**A longitudinal analysis of early risk factors for adult onset offending: What predicts a delayed criminal career?**

# A longitudinal analysis of early risk factors for adult onset offending: What predicts a delayed criminal career?

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**Abstract**

**Background**: Late onset offending, at the age of 21 or thereafter, is an underexplored dimension of the criminal career.

**Aims**: Our aims were to explore which factors are precursors of late onset offending, and the extent to which adult criminality can be predicted in childhood and adolescence.

**Method**: This is the first study that defines late onset offending based on a combination of official records and self-reports. Longitudinal data from the Cambridge Study in Delinquent Development (CSDD) were used. 403 South London men, followed from ages 8-10 to ages 48-50, were divided into late-starters (LS, n = 51), early-starters (ES, n = 140) and non-offenders (NO, n = 212).

**Results**: LS men were more likely than NO men to have been neurotic, truants, or in poor housing at ages 8-10. At ages 12-14 they tended to be neurotic, and at ages 16-18 they had high unemployment and spent time hanging about on the streets. Compared with ES, LS were nervous at ages 8-10, and at age 18 they were more likely to be sexual virgins. Overall, LS men were more similar to NO men before age 21, but more similar to ES men by age 32.

**Conclusions**: Our hypotheses that late onset offenders would be particularly characterised by neuroticism or nervousness, but that this would buffer rather than fully protect over the life course, were sustained. Intervention to increase the resilience of children and adolescents who are rated as high on neurotic characteristics may lessen the burden that these factors impose in adult life and reduce the risk of a deteriorating quality of life and late onset criminal careers.

**Keywords**: Late onset offending, delayed criminal career, protective factors.

## Introduction

Late onset offending, defined as the onset of criminal behaviour at age 21 or thereafter, is a neglected aspect of criminal careers. Across Western countries such late onset offending is well recognised (Eggleston and Laub, 2002; Gomez-Smith and Piquero, 2005), and there are studies variously covering official records, self-reports, prison populations (Aday, 2003; Walmsley, 2009), and the wider criminal justice system (Gulotta, 1999). However, factors associated with late onset are not well understood.

Psychosocial and temperamental characteristics play a significant part in the development of delinquency (Farrington, 2005a,b; Lahey et al, 2003), and some of these may contribute to acting as insulators against antisocial influences and deflecting behavioural outcomes late in life (Farrington, 2009). In a study by Pulkkinen et al (2009) the adult onset offenders displayed more psychosomatic symptoms than the non-offenders, did more bullying and were more aggressive and socially active. They also manifested more behavioural problems than the adolescence-limited offenders. Even though they were more self-confident than the non-offenders or early onset life-course-persistent offenders, they showed an emotionally unstable personality. In adulthood, they tended to be neurotic, disinhibited, aggressive, and heavy alcohol consumers.

Using data from the longitudinal Cambridge Study in Delinquent Development (CSDD), we aimed to analyse which early factors are likely to be significant predictors of a late onset criminal career, and which may act as psychological protectors to the extent of apparently delaying onset of criminal careers among men who might otherwise have been expected to start offending in their teens.

**Risk and protective factors for late criminal onset**

Exploration of late onset offending thus requires consideration of possible interactions between childhood risk and protective factors (Farrington, 2007). Some factors, such as desirable family or school influences, may serve as an insulating barrier, protecting children and adolescents from undue antisocial pressure or influence from elsewhere (Thornberry, 2005). Our plan was to extend this concept to the explanation of a delayed criminal career by suggesting that late starters tend to have psychological characteristics that provide early, but temporary, insulation against or resistance to antisocial influences. Nervousness, neuroticism, inhibition, and social isolation may play a temporary protective role, and sustain the avoidance of antisocial involvement. They may also, however, hamper the development of psychological resilience so that the impact of later stressors is intensified, either by making people more vulnerable or reducing their ability to cope (Lay et al, 2005).

This temporary resistance to antisocial activities may occur for different reasons. First, not all late onset offenders are well-adjusted children or adolescents. The ‘never offenders’, or abstainers in Moffitt’s (2003) terms, may nevertheless suffer from some forms of maladjustment. Abstaining from delinquency is not necessarily “a sign of good adolescent adjustment” (Moffitt, 1993, p. 690). Secondly, risk factors do not always have an immediate and direct effect on all individuals and situations. In some cases their ‘sleeper’ effects are only seen later in life (Loeber, 1990). The extent and timing of their impact depends on the combination of individual characteristics, and their exposure to hazardous circumstances at a vulnerable time (Loeber and Farrington, 2001). Thirdly, psychological insulation may not last forever, but rather may contribute to a sort of

heightened sensitivity or *kindling effect* (Kendler et al, 2000) that places individuals at greater risk when rechallenged. Fourthly, many factors that play a protective or inhibitory role in childhood or adolescence might become risk factors in adulthood. Fifthly, early predictors may have a long-term impact and an even stronger effect as time goes by. It may be that, as in a *ripple effect*, the longer the temporal interval, the sturdier the influence.

**Aims of the study**

The aims of our study were, therefore: 1) to identify which early psychological, temperamental, familial, social, and/or behavioural factors are significant predictors of late onset offending; 2) to investigate how accurately late onset offending may be predicted; 3) to explore the risk and protective mechanisms at work in delaying the onset of a criminal career.

