OFFENDERS AS VICTIMS OF CRIME? AN INVESTIGATION INTO THE RELATIONSHIP BETWEEN CRIMINAL BEHAVIOUR AND VICTIMISATION[$]

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Abstract

In this paper we consider the association between victimisation and offending behaviour using data from the Youth Lifestyles Survey. We consider the impact of violent, non-violent and persistent offending on the probability of being a victim of violent and non-violent crime and find a positive association between these using univariate probit estimates. However, taking into account the endogenous nature of offending and victimisation via a bivariate probit model, we find that univariate estimates understate the association. We suggest that policy recommendations should only be based on the bivariate analysis of the association between offending and victimisation.

Keywords: Victims of Crime, Offenders, Bivariate Probit
JEL Classification: K42

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1. Introduction

In this paper we consider some relatively unexplored factors relating to the determinants of crime victimisation. The identification of characteristics of individuals or firms that suffer disproportionate risks of being victims of crime is a long established area of research. One defect of this literature is that it overwhelmingly portrays victims and offenders as separate groups from within the population. However, there has recently been a small number of studies of violent offenders which have challenged this overly simplistic view (Jensen & Brownfield, 1986; Mayhew & Elliott, 1990; Sampson & Lauritsen, 1990, 1994; Wittebrood & Nieuwbeerta, 1999; and Pedersen, 2001), and which have demonstrated that offenders also run a greater risk of being victims of violence than non offenders. Whether this finding generalises to victims of non violent crimes is an important consideration, not least for policy issues relating to both policing and victim support. Additionally, one group of victims, namely those who have experienced repeat or multiple victimisation, have been seen increasingly as a particularly important group for policing (Pease, 1998) and it is of special interest to consider the victim/offender relationship for such persons.

In addressing these questions, this paper complements the literature in a number of ways. Firstly we have explicitly considered the influence of individual criminality on the probability of being a victim of either violent and/or non violent crime. Previously, models of victimisation have included covariates to capture socio-demographic characteristics of the individual and the area in which the individual resides (e.g. inner city area), which may or may not act as proxies for criminality. Given the nature of our data we are able to not only control for these characteristics, but also for self-reported criminal behaviour. To explore the resulting issues of victim/offender relationships, this paper uses a rich and informative dataset, the 1998 Youth Lifestyles Survey, which has hitherto not been used to study the process of crime victimisation.

The balance of the paper is as follows. In the next section we consider the factors that are likely to influence the probability of being a victim of crime, as discussed in the recent literature. Following this we describe our data set and then proceed to present some preliminary analysis. In Section 5 we present the results of our main analysis and our discussion of these results. Section 6 concludes.

2. Victimisation and Offending Behaviour

There have been at least three reasons advanced in the literature to explain why one might observe offenders as running an enhanced risk of becoming a victim of crime. The first due to Wolfgang and Ferracuti (1967) is related to the purported existence of violent subcultures in society for whom retribution for harm done to them as members of this culture is seen as a legitimate response. Victims become offenders and, in turn, offenders become victims, as within the group there is a value system that supports this way of sorting out disagreements.

More general routine activity and lifestyle theories due to Hindelang et al. (1978) and Cohen et al. (1981) are outlined by Wittebrood and Nieuwbeerta (1999) and by Pedersen (2001) to explain observed associations between levels of offending and victimisation (not necessarily relating to the same persons). Simply put, routine activity or lifestyle theory suggests that an association will be observed if victims and offenders share similar general lifestyles. It is assumed that certain lifestyle factors enhance the risk of being an offender. People who live in the same area and have similar social and demographic characteristics to the offenders they encounter on a day-to-day basis will run a higher risk of becoming a victim of violence than those who do not share these lifestyle features. If this accurately portrays the situation facing offenders, then, as Wittebrood and Nieuwbeerta (1999) suggest, an observed general positive correlation between victimisation rates of violent crime and rates of offending is essentially a spurious relationship.

As an example, consider two districts in a town that differ with respect to crime rates. District one is a poor inner city area with high crime rates and district two is a relatively prosperous suburban area with low crime rates. A sample of persons from these two districts would reveal both a higher proportion of offenders and victims in those sampled from district one compared with district two. The apparent positive relationship between offending and victimisation is spurious in this case as both are linked to the lifestyle factor 'district' and does not imply that an offender is either more or less likely to be a victim once one has controlled for 'district'.

This theory is to be distinguished from that which asserts that criminal conduct in itself exerts an extra and direct reason for an observed association. The conduct of the violent offender increases the risk of being a victim of violent crime 'because of the motives, vulnerability or culpability of people involved in those activities' (Jensen and Brownfield, 1986). Offenders are seen as putting themselves more frequently at risk of violence towards

them than non offenders who otherwise share the same socio-demographic profiles. They will tend to meet with other offenders or engage in activities with other offenders, so making themselves more vulnerable to violent crime. Using the example above, in this case the conditional probability of being a victim given a district and being an offender will be higher than the conditional probability of being a victim just given district. A positive correlation between victimisation and offending should still exist even when 'district' characteristics are controlled for. Additionally, it may also be reasonable to think that offenders who are also victims may be less prepared than non offenders to report to the police any violent criminal acts carried out against them. Such a finding would be indirect evidence in favour of this theory compared to the theory based on routine activity or lifestyle as outlined above.

