. Using these variables, we have:

$$\text{Incidence} = \frac{\Sigma C_i}{\mathcal{N}}$$

$$\text{Prevalence} = \frac{\Sigma V_i}{\mathcal{N}}$$

$$\text{Vulnerability} = \frac{\Sigma C_i}{\Sigma V_i}.$$

All summations here are over $i=1, \ldots, \mathcal{N}$. In what follows, $\mathcal{N}$ and ΣC are treated as given while ΣV is a random variable.

If each respondent is equally likely to be selected as the victim for each crime captured by the survey, the probability of respondent i being the victim is $1/\mathcal{N}$. If selection is independent for each crime (sampling for crime is random), then the probability of any one respondent *not* being a victim for any of the ΣC crimes is

$$\Pr\{V=0\} = \left(1-\frac{1}{\mathcal{N}}\right)^{\Sigma C} = \left(\frac{\mathcal{N}-1}{\mathcal{N}}\right)^{\Sigma C}.$$

Therefore, on these assumptions, the probability of being a victim is

$$\Pr\{V=1\} = \left[1-\left(\frac{\mathcal{N}-1}{\mathcal{N}}\right)^{\Sigma C}\right].$$

Our expected value of prevalence is then the proportion of victims we would expect under these assumptions, namely $\Pr(V=1)$.

The theoretical distribution of the number of victims is bionomial, with the probability of a 'success' being $\Pr(V=1)$ with $\mathcal{N}$ 'trials'. Therefore, the expected number of victims is

$$\mathrm{E}(\Sigma V_i) = \mathcal{N}\Pr(V=1).$$

We test the random sampling hypothesis by comparing the observed number of victims with that expected: the number of 'trials' is certainly large enough for the normal approximation to work very well in this case. The p-values quoted in Tables 1 and 2 are the (one-sided) probabilities of obtaining a statistic at least as large as the one we obtain, under null hypothesis. This test statistic applies also to prevalence, since this is defined as $\Sigma V/\mathcal{N}$ with $\mathcal{N}$ given.

The expected number of victims has also been used to obtain expected vulnerability. Our measure here is

$$\mathrm{E}(\text{Vulnerability}) = \frac{\Sigma C_i}{\mathrm{E}\{\Sigma V_i\}}.$$

We have used this definition to ensure that the product of expected prevalence and expected vulnerability yields the observed incidence rate: that is, we have decomposed observed incidence in terms of expected values. It may be noted that this does not yield the true expected value of vulnerability, which is $\Sigma C\ \mathrm{E}(1/\Sigma V)$ for the given number of crimes ΣC. Since, however, $\mathrm{E}(1/\Sigma V) \geqslant 1/\mathrm{E}(\Sigma V)$ (Kendall and Stuart 1977, exercise 9.13), our measure understates the true expected value.