Our concept of a late onset offending is a pattern of criminal behaviour with an official age of onset (i.e. age of first conviction) and/or first self-reported offending at age 21 years or older. To the best of our knowledge, this is the first time that a study has employed both official records and self-report to investigate the true age of criminal onset, and this is the first study to have longitudinal data (from ages 8-10 until 48-50) on both; we have previously investigated the characteristics of late onset offenders based only on convictions (Zara and Farrington, 2009), but this might produce misleading results, and errors in allocating a person to a specific onset group can be reduced by combining SRD and official data (Kazemian and Farrington, 2005).

**Hypotheses**

Our hypotheses were:

a. Late onset offending is affected by psychological and temperamental factors such as nervousness, neuroticism and social isolation that protect the individual against antisocial influences until age 21 but not thereafter.

b. As late starters age, so they become closer in life style and attitudes to early starters, and more different from non-offenders.

**Method**

Prospective longitudinal data from the Cambridge Study in Delinquent Development (CSDD) were used in this research. The CSDD began in 1961 with a sample of 411 South London boys. Most of the participants (n = 399, 97 percent) were attending one of six state primary schools within a one-mile radius of the research office established for this investigation. In order to make the sample as representative as possible of the male population of the area, 12 additional boys were drawn from a local school for children with learning difficulties. Most boys were white and born in the UK (n = 357, 87 percent). Almost all (94 per cent) were living in traditional two-parent families, with the main breadwinner (usually the father) mostly having a low socio-economic status manual occupation. The reliability and validity of the study data are well established (West, 1969; West, 1982; West and Farrington, 1973; West and Farrington, 1977; Piquero et al, 2007; see also Farrington et al, 2006, for a full list of publications).

The participants were followed-up at intervals from ages 8-10 to ages 48-50. Various tests and nine face-to-face interviews were completed during this 40-year period. The

tests furnished data on psychological and temperamental characteristics, psychomotor impulsivity, and cognitive attainments. Information about family, scholastic, and occupational factors, relationships with girls or women, illnesses and injuries, leisure activities, and life-success, along with official records and self-reports, were gathered during interviews.

Interviews with the boys' parents provided observational details of their level of nervousness and daring, family matters such as income, size, and unemployment, child-rearing styles, parental supervision, separations from the parents, parental disharmony, and parental history of psychiatric treatment.

Teachers completed questionnaires when the boys were aged 8, 10, 12 and 14, supplying information about each boy's troublesome or aggressive behaviour at school, hyperactivity or lack of concentration, levels of anxiety, lying, truancy and scholastic achievement. Peers were asked to rate the boys on such aspects as daring, dishonesty, troublesomeness, and popularity.

The men's female partners completed questionnaires when they were aged 32 and the men and their partners were personally re-interviewed when they were aged 48. The CSDD has an extraordinary low attrition rate. At age 32, 378 of the 403 men still alive (94 percent) were interviewed, while the figure at age 48 was 365 out of 394 still alive (93 percent) (for more details see Farrington, 2003; Farrington et al, 2009).

**The sample for this study**

For the study reported here, eight of the original 411 boys were not at risk of conviction because of death or emigration, so they were removed from the analysis. One hundred and sixty-seven of the remaining 403 had sustained a conviction, 129 with a first conviction between ages 10 and 20 and 38 at ages 21 or later. Two-hundred and thirty-six were technically non-offenders. The groups for comparison were, however, adjusted to take account of self report. The conviction and SRD offences were similar, including shoplifting, theft, burglary, drug offences, fraud, vandalism, and violence, but in order to identify clear self-reported offenders, only those in the worst quarter on SRD ( the quarter with the highest variety and frequency of offending) were included.

Sixteen men, in the non-offender (NO) group, reported offending behaviour without convictions at age 32, while three late starter (LS) men who were convicted from the age of 21 reported offending earlier. The LS group thus consisted of 51 men (38+16-3). Eight NO men reported offending behaviour which had never led to a conviction and which had started at age 14 and variously continued to age 18 (n = 3) or to age 32 (n = 5). This meant that the final sample of the early starters (ES) group was 140 (129+3+5+3). The true NO group was thus reduced to 212 (236-16-5-3).

**Procedure**

Late criminal onset was the outcome variable. Accordingly, LS, ES, and NO groups were compared on a key set of dichotomous childhood, adolescent and adulthood predictor or explanatory variables across six different dimensions (psychological/ individual, school, familial, economic, social, behavioural) from four life-time periods: childhood (ages 8-10; 27 variables), early adolescence (ages 12-14; 25 variables), late adolescence (ages 16-18; 24 variables) and adulthood (age 32 years; 24 variables). The variables measured in each age range were not the same.

We wanted to know whether true late onset offending behaviour could be predicted in childhood and/or adolescence, and, if so, by which risk factors. Thus, we were concerned with which risk factors the late onset group had in common with the early onset offenders and with which risk factors they had in common with their non-offending peers. We also wanted to know if there were any features on which they were distinguished from both groups. Our expectation was that they would have many if not most risk factors for offending in common with the ES group, while some other risk factors would not be present or would not influence late onset offenders, at least through some phases of development. Some psychological factors may in fact buffer the impact of certain risk conditions, and exercise some protection in early developmental periods, but may have risk effects in adult life and not wholly rescue an individual from starting a criminal career.