This evidence is of particular interest when repeat or multiple victims of crime are considered. The Home Office definition of repeat victimisation (Bridgeman and Hobbs, 1997) is 'when the same person or place suffers from more than one incident over a specified period of time'. Repeat victimisations have become recognised as important because they account for a disproportionately high number of total victimisations. Pease (1998, p.3), using evidence from four British Crime Surveys, indicates that between 1982 and 1992, on average 41% of property victimisations (excluding vehicle offences) were associated with the 2% of respondents who reported 4 or more victimisations. In this sample, 84% of respondents reported no property offences against them. For personal crime (largely violent crime), the corresponding figure was 59% of total victimisations suffered by just 1% of respondents, with 92% of respondents reporting no experience of personal crime. Pease (1998, p3) states that 'The important conclusions justified by the research to date are that victimisation is the best single predictor of victimisation; that when victimisation recurs it tends to do so quickly; that a major reason for repetition is that offenders take later advantage of opportunities which the first offence throws up; and that those who repeatedly victimise the same target tend to be more established in crime careers than those who do not'. Some evidence in support of these conclusions is given in Ellingworth et al. (1995), Ratcliffe and McCullagh (1998) and Outlaw et al. (1999).

The conclusions of Outlaw et al. (1999) are of particular interest, as they suggest that single, repeat (the person suffers a repeat of the same crime in a given period) and multiple (the person suffers from more than one type of crime in a given period) victimisation are distinct phenomena that should be considered separately. Repeat property victimisation relates to the commonly held impression that a property which has been burgled may well be burgled again (probably by the same burglar) once goods have been replaced or where

information about the property (e.g. the existence of some unusual possessions) has been handed on to other criminally interested parties. Multiple victimisation was found to be a function of individual lifestyle factors (such as being young males taking part in dangerous activities) and did not reflect neighbourhood-level variation. The latter was found to be particularly important for repeat property victimisation however, along with individual level predictors (such as ethnicity, sex, and income).

As the research above indicates, victimisation and repeat victimisation studies have both concentrated on the individual and local area socio-demographic factors to explain outcomes. Clearly, such factors must be allowed for if one wishes to isolate a separate effect for the offending nature or otherwise of victims. The range and variety of such factors that has been considered in the victimisation literature is extremely large, and is primarily constrained by the particular features of the data set available. Research in this area has tended to emphasise the role of area characteristics (seen as indicators of social deprivation) upon property crime victimisation (for example see Osborn et al., 1992; Trickett et al., 1993, 1995). Individual or household characteristics have usually been found to be of less importance in 'explaining' the incidence of property crime, although Osborn et al. (1992) and Outlaw et al. (1999) suggest that repeat victimisation is associated with key characteristics at the micro level. A common finding in these studies is that less affluent areas are most likely to be targeted by burglars, although it may be wealthier people in these areas that become victims.

3. The Data

Previous empirical analysis of property crime victimisation in the UK has tended to focus on a single year of the British Crime Survey (Budd, 1999), or in some cases the British Crime Survey supplemented with area characteristics taken from matched Census data (Osborn et al., 1992 and Trickett et al., 1995). Other papers have either used specific household surveys (Fishman et al., 1998), or in one study, the General Household Survey (MacDonald and Pudney, 2000). In this paper our data are from the 1998 Youth Lifestyles Survey (YLS). This is a rich source of information, as it contains information on victimisation and criminal behaviour. The YLS is conducted by the National Centre for Social Research on behalf of the Home Office, and is based on a nationally representative sample of 4,848 12-30 year olds living in private households in England and Wales. The core sample for the YLS was achieved by revisiting eligible households who were interviewed for the 1998 British Crime

Survey. This provided a sample of 3,643 young people. In addition to this core sample a 'top-up' sample was achieved through focused enumeration and screening of neighbouring addresses. The top-up sample resulted in an additional 1,205 interviews, giving a complete sample of 4,848 observations. For more details of the survey and the sampling frame see Stratford and Roth (1999).

In the survey, information on offending behaviour (and other sensitive subjects) is collected via self-completion questionnaires, and in most cases through Computer-Assisted-Self-Interviewing (CASI). To allow a comparison between CASI and the traditional paper-based survey (PAPI), a small number of randomly selected interviews were based on the latter. For our analysis, because CASI responses have been found to be more accurate (see Flood-Page et al., 2000), we have chosen to exclude those based on PAPI. Dropping these observations and any with missing values yields a final sample of 3,956 observations.