*Analytic Strategy*

A series of odds ratios (ORs) and logistic regression analyses were employed. A number of logistic regressions were carried out for predictors in each age group (8-10, 12-14, 16-18), and then the significant predictors were included together in a final analysis covering ages 8-18.

## Results

*Childhood Predictors of Late Onset Offending*

Table 1 shows childhood features for LS, ES and NO. As expected, LS and NO were alike in many aspects of their childhood. Just five of the 27 early factors (19%) predicted late onset offending. According to the New Junior Maudsley Inventory, LS boys tended to be more neurotic than NO boys. They were also more likely to have been rated as nervous by their parents. They also experienced more physical neglect, poor supervision, poor housing, and were more likely to have truanted than NO boys. ES boys, by contrast, were more likely to be rated as daring, to have a criminal parent, experience poor child rearing, and come from a low income family than LS. They were also more difficult to discipline and more troublesome than LS.

TABLE 1 HERE

*Early Adolescent Predictors of Late Onset Offending*

During early adolescence the only significant difference between LS and NO was in the persistently higher scores on the neuroticism dimension of their personality, again according to the NJMI. By contrast, as expected, LS participants differed in most

aspects of their lives from the ES participants. ES men had had poorer concentration, been more aggressive, and more daring than LS men in this age band; perhaps reflective of the latter, they were also more likely than LS men to have had early sexual intercourse. ES man had had lower non-verbal IQ on the Progressive Matrices test, and were more likely than LS men to have left school at age 15 or earlier. In addition to their personal strengths, LS men had had more stable environments too. They were less likely than ES men to have come from a family in which the father was unemployed, to have been rated by their parents as frequent liars and truants or to be involved with delinquent peers, stealing outside the home or hostile to the police on an attitude questionnaire.

TABLE 2 HERE

*Late Adolescent Predictors of Late Onset Offending*

LS men and NO men had generally been similar in late adolescence too, especially on behavioural factors. LS men had had a higher anti-establishment attitude and reported higher unemployment and more unstable job records at ages 16-18. LS men had also spent more time hanging about outside the house on the streets than NO men. By contrast, LS men were less likely than ES men to have been aggressive at 16-18, to have been injured because of violence or accidents, and to express anti-police attitudes. Compared with ES men they were more likely to have taken or passed exams, and less likely to have unskilled manual jobs or to have experienced unemployment or debts; they were less likely to have had any experience of sexual intercourse at this age. Further differences were found in that LS men were less likely to have had involvement

with antisocial groups, drunk driving, heavy gambling, binge drinking, fights after drinking, self-reported drug use or self-reported violence than their ES peers.

TABLE 3 HERE

*Adult correlates of late onset offending*

By the age of 32, the number of differences between LS and NO men had increased in almost all areas of their lives, and, conversely, LS and ES men had become more similar. LS men showed more signs of alcoholism (as indicated by the CAGE) and a higher anti-establishment attitude than NO men. They had had longer periods of unemployment in the past five years, were more likely to have low-paid jobs, shorter job durations, and to be currently unemployed. LS men were also more antisocial than NO, although still more likely than NO men to rate as anxious and depressed on the General Health Questionnaire. There was a tendency for the highest anxiety and depression ratings to be among those for whom criminal onset occurred very late. Of those who started offending between ages 31-50, 13 out of 33 men (39.4%) were anxious or depressed, compared with 2 out of 15 (13.3%) of those who started offending between ages 21 and 30. Overall, LS men had a significantly higher rating of life-style problems ‘life failure’ at age 32 than did their NO peers. By contrast, there was no difference between LS and ES men in their degree of ‘life failure’ at age 32. The LS men did, however, retain some differences from the ES men. The LS men were less likely to hold an anti-establishment attitude and reported longer job durations than the ES men, being also less involved in binge drinking, using drugs, or stealing from work but also less likely to be in a relationship with a female partner.

TABLE 4 HERE

We considered using p-value corrections but decided not to in light of the arguments of Feise (2002) and Perneger (1998). The number of significant p-values was much greater than the chance expectation of 5 %. Out of 200 tests performed (100 for each comparative group: LS vs. NO and LS vs. ES), 19% of the ORs were significant in discriminating LS from NO men, and 41% of the ORs were significant in discriminating LS from ES men.

*Regression Analyses*

Tables 5 and 6 show the variables that were selected in the regression models in order of their predictive strength (i.e. their contribution to the predictive power of the model), the change in the likelihood ratio chi-squared (LRCS) and the partial OR in the final model.

*Predictors of late starters versus non-offenders*

The most robust predictors for LS compared with NO men were: at ages 8-10 frequent truancy, poor housing and high neuroticism; at ages 12-14 high neuroticism; at ages 16-18 an unstable job record, and spending time hanging about (see table 5). Combining variables at all ages (8-18) the most important independent predictors were poor housing, an unstable job record, neuroticism, and frequent truancy.

TABLE 5 HERE

Using these four all-age significant predictors, a risk measure (from 0 = no risk to 4 = high risk) was developed to investigate how accurately LS could be predicted on the basis of the level of risk. The proportion of LS increased from 21.6% for those with no risk factors (11 out of 123) to 66.7% for those with 3 or more risk factors (4 out of 6). Figure 1 shows the linear relationship between the number risk factors and the chance of being a LS man.

FIGURE 1 HERE

The area under the ROC curve (AUC) plots the probability of a *hit* (e.g. the percentage of LS identified at any cut-off point) versus the probability of a *false positive* (e.g. the percentage of NO identified at the same cut-off point), and it is a measure of how well a risk measure can discriminate between the two groups. The analysis, performed to test the degree of predictive accuracy of the risk measure for LS vs. NO, yielded AUC = .71 (SE = .042, $p < .0001$), indicating that a prediction of group membership on this basis would be correct in 71% of the cases (Zweig and Campbell, 1993).

*Predictors of late starters versus early starters*

The most significant predictors which distinguished the LS men from the ES men were: at ages 8-10 lower troublesomeness, higher nervousness, and not having a criminal parent; at ages 12-14 less frequent truancy, later sexual intercourse, not stealing outside home, and higher low non-verbal IQ; at ages 16-18, lower self-reported violence, later sexual intercourse, exams taken, and not having debts (see table 6). Overall, at ages 8-18, the key independent predictors of LS were lower likelihood of self-reported

violence, truancy, stealing outside home, having sexual intercourse, and higher nervousness and non-verbal IQ ratings.

TABLE 6 HERE

A risk measure (from 0 = no risk to 6 = high risk) was developed to examine accuracy of prediction of LS compared with ES. The proportion of LS diminished from 58.5 per cent for those with 0 risk factors (24 out of 41) to 4.3 per cent for those with 3 risks (1 out of 23), and none (out of 19) for those with 4 or more risks. Correspondingly, the proportion of ES increased from 41.5 per cent for those with 0 risk factors (17 out of 41) to 100 per cent for those with 4 or more risk factors (19 out of 19). Figure 2 shows how the percentage of early starters, compared with late starters, increased with the level of risk. The AUC value was .76 (SE = .038, $p < .0001$), showing that in 76 per cent of the cases ES reported a higher risk score than LS.

FIGURE 2 HERE

**Discussion**

Both our hypotheses were sustained. Late onset offenders could be distinguished both from their non-offending and early onset offending peers on a number of childhood and adolescent factors, but the strongest and most consistent predictors over time referred to nervousness and neuroticism. These factors apparently offered some protection against early onset offending, but failed to protect throughout adult life.

*Limitations of the study*

Our study has limitations. It does not take into account offending committed by people across the whole spectrum of socio-economic class, gender or culture. It would be important to study whether offenders from more diverse backgrounds begin their criminal careers at different times, and any gender differences in offending onset. Furthermore, our research does not consider different types of offences separately. It could be interesting to explore crime specialization and seriousness among late starters. We did not explore neuropsychological factors, nor include analysis of the risk processes for subtypes such as childhood-limited conduct problems recently investigated in developmental psychiatry (Odgers et al., 2007). Further studies that consider the risk processes involved in different offending subtypes could lead to more focused and specified intervention programmes. Finally, as with all longitudinal studies, there must be caution in generalising findings about childhood and adolescence which come from a different social and political era to the present.

*Extending the developmental perspective*

Not much research has been done so far on investigating early influences on adult criminal onset. However, a late criminal career is not as rare as might be believed, and it can be significantly predicted in childhood and adolescence.

Late onset offenders constituted one eighth of the entire sample, and accounted for 26.7 per cent of all offenders (51 out of 191). In childhood, late starters were exposed to a number of family adversities, including physical neglect, poor parental supervision, and poor housing. Their protection from offending at an early age probably lay in their nervousness and neuroticism, as suggested by Farrington et al (1988). Such

psychological characteristics may offer protection through separation from some risk enhancers, such as delinquent peers or risk-taking and bravado activities. It is arguable, however, that the neurotic child or adolescent may be less prepared by avoidance of problems in these periods for the challenging experiences of adulthood. The buffering of neuroticism turns out to be insufficient to exercise the sort of protection that initially prevented antisocial behaviours. It may even leave individuals more vulnerable to offending behaviour, perhaps through pathological mechanisms of coping with this nervousness. LS men were generally more similar to never offending men in childhood and adolescence except for the neuroticism, but in adulthood they became more generally different from them and more similar to ES offenders. Our nervous late starters were more likely to have problems in their interpersonal lives than either of the other groups.

Given that juvenile delinquency is mostly a group activity, it is not surprising that the more solitary children were not involved with antisocial peers or in delinquent behaviour. LS stayed away from daring activities in childhood, and yet they were frequent truants from school, suggesting that they may have preferred avoiding those experiences in which they might have felt threatened by tasks or commitments. Despite the fact that in early development LS did not include behavioural problems or offending, their later adjustment was not as smooth and as easy as one would expect for people who in childhood and adolescence were socially well-behaved. Their overall life success at age 32 was similar to that of early starters. The LS group tended to have unskilled, low-paid and unstable jobs.