4. Preliminary analysis

To address the questions posed earlier, we split our sample into those who have offended in the past and those who have not using a Home Office derived variable that indicates whether a respondent has admitted to ever having committed any one of 27 core offences covered. These offences relate to criminal damage (two), property offences (fifteen), fraud (four) and violent offences (six), but exclude 'low level' or trivial offences. Questions were worded to resemble the legal definition of offences as far as possible and were intended to relate to incidents where the respondent intended harm or damage. Theft, outside of shoplifting, related only to incidents where the worth of stolen items was in excess of £5. Two of the six questions pertaining to violent offences related to incidents where the victim required medical attention. Drug and sexual offences were not covered. Based on these classifications, in our sample 1,798 individuals can be broadly defined as offenders and 2,158 as non-offenders.

With respect to victims of crime, there are three victimisation questions in the YLS, but we concentrate on the following two:[1]

[1] The third main victimisation question concerns robbery, but the numbers reporting to being a victim of this offence are too small for our analysis. In addition, respondents under the age of 16 are asked whether they have been a victim of sex crime, but we exclude this from our analysis, as there are obvious questions about the reliability of responses to this question.

- In the last 12 months when you were out (not at home), has anyone STOLEN anything of yours that you had left somewhere (e.g. from school, a cloakroom, an office, a car or anywhere else you left it)?

- In the last 12 months when you were out (away from your home), has anyone deliberately done any of the following: kicked you, hit you with their fists or with a weapon of any sort, slapped or scratched you, or used force or violence against you in any other way?

Respondents answering yes to question 1 are defined as being a 'victim of theft from the person', whilst individuals responding yes to question 2 are defined as being 'a victim of assault'.

Of the 1,798 respondents defined as offenders, 592 (32.9%) have been a victim of either assault or theft or both, whereas 415 (19.2%) of the 2,158 non-offenders have been victims. This significant difference in victimisation (t = 9.84) suggests a strong association being offending behaviour and victimisation. In Table 1 we break these figures down further. Here we report the numbers of offenders and non-offenders who have been victims of only assault, of only theft, and of both assault and theft.

Table 1. General victimisation rates for offenders/non-offenders (%)[$]

	Never Offended	Offended Ever
Victim of only assault	7.0	13.5
	(0.551)	(0.805)
Victim of only theft	10.0	14.2
	(0.645)	(0.823)
Victim of assault and theft	2.2	5.3
	(0.318)	(0.528)
Observations	2158	1798

[$] Note: Standard errors in parenthesis

Table 1 illustrates that those in the sample who admitted to having ever committed one of the named criminal acts were disproportionately more likely to also be a victim of assault, theft or both. In each case, the difference in the proportion of the sample victimised between offenders and non-offenders is statistically significant at the conventional 5% level of significance. For assault only, the t-value is 6.7, for theft only the t-value is 4.1 and for assault and theft the t-value is 5.1.

This pattern of victimisation in relation to offending behaviour is one that appears to be established relatively early in life. The YLS sample can be further analysed to include only those in the sample currently at school (including sixth form students). Table 2 reports the findings for assault, theft and both assault and theft for this group. In each case victimisation rates for schoolchildren are statistically significantly greater for those admitting to criminal offences than for those who did not. The t-values here are 3.0 for assault only, 2.3 for theft only and 2.3 for assault and theft. Taken together, 201 out of 757 non-offenders were victims of the named crimes (26.5%) whereas 173 out of 429 offenders (40.3%) were also victims. The overall t-value for the difference in these proportions is 4.9.

Table 2. Victimisation rates for schoolchildren (%)[$]

	Never Offended	Offended Ever
Victim of only assault	9.2	14.9
	(1.054)	(1.722)
Victim of only theft	13.3	18.4
	(1.237)	(1.874)
Victim of assault and theft	4.0	7.0
	(0.710)	(1.233)
Observations	757	429

[$] Note: Standard errors in parenthesis

Section 2 reported on some of the published work that had identified an increased risk of being a victim of violent crime with being an offender of violent crime. It seems useful, therefore, to examine the evidence in the YLS relating explicitly to those in the sample who

self reported violent offences. Preliminary analysis of the YLS data for those who admitted being offenders of assault adds support for these earlier findings relating to violent crime. For instance, Gottfredson (1984) working with an early sweep of the British Crime Survey, found that of those in the sample who had committed at least one violent crime, 42% were also victims of violent crimes. This could be contrasted with those people who had never committed a violent crime of whom only 6% had been victims of violent crime.

However, what has received very little attention in the literature is the complimentary enhanced risk of violent (and non-violent) offenders being victims of non-violent property crime (specifically theft). Table 3 illustrates this point. The YLS sample was split for self-reporting offenders between those who reported violent offences (some of whom will also have reported to non-violent offending) and those who reported only non-violent offences. Both violent and non-violent offenders were significantly more likely to be victims of violent crime than non-offenders (line 1 in Table 3). Interestingly, both groups were also more likely than non-offenders to be victims of theft, or of both assault and theft (lines 2 and 3 in Table 3).