Our research suggests that the risk of late onset criminal careers may be predicted in childhood and adolescence. Given these findings, late onset offending deserves special consideration. If nervousness and neuroticism are indeed the key factors, then prevention may well be feasible by enhancing psychological resilience and teaching educational and employment skills, in order to increase later life success.

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*Table 1*

*Childhood predictors of criminal onsets*

| **Ages 8-10** | **Onset groups** % | | | **Odds Ratio** | | | |
|---|---|---|---|---|---|---|---|
| | NO (212) | LS (51) | ES (140) | LS/NO | 95% CI | ES/LS | 95% CI |
| *Psychological/individual* | | | | | | | |
| Nervousness | 26.7 | 30.6 | 17.7 | 1.2 | (.61-2.4) | .49* | (.23-1.0) |
| Neuroticism | 24.9 | 41.3 | 32.1 | 2.1* | (1.1-4.1) | .67 | (.34-1.3) |
| Daring | 19.1 | 27.5 | 47.1 | 1.6 | (.79-3.2) | 2.4* | (1.2-4.7) |
| *Family* | | | | | | | |
| Criminal parent | 17.0 | 25.5 | 42.9 | 1.7 | (.81-3.5) | 2.2* | (1.1-4.5) |
| Physical neglect | 6.3 | 14.6 | 20.6 | 2.5* | (1.0-6.7) | 1.5 | (.62-3.7) |
| Poor child-rearing | 18.8 | 18.4 | 33.6 | .98 | (.44-2.2) | 2.2* | (1.01-5.0) |
| Poor supervision | 12.0 | 22.9 | 29.1 | 2.2* | (1.0-4.8) | 1.4 | (.64-3.0) |
| *Socio-economic* | | | | | | | |
| Low family income | 18.9 | 17.6 | 31.4 | .92 | (.42-2.4) | 2.1* | (1.0-4.8) |
| Poor housing | 26.4 | 51.0 | 48.6 | 2.9* | (1.5-5.4) | .91 | (.48-1.7) |
| *Behavioural* | | | | | | | |
| Difficult to discipline | 14.2 | 20.0 | 34.7 | 1.5 | (.69-3.4) | 2.2* | (1.02-4.8) |
| Troublesome | 12.3 | 17.6 | 38.6 | 1.5 | (.67-3.5) | 2.9* | (1.3-6.5) |
| Truant | 1.9 | 10.0 | 10.8 | 5.8* | (1.5-22.4) | 1.1 | (.37-3.2) |

*Notes*: * 95% confidence interval (CI) does not include 1; $p < .05$.
NO = non-offenders; LS = late starters; ES = early starters.
Non-significant predictors: Broken family; High delinquency school; Dishonesty; Few friends; Impulsiveness; Low non-verbal IQ; Low verbal IQ; Low school attainment; Large family size; Parental disharmony; Neurotic parent; Authoritarian parent; Poor concentration/restless; Sibling behavioural problems; Unpopularity.

*Table 2*

*Early adolescent predictors of criminal onsets*

| **Ages 12-14** | **Onset groups** % | | | **Odds Ratio** | | | |
|---|---|---|---|---|---|---|---|
| | NO (212) | LS (51) | ES (140) | LS/NO | 95% CI | ES/LS | 95% CI |
| *Psychological/individual* | | | | | | | |
| Aggressive | 20.3 | 23.5 | 54.3 | 1.2 | (.58-2.5) | 3.9* | (1.9-7.9) |
| Daring | 8.5 | 9.8 | 21.4 | 1.2 | (.41-3.3) | 2.5* | (1.0-6.9) |
| Early sexual intercourse | 19.1 | 14.0 | 50.0 | .69 | (.29-1.7) | 6.1* | (2.6-14.6) |
| Hostile to police | 17.5 | 25.5 | 40.6 | 1.6 | (.78-3.3) | 2.0* | (1.0-4.1) |
| Neuroticism | 18.9 | 35.3 | 30.4 | 2.3* | (1.2-4.6) | .80 | (.41-1.6) |
| Poor concentration | 15.6 | 25.5 | 42.9 | 1.9 | (.89-3.9) | 2.2* | (1.1-4.5) |
| *Family* | | | | | | | |
| Father unemployment | 7.3 | 4.8 | 20.7 | .64 | (.14-2.9) | 5.2* | (1.2-23.1) |
| *School* | | | | | | | |
| Early school leaving | 51.4 | 56.9 | 77.9 | 1.2 | (.67-2.3) | 2.7* | (1.3-5.3) |
| Low non-verbal IQ | 24.6 | 21.6 | 39.9 | .84 | (.40-1.8) | 2.4* | (1.1-5.1) |
| *Social* | | | | | | | |
| Delinquent friends | 13.7 | 15.7 | 45.7 | 1.2 | (.50-2.7) | 4.5* | (1.9-10.3) |
| *Behavioural* | | | | | | | |
| Frequent lying | 19.3 | 27.5 | 47.1 | 1.6 | (.78-3.2) | 2.4* | (1.2-4.7) |
| Frequent truancy | 14.6 | 13.7 | 54.3 | .93 | (.38-2.2) | 7.5* | (3.1-17.7) |
| Stealing outside home | 7.9 | 9.5 | 33.3 | 1.2 | (.39-3.9) | 4.8* | (1.1-14.2) |

*Notes*: * 95% confidence interval (CI) does not include 1; $p < .05$.
NO = non-offenders; LS = late starters; ES = early starters; SR = self-reported.
The predictor "Early sexual intercourse" refers to age 15 or earlier.
The predictor "Early school leaving" refers to age 15 or earlier.
Non-significant predictors*:* Anxiety; Fighting outside home; Hostility to police; Large family size; Low family income; Low verbal IQ; Nervousness; Poor child rearing; Poor housing; Unpopularity.

*Table 3*

*Late adolescent predictors of criminal onsets*

| **Ages 16-18** | **Onset groups** % | | | **Odds Ratio** | | | |
|---|---|---|---|---|---|---|---|
| | NO (212) | LS (51) | ES (140) | LS/NO | 95% CI | ES/LS | 95% CI |
| *Psychological/individual* | | | | | | | |
| Aggressive | 19.4 | 16.0 | 37.8 | .79 | (.34-1.8) | 3.2* | (1.4-7.3) |
| Anti-establishment | 15.4 | 30.0 | 37.8 | 2.4* | (1.1-4.8) | 1.4 | (.71-2.8) |
| Anti-police | 12.7 | 16.0 | 41.6 | 1.3 | (.56-3.1) | 3.7* | (1.6-8.6) |
| Had sexual intercourse | 62.8 | 66.0 | 92.5 | 1.1 | (.60-2.2) | 6.4* | (2.7-15.3) |
| Injured through violence/road accident | 12.6 | 12.8 | 26.0 | 1.0 | (.39-2.7) | 2.4* | (1.0-6.2) |
| *School* | | | | | | | |
| No exam taken | 40.0 | 44.0 | 70.4 | 1.2 | (.63-2.2) | 3.0* | (1.5-5.9) |
| *Socio-economic* | | | | | | | |
| Debts | 21.9 | 14.0 | 31.1 | .58 | (.24-1.4) | 2.8* | (1.2-6.7) |
| High unemployment | 10.9 | 21.3 | 38.5 | 2.2* | (1.0-5.1) | 2.3* | (1.1-5.1) |
| Unskilled manual job | 7.5 | 10.0 | 31.3 | 1.4 | (.48-3.9) | 4.1* | (1.5-11.1) |
| Unstable job record | 10.9 | 28.0 | 41.0 | 3.2* | (1.5-6.8) | 1.8 | (.88-3.6) |
| *Social* | | | | | | | |
| Antisocial group | 8.5 | 10.0 | 31.9 | 1.2 | (.42-3.4) | 4.2* | (1.6-11.3) |
| Hanging about | 7.5 | 20.0 | 26.7 | 3.1* | (1.3-7.4) | 1.5 | (.66-3.2) |
| *Behavioural* | | | | | | | |
| Binge drinking | 22.4 | 22.0 | 46.7 | .98 | (.46-2.1) | 3.1* | (1.5-6.6) |
| Drunk driving | 14.5 | 18.0 | 33.3 | 1.3 | (.57-2.9) | 2.3* | (1.01-5.1) |
| Fights after drinking | 22.9 | 24.0 | 49.6 | 1.1 | (.51-2.2) | 3.1* | (1.5-6.5) |
| Heavy gambling | 14.5 | 16.0 | 37.0 | 1.1 | (.48-2.6) | 3.1* | (1.3-7.1) |
| SR drug use | 20.9 | 28.0 | 48.9 | 1.5 | (.73-2.9) | 2.5* | (1.2-4.9) |
| SR violence | 8.5 | 4.0 | 44.4 | .45 | (.10-2.0) | 19.2* | (4.5-82.2) |

*Notes*: * 95% confidence interval (CI) does not include 1; $p < .05$.
NO = non-offenders; LS = late starters; ES = early starters; SR = self-reported.
Non-significant predictors: High impulsivity; High neuroticism; Illness; Motoring offences; Poor relationship with parents; Reading problems.