Table 3. Victimisation rates for violent/non-violent offenders and non-offenders (%)[$]

	Never Offended	Non-violent Offender	Violent Offender
Victim of only assault	7.0	10.2	19.2
	(0.551)	(0.893)	(1.553)
Victim of only theft	10.0	13.5	15.3
	(0.645)	(1.001)	(1.420)
Victim of assault and theft	2.2	3.2	9.0
	(0.318)	(0.519)	(1.127)
Observations	2158	1153	645

[$] Note: Standard errors in parenthesis

Also noted in Section 2 was the growing interest shown to the problem of multiple and repeat victimisations. The YLS survey data is broadly in line with the British Crime Survey

figures reported in Section 2 for repeat victimisation. For assault, 57% of offences were suffered by the 2% of respondents who reported 4 or more assaults on them in the previous year. For theft, 21% of offences were on the 0.8% of respondents who self reported 4 or more property offences in the year. Table 4 indicates that violent offenders are substantially more likely than non-violent or non offenders to be repeat victims of both assault and theft. As was the case for Table 3, violent offenders may also have admitted to non-violent offences.

Table 4. Single and Repeat Victimisation (%)[$]

	Never Offended	Non-violent Offender	Violent Offender
Victim of only one assault	3.9	6.0	9.5
	(0.416)	(0.699)	(1.153)
Victim of only one theft	7.8	10.1	9.9
	(0.578)	(0.886)	(1.178)
Victim of more than one assault	3.8	5.0	13.8
	(0.409)	(0.644)	(1.359)
Victim of more than one theft	3.2	5.1	10.5
	(0.373)	(0.644)	(1.186)
Observations	2158	1153	645

[$] Note: Standard errors in parenthesis

We have seen in this section that there appears to be an association between offending behaviour and victimisation. These simple descriptive statistics provide motivation for studying the factors that influence the probability of being a victim in more detail. Whether this evidence supports either the lifestyle or the criminal conduct theories of victimisation above, or neither, needs to be addressed through a statistical analysis that controls for the lifestyle factors of victims explicitly. In the next section we consider an empirical approach to the current sample that provides results from multivariate models that help clarify this problem.

5. Results

5.1 Univariate Probits

The probability of the discrete event of being a victim of crime is most naturally modelled as a probit (or logit) relation. We denote an individual's propensity to be a victim of crime with the latent variable v_i^*, which is related to the observed individual and area characteristics through the structural model:

$$v_i^* = X_i b_1 + c_i d + e_{1i} \tag{1}$$

where X_i is a vector of personal, demographic and lifestyle attributes for individual i, c_i is an indicator variable for whether the individual has engaged in criminal behaviour, b and δ are the parameters to be estimated, and e_{1i} is a normally distributed error term with mean zero and variance one, that captures the unobserved determinants of victimisation. The latent variable v_i^* drives the observed outcome of being a victim, v_i, through the measurement equation:

$$v_i = \begin{cases} 1 & \text{if } v_i^* > 0 \\ 0 & \text{if } v_i^* \leq 0 \end{cases} \tag{2}$$

Estimation of (1) as a probit model is straightforward, and provides us with direct measures of the impact of the various explanatory variables on the likelihood of being a victim of crime.

In Tables 5 and 6 we present the results for our estimated models for victimisation and repeat victimisation respectively. In each case we estimate models for victims of assault only, theft only and assault and theft (multiple victimisation). We control for personal characteristics (e.g. age, gender, ethnicity, having children, marital status, etc), area characteristics (including region and measures of social deprivation), risk factors related to being outside the home (e.g. participation in sport and social activities), and offending behaviour. The base categories are: single, female, 'other' ethnic origin, with no children, not born in UK, in work and having qualifications, living in non owner-occupied property in an inner city area of London that is not considered deprived. Descriptive statistics for all the variables used in this analysis are given in Appendix Table A1.