*Table 4*

*Adult correlates of criminal onsets*

| **Age 32** | **Onset groups** % | | | **Odds Ratio** | | | |
|---|---|---|---|---|---|---|---|
| | NO (212) | LS (51) | ES (140) | LS/NO | 95% CI | ES/LS | 95% CI |
| *Psychological/individual* | | | | | | | |
| Alcoholism (CAGE) | 19.7 | 35.4 | 40.2 | 2.2* | (1.1-4.5) | 1.2 | (.61-2.4) |
| Anti-establishment | 16.2 | 29.2 | 49.2 | 2.1* | (1.03-4.4) | 2.4* | (1.2-4.8) |
| Anxiety/depression (GHQ) | 18.7 | 31.3 | 29.7 | 2.0* | (1.0-4.0) | .93 | (.45-1.9) |
| No female partner | 15.7 | 25.0 | 11.9 | 1.8 | (.84-3.8) | .41* | (.17-.95) |
| *Socio-economic* | | | | | | | |
| Current unemployment | 5.6 | 14.6 | 20.5 | 2.9* | (1.1-7.9) | 1.5 | (.61-3.7) |
| High past unemployment | 7.1 | 23.4 | 29.9 | 4.0* | (1.7-9.6) | 1.4 | (.64-3.0) |
| Low-paid job | 21.4 | 38.1 | 29.3 | 2.3* | (1.1-4.6) | .67 | (.32-1.4) |
| Short job duration | 7.1 | 17.0 | 32.5 | 2.7* | (1.1-6.9) | 2.4* | (1.01-5.5) |
| *Behavioural* | | | | | | | |
| Antisocial | 6.6 | 33.3 | 49.2 | 7.1* | (3.1-16.2) | 1.9 | (.97-3.9) |
| Binge drinking | 9.6 | 16.7 | 37.0 | 1.9 | (.77-4.6) | 2.9* | (1.3-6.8) |
| Drug use | 9.6 | 18.8 | 35.4 | 2.2 | (.92-5.2) | 2.4* | (1.1-5.4) |
| Heavy drinking | 15.2 | 12.5 | 35.4 | .80 | (.31-2.0) | 3.8* | (1.5-9.7) |
| Stealing from work | 17.2 | 20.8 | 36.7 | 1.3 | (.58-2.8) | 2.2* | (1.01-4.8) |
| *Composite* | | | | | | | |
| Life failure | 9.6 | 41.7 | 42.2 | 6.7* | (3.2-14.2) | 1.0 | (.52-2.0 |

*Notes*: * 95% confidence interval (CI) does not include 1; $p < .05$.
NO = non-offenders; LS = late starters; ES = early starters; SR = self-reported.
CAGE: alcohol screening instrument (see Mayfield, McLeod, & Hall, 1974).
GHQ = General Health Questionnaire, designed to detect non-psychotic psychiatric illness (anxiety/depression) (see Goldberg, 1978).
The variable "High past unemployment" refers to having been unemployed for 10 months or more in the last 5 years. The Life failure index was a combined measure based on 9 criteria: unsatisfactory accommodation; unsatisfactory cohabitation; unsuccessful with children; unsatisfactory employment history; involved in fights in the last five years; substance use in the last five years; self-reported offenses (other than theft from work or tax fraud) in the last five years; unsatisfactory mental health (scoring five or more on the GHQ); convictions in the last five years (Farrington et al., 2006).
Non-significant predictors: Aggressive attitude; Drunk driving; Heavy gambling; Fighting; Impulsivity; Involvement in fights; Neighbourhood problems; Not home owner; Poor home conditions; Stormy relationship with partner; Unstable job record.

*Table 5*

*Logistic Regression Analyses for Variables Predicting Late Starters (1) vs. Non-offenders (0)*

| Age | Predictors | LRCS Change* | p | Partial OR | p |
|---|---|---|---|---|---|
| 8-10 | Truant | 6.83 | .009 | 4.6 | .034 |
| | Poor housing | 5.01 | .025 | 2.2 | .028 |
| | Neuroticism | 4.13 | .042 | 2.1 | .039 |
| 12-14 | Neuroticism | 5.94 | .015 | 2.3 | .013 |
| 16-18 | Unstable job record | 8.26 | .004 | 2.8 | .010 |
| | Hanging about | 4.01 | .045 | 2.6 | .039 |
| 8-18 | Poor housing (8-10) | 12.78 | .001 | 3.0 | .002 |
| | Unstable job record (16-18) | 7.61 | .006 | 3.2 | .004 |
| | Neuroticism (12-14) | 5.29 | .021 | 2.5 | .013 |
| | Truant (8-10) | 4.27 | .039 | 4.7 | .037 |

*Notes*: Forward stepwise analyses used.
LRCS = Likelihood Ratio Chi-Squared; OR = Odds Ratio.
* When predictor added to equation.