Table 5. Probit estimates of the probability of being a victim

	Assault Only		Theft Only		Assault and Theft	
Covariate	β	t-value	β	t-value	β	t-value
Personal Characteristics						
Age	–0.032	3.70	–0.012	1.48	–0.056	4.19
Male	0.411	5.95	–0.027	0.44	0.219	2.26
Have at least one child	–0.058	0.61	0.017	0.21	0.347	2.47
Has current partner	–0.070	1.06	0.083	1.32	0.077	0.80
White origin	0.480	1.73	–0.077	0.42	–0.410	1.87
Black origin	0.370	1.09	0.018	0.08	–0.285	0.98
Asian origin	0.312	0.96	0.163	0.76	–0.395	1.39
Native born	0.149	0.94	0.039	0.32	–0.370	2.31
Unemployed	–0.018	0.13	0.216	1.78	0.276	1.55
No qualifications	–0.120	0.93	0.196	1.82	0.089	0.54
At school	–0.214	2.04	0.275	2.73	–0.095	0.66
Owner occupier	–0.044	0.66	–0.041	0.67	0.010	0.11
Area Characteristics						
North of England	0.230	1.66	–0.254	1.87	–0.117	0.59
Yorkshire/Humberside	0.237	1.89	0.000	0.00	0.144	0.92
North West England	0.260	2.12	0.033	0.31	–0.195	1.12
East Midlands	0.045	0.32	–0.178	1.42	0.066	0.38
West Midlands	0.109	0.82	–0.035	0.31	–0.224	1.20
East Anglia	0.220	1.37	0.008	0.06	0.081	0.38
South East England	–0.061	0.50	0.042	0.42	0.049	0.32
South West England	0.241	1.70	–0.205	1.52	–0.998	2.63
Wales	0.213	1.45	0.007	0.05	–0.072	0.35
Urban area	0.135	1.74	0.080	1.14	–0.157	1.51
Rural area	0.285	2.07	–0.022	0.16	–0.181	0.80
Acorn 17 most deprived	–0.322	2.19	0.190	1.32	0.125	0.53
People wish to leave area	0.099	1.37	0.142	2.14	0.014	0.14
Risk Factors						
Active in community	0.006	0.07	0.078	1.12	0.190	1.86
Sports participation	–0.023	0.33	0.180	2.86	0.175	1.70
Social activities	–0.098	1.00	0.044	0.48	–0.043	0.31
Hangout on street	0.121	1.56	0.035	0.47	0.096	0.91
Was bullied at school	0.357	5.94	0.089	1.56	0.403	4.72
Goes out alone at night	0.056	0.79	0.190	2.99	0.018	0.18
Carries personal alarm	0.281	2.14	–0.049	0.38	–0.215	0.85
Thinks judges out of touch	0.176	2.59	0.123	1.95	0.103	1.04
Offending behaviour						
Non-violent offender	0.145	2.04	0.201	3.18	0.201	1.88
Violent offender	0.316	3.80	0.212	2.67	0.537	4.74
Persistent offender	0.393	3.80	–0.165	1.45	0.260	1.91
Intercept	–1.856	4.91	–1.527	5.37	–0.582	1.45
Log Likelihood	–1149.91		–1390.76		–528.66	
Chi-squared (d.f.)	265.21 (36)		102.73 (36)		173.01 (36)	
Observations	3956		3956		3956	

Table 6. Probit estimates of the probability of being a repeat victim

	Assault Only		Theft Only		Assault and Theft	
Covariate	β	t-value	β	t-value	β	t-value
Personal Characteristics						
Age	–0.057	5.05	–0.025	2.14	–0.033	1.28
Male	0.459	5.38	0.133	1.57	0.277	1.50
Have at least one child	0.225	1.87	0.184	1.54	0.736	2.90
Has current partner	–0.142	1.74	0.069	0.80	0.012	0.07
White origin	–0.035	0.14	–0.256	1.21	–0.362	0.97
Black origin	–0.088	0.26	–0.111	0.41	–0.542	0.95
Asian origin	–0.225	0.70	–0.098	0.38	–0.234	0.49
Native born	0.010	0.05	–0.241	1.64	0.021	0.06
Unemployed	0.033	0.20	0.280	1.78	–0.277	0.63
No qualifications	0.155	1.11	0.196	1.39	0.494	1.96
At school	–0.173	1.40	0.347	2.53	0.484	1.71
Owner occupier	–0.044	0.54	0.018	0.21	0.231	1.27
Area Characteristics						
North of England	0.287	1.75	–0.332	1.72	–0.131	0.43
Yorkshire/Humberside	0.265	1.77	0.054	0.38	0.025	0.10
North West England	0.135	0.89	–0.133	0.90	–0.558	1.70
East Midlands	0.158	0.96	0.048	0.31	–0.031	0.12
West Midlands	–0.014	0.09	–0.172	1.08	–0.680	1.89
East Anglia	0.159	0.81	0.054	0.29	–0.192	0.53
South East England	0.032	0.22	–0.005	0.04	–0.561	1.96
South West England	0.137	0.78	–0.618	2.60	–	–
Wales	0.223	1.27	–0.235	1.21	–	–
Urban area	0.113	1.22	–0.052	0.55	0.012	0.07
Rural area	–0.052	0.27	–0.241	1.08	–0.050	0.11
Acorn 17 most deprived	0.113	0.57	0.293	1.27	0.210	0.43
People wish to leave area	0.057	0.66	0.223	2.61	0.314	1.82
Risk Factors						
Active in community	0.088	0.93	0.090	0.95	0.015	0.08
Sports participation	–0.085	1.01	0.070	0.80	0.005	0.03
Social activities	–0.054	0.47	–0.200	1.79	0.253	0.92
Hangout on street	0.028	0.31	0.019	0.19	–0.161	0.80
Was bullied at school	0.415	5.75	0.305	4.02	0.396	2.54
Goes out alone at night	0.116	1.36	0.109	1.24	0.209	1.14
Carries personal alarm	0.257	1.55	–0.032	0.17	0.316	0.96
Thinks judges out of touch	0.139	1.67	0.148	1.72	0.020	0.11
Offending behaviour						
Non-violent offender	0.130	1.45	0.287	3.15	0.001	0.01
Violent offender	0.443	4.55	0.531	5.23	0.456	2.24
Persistent offender	0.436	3.78	0.062	0.47	0.541	2.50
Intercept	–1.179	3.01	–1.279	3.53	–2.665	3.44
Log Likelihood	–753.67		–682.92		–151.59	
Chi-squared (d.f.)	236.53 (36)		158.55 (36)		68.95 (34)	
Observations	3956		3956		3428	

The figures in Table 5 are quite revealing about the association between offending behaviour and victimisation, once other lifestyle factors have been controlled for. Regardless of how victimisation is defined, there appears to be a positive and statistically significant association between offending behaviour and the risk of being a victim. With respect to victims of assault only, it appears that violent or persistent offending are more statistically significant predictors of violent victimisation than non-violent offending. For victims of theft only, non-violent and violent offending appear more important than persistent offending, whereas violent offending is the most statistically significant factor associated with the risk of being a multiple victim of assault and theft.

Before we consider the results for repeat victimisation it is worth mentioning some of the other factors that are significantly associated with the probability of being a victim. Considering personal characteristics, these only appear important in the first and third models (assault only or assault and theft). For these two models there is a statistically significant negative association between age and victimisation (in the theft only model the coefficient on age is negative but not significant), and males appear more likely than females to be victims of assault only or assault and theft. Interestingly, individuals at school are less likely than those not currently at school to be victims of assault only, but more likely to be victims of theft only. With respect to factors that indicate an individual's exposure to risk, those who were bullied at school appear more likely to be victims of assault when compared to those who were never bullied. It also appears that individuals who think judges are out of touch with ordinary people tend to have a higher probability of being a victim of either theft only or assault only (although this variable is potentially endogenous), whilst individuals who actively engage in sport or who go out alone at night are more likely to be victims of theft only. Generally, regional or area characteristics are not significant. This may be due to the relatively wide measures used in the analysis, which fail to capture the essentially local effects that may affect behaviour of the relatively young sample under investigation.

It is important to note that when the offending variables are excluded from all three models reported in Table 5, not much changes in terms of the lifestyle and personal characteristics that are associated with victimisation (these results are not reported in detail here). For the assault only model, the exclusion of offending variables results in only one further lifestyle factor (hanging out in the street) becoming statistically significant, whilst for the theft only model being involved in sport becomes significant, and for the multiple victimisation model (assault and theft) the estimated coefficients on sports participation and hanging out in the street, become statistically significant at the 10% level or less.

The results for repeat victimisation given in Table 6 also support the strong association between offending behaviour, particularly violent offending, and an increased likelihood of victimisation. In addition, having at least one child and having been bullied at school appear as statistically significant factors determining repeat victimisation. When compared to non-offenders, violent offenders are more likely to be repeat victims of assault, theft, or assault and theft. Interestingly, non-violent offending is only significantly associated with being a repeat victim of theft only, whilst persistent offending appears to have a significant impact on the risk of being a repeat victim of assault only and multiple victimisation.

5.2 Bivariate Probits

The results presented above provide a strong case in support of the theory that there is a direct link between offending behaviour and the risk of victimisation, once lifestyle characteristics are controlled for. Unfortunately, there is a potential bias in the univariate probit estimates due to the likely overlap in unobserved characteristics that determine both offending behaviour and the likelihood of being a victim. This potential for unobserved heterogeneity will result in the error term, e_{1i} in (1), being correlated with the explanatory variable(s) capturing offending behaviour. If this is the case, offending will not be exogenous, and the coefficients on the offender variables in the probit models will be biased, capturing not only the true effect of being an offender but also the effect on victimisation of having this unobservable characteristic. Previous studies have failed to address this potential bias.

Estimating the relationship between victimisation and offending as a bivariate probit can overcome this problem (Greene, 1997). The empirical specification of the bivariate model is as follows,

$$v_i^* = a_1 + X_i b_1 + c_i d + e_{1i} \qquad (3)$$

$$c_i^* = a_2 + X_i b_2 + Z_i x + e_{2i} \qquad (4)$$

where the error terms e_{1i} and e_{2i} are jointly distributed as bivariate normal with means zero, unit variances, and correlation r. The variables v_i, c_i and X_i are as before, Z_i is a vector of identifying restrictions, and b_1, b_2, d and x are the parameters of interest that we wish to

estimate. One practical difficulty we face in trying to estimate the bivariate probit is finding a set of identifying restrictions that are significant determinants of the endogenous variable(s) but also orthogonal to the residuals of the main equation (i.e. not significantly associated with the probability of being a victim). In order to estimate the bivariate probit, we have included the following in Z_i: expulsion from school and truancy, pacifism, excessive drinking, drug use, views on the courts, contact with people in trouble, and having no father when a teenager (13 variables in total).[2]

In table 7, in order to save space we present a summary of the key results from the bivariate models we have estimated, alongside the equivalent univariate estimates. In this table we only consider the impact of estimating the bivariate model on the coefficient for offending behaviour, plus we provide the estimated value for the correlation between error terms (r). In Table 8, however, we present the full set of estimated coefficients for the first two of these models (assault only-violent offender and theft only-non-violent offender). Full results are available from the authors.