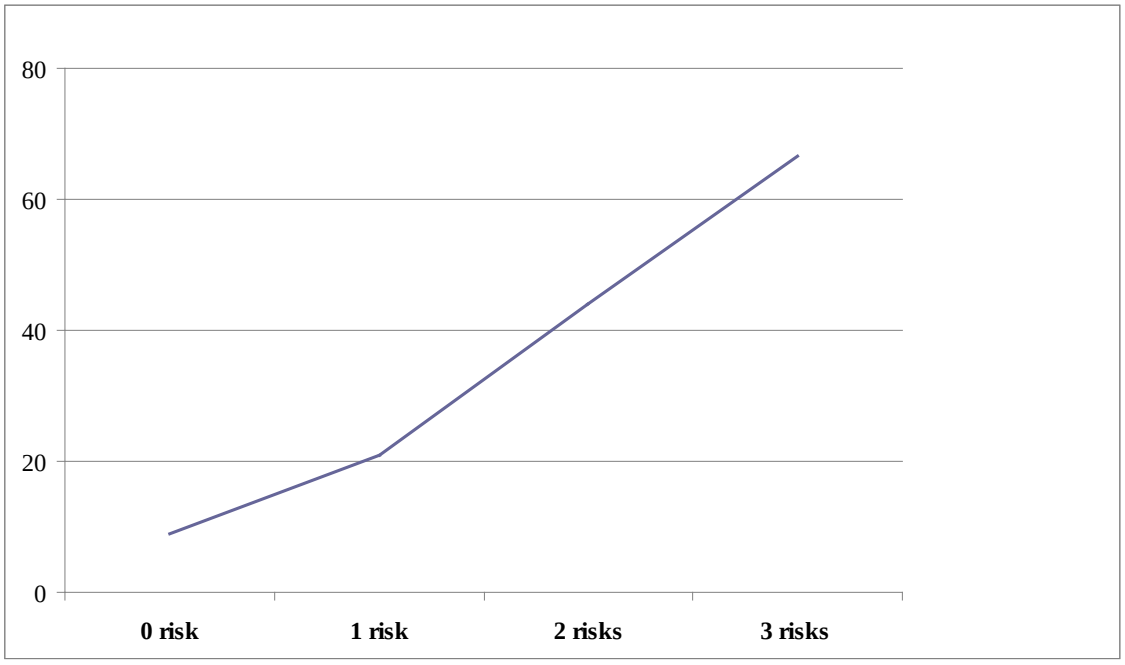
*Table 6*

*Logistic Regression Analyses for Variables Predicting Early Starters (1) vs. Late Starters (0)*

| Age | Predictors | LRCS Change* | p | Partial OR | p |
|---|---|---|---|---|---|
| 8-10 | Troublesome | 6.49 | .011 | 2.5 | .033 |
| | Nervousness (-) | 3.41 | .065 | .44 | .043 |
| | Criminal parent | 3.73 | .053 | 2.1 | .059 |
| 12-14 | Frequent truancy | 23.79 | .001 | 5.9 | .001 |
| | Early sexual intercourse | 12.71 | .001 | 7.3 | .001 |
| | Stealing outside home | 8.85 | .003 | 5.2 | .008 |
| | Low non-verbal IQ | 5.11 | .024 | 3.0 | .030 |
| 16-18 | SR violence | 34.06 | .001 | 15.6 | .001 |
| | Had sexual intercourse | 11.57 | .001 | 5.4 | .001 |
| | No exams taken | 8.47 | .004 | 3.0 | .007 |
| | Debts | 5.54 | .019 | 3.0 | .025 |
| 8-18 | SR violence (16-18) | 31.81 | .001 | 21.6 | .004 |
| | Frequent truancy (12-14) | 13.48 | .001 | 4.7 | .007 |
| | Stealing outside home (12-14) | 7.45 | .006 | 8.6 | .005 |
| | Had sexual intercourse (16-18) | 5.96 | .015 | 4.9 | .009 |
| | Nervousness (-) (8-10) | 5.73 | .017 | .23 | .011 |
| | Low non-verbal IQ (12-14) | 6.90 | .009 | 4.2 | .014 |

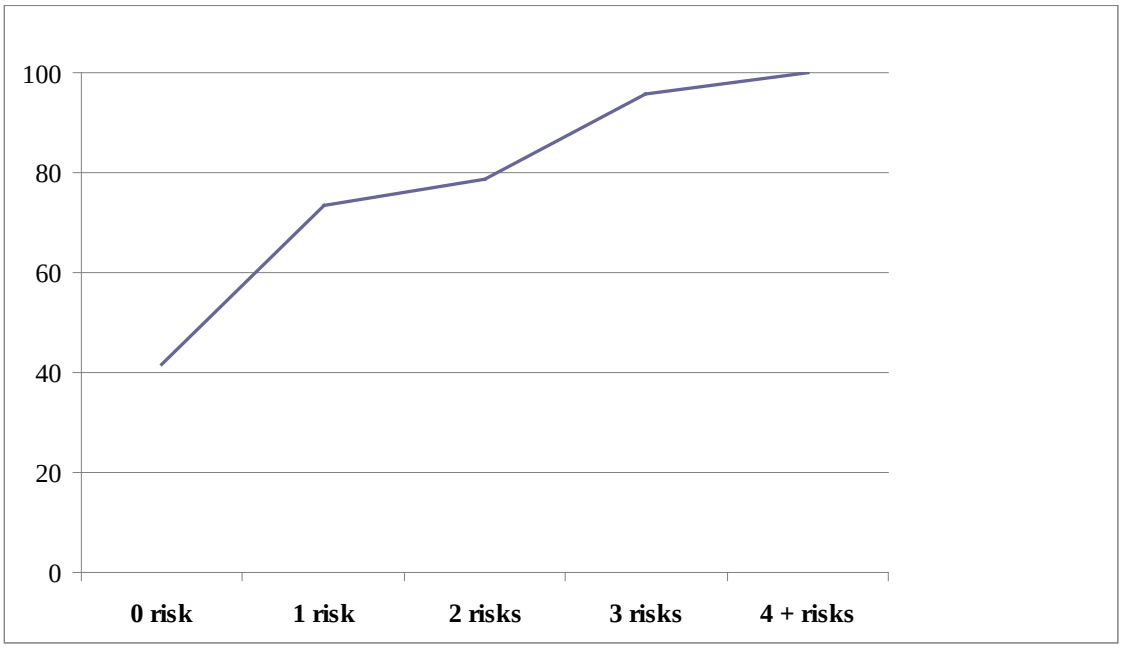
*Notes*: Forward stepwise analyses used.
LRCS = Likelihood Ratio Chi-Squared. OR = Odds Ratio.
(-) = Negatively Related.