The results reported in Table 7 show that the univariate estimates of the coefficient on offending behaviour are quantitatively smaller than the bivariate estimates. In addition, for all the models estimated, there appears to be a significant negative correlation at the 10% significance level or less between the error terms of the two equations (3)-(4). This suggests that the unobserved heterogeneity influencing the probability of being a victim is significantly and negatively associated with the unobserved influences on the likelihood of being an offender. That is, there are unobserved factors (possibly personal characteristics) which both raise the probability of an individual becoming a victim (and a repeat victim) whilst lowering the probability of being an offender, or vice versa. This negative correlation explains the increase in the magnitude of the coefficient estimates for offending behaviour in the bivariate probit models compared with those for the univariate probit analysis, and suggests that any policy recommendations coming from this type of work should only be based on the bivariate analysis. Looking at the figures in Table 8 to compare the results of the univariate and bivariate models, it is clear that are very few changes in terms of significant coefficients. In many cases there is a slight reduction in the size of the t-values in the bivariate models, such that for assault only, hanging out in the street become only marginally significant (t = 1.67).

[2] Likelihood ratio tests were conducted for all the models reported in Table 5. In four out of six cases there was no significant difference (at the 5% level) in the log likelihood between the models with and without identifying restrictions in the victimisation equation. In only two cases (assault and theft/any offence, repeat theft only/non-violent offender) were the identifying restrictions rejected. In all other respects, however, the results for these two cases are completely consistent with the other results reported.

The only other difference is that age becomes significant in the bivariate estimate of the theft only model, as do being unemployed and having no qualifications, which were previously of marginal significance. Additionally, one may note small differences between the univariate estimates in Table 8 and those reported earlier in Table 5 because the models reported in the former only have one offender variable, rather than three.

Table 7. Summary of univariate and bivariate estimates[$]

	v_i = assault only c_i = violent offender		v_i = theft only c_i = non-violent offender		v_i = assault or theft c_i = any offence	
	Univariate	Bivariate	Univariate	Bivariate	Univariate	Bivariate
$\acute{d}$	0.327	0.627	0.134	0.772	0.347	0.939
	(4.56)	(3.31)	(2.31)	(3.13)	(7.22)	(9.31)
$\hat{r}$		–0.189		–0.384		–0.427
		(1.69)		(2.45)		(5.67)
	v_i = repeat assault only c_i = violent offender		v_i = repeat theft only c_i = non-violent offender		v_i = repeat assault or theft c_i = any offence	
	Univariate	Bivariate	Univariate	Bivariate	Univariate	Bivariate
$\acute{d}$	0.475	1.079	0.088	0.874	0.411	0.869
	(5.81)	(5.48)	(1.11)	(2.96)	(6.46)	(6.42)
$\hat{r}$		–0.375		–0.454		–0.329
		(3.13)		(2.55)		(3.50)

[$] Note: Absolute t-values in parenthesis

Table 8. Full results for univariate and bivariate estimates

	Assault Only				Theft Only			
	Univariate		Bivariate		Univariate		Bivariate	
Covariate	β	|t|	β	|t|	β	|t|	β	|t|
Personal Characteristics								
Age	–0.033	3.82	–0.030	3.43	–0.012	1.55	–0.016	2.03
Male	0.425	6.19	0.377	5.10	–0.002	0.03	–0.001	0.01
Have at least one child	–0.042	0.44	–0.052	0.55	0.023	0.27	0.007	0.09
Has current partner	–0.056	0.85	–0.070	1.05	0.091	1.46	0.070	1.14
White origin	0.471	1.72	0.461	1.70	–0.072	0.40	–0.085	0.48
Black origin	0.366	1.10	0.334	1.00	0.034	0.15	0.046	0.20
Asian origin	0.269	0.84	0.265	0.84	0.174	0.81	0.180	0.85
Native born	0.175	1.12	0.155	0.99	0.050	0.41	0.001	0.01
Unemployed	–0.010	0.07	–0.016	0.11	0.208	1.72	0.222	1.87
No qualifications	–0.114	0.89	–0.126	0.99	0.197	1.83	0.220	2.09
At school	–0.248	2.38	–0.217	2.06	0.268	2.66	0.277	2.82
Owner occupier	–0.042	0.64	–0.029	0.44	–0.050	0.83	–0.047	0.80
Area Characteristics								
North of England	0.226	1.64	0.232	1.69	–0.263	1.94	–0.241	1.82
Yorkshire/Humberside	0.232	1.86	0.231	1.85	–0.003	0.02	0.002	0.02
North West England	0.254	2.08	0.248	2.04	0.036	0.33	0.042	0.41
East Midlands	0.058	0.41	0.054	0.39	–0.180	1.44	–0.180	1.47
West Midlands	0.120	0.92	0.118	0.91	–0.039	0.34	–0.025	0.22
East Anglia	0.212	1.33	0.196	1.23	0.020	0.14	–0.005	0.03
South East England	–0.074	0.61	–0.070	0.58	0.039	0.39	0.045	0.47
South West England	0.236	1.68	0.245	1.75	–0.213	1.58	–0.197	1.49
Wales	0.205	1.42	0.219	1.51	–0.002	0.02	0.009	0.07
Urban area	0.117	1.52	0.123	1.60	0.079	1.11	0.096	1.39
Rural area	0.246	1.80	0.263	1.93	–0.033	0.23	0.025	0.18
Acorn 17 most deprived	–0.296	2.03	–0.291	2.01	0.192	1.34	0.143	1.01
People wish to leave area	0.102	1.43	0.094	1.32	0.146	2.22	0.134	2.07
Risk Factors								
Active in community	–0.003	0.04	–0.007	0.08	0.076	1.09	0.099	1.44
Sports participation	–0.023	0.33	–0.035	0.52	0.183	2.93	0.183	2.99
Social activities	–0.079	0.81	–0.080	0.82	0.051	0.56	0.015	0.16
Hangout on street	0.173	2.26	0.133	1.67	0.050	0.69	0.005	0.07
Was bullied at school	0.351	5.86	0.347	5.81	0.093	1.64	0.074	1.32
Goes out alone at night	0.076	1.09	0.052	0.74	0.205	3.26	0.160	2.50
Carries personal alarm	0.272	2.07	0.276	2.12	–0.051	0.40	–0.053	0.42
Thinks judges out of touch	0.191	2.83	0.171	2.51	0.132	2.10	0.111	1.79
Offending behaviour								
Non-violent offender	–	–	–	–	0.134	2.31	0.772	3.13
Violent offender	0.327	4.56	0.627	3.31	–	–	–	–
Intercept	–1.810	4.84	–1.836	4.94	–1.513	5.32	–1.456	5.20
$\hat{r}$			–0.189	1.69			–0.384	2.45
Log Likelihood	–1160.33		–2522.87		–1394.59		–3606.01	
Chi-squared (d.f.)	244.36 (34)		862.26 (80)		95.07 (34)		434.65 (80)	
Observations	3956		3956		3956		3956	

6. Concluding Remarks

In this paper we have used data from the Youth Lifestyles Survey (YLS) to explore the determinants of crime victimisation. We have considered the relationship between offending behaviour and being a victim of crime, and found that simple cross-tabulations suggest a strong association between these variables. In particular, we found that violent and non-violent offenders were significantly more likely to be victims of violent crime than non-offenders (see Table 3), and that both groups were also more likely than non-offenders to be victims of theft, or of both assault and theft.

To explore these associations further we estimated univariate probit models, which indicated a range of personal, area and risk characteristics which influence the probability of being a victim (or repeat victim) of violence, theft or both. The models which also included self reported offending variables consistently indicated the enhanced probability of being a victim for those who admitted to some type of offending in the past. In so far as lifestyle and other factors have been controlled for by the other variables included in these equations, these results provide strong evidence in favour of there being an additional risk to offenders of becoming a victim through the conduct of the offenders themselves. The observed association between offending and victimisation is not a spurious relationship, therefore. One potential weakness in interpreting the results in this way is that the offending variables might themselves be endogenously determined by, in part, the same lifestyle and other factors which determine victimisation. This would bias the coefficient values on all variables, including the offending variables, in the univariate probit.

In order to address this potential problem, we estimated bivariate probit models for victimisation and offending. Rather than reduce the estimated effect of offending behaviour on victimisation, the bivariate results are even more strongly in favour of there being an increased probability of being a victim of either violent or non violent crime of an individual who has admitted to offending behaviour in the past through the individual behaviour of those persons. The separation of the young population between those who are victims of crime and those who are offenders is not a separation that can be supported by this analysis.

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Appendix

Table A1. Variable means

Personal Characteristics		**Risk Factors**	
Age	21.191	Active in community	0.175
Male	0.470	Sports participation	0.609
Have at least one child	0.234	Social activities	0.885
Has current partner	0.511	Hangout on street	0.214
White origin	0.910	Was bullied at school	0.320
Black origin	0.027	Goes out alone at night	0.555
Asian origin	0.040	Carries personal alarm	0.052
Native born	0.940	Thinks judges out of touch	0.259
Unemployed	0.048	**Additional variables for offender equation**	
No qualifications	0.070	Expelled from school	0.097
At school	0.278	Persistent truant	0.084
Owner occupier	0.624	Never tempted to hit someone	0.177
Area Characteristics		Frequent drinker	0.054
North of England	0.072	Started drinking early in life	0.254
Yorkshire/Humberside	0.110	Only taken soft drugs in past year	0.194
North West England	0.119	Taken hard drugs in past year	0.038
East Midlands	0.082	Ever taken any drug	0.167
West Midlands	0.099	Think courts too lenient	0.511
East Anglia	0.045	Think courts too tough	0.047
South East England	0.196	Family in trouble with police	0.019
South West England	0.072	Friends in trouble with police	0.152
Wales	0.061	No father when teenager	0.190
Urban area	0.567	**Offending behaviour**	
Rural area	0.176	Any offence	0.454
Acorn 17 most deprived	0.124	Non-violent offender	0.163
People wish to leave area	0.211	Violent offender	0.291
		Persistent offender	0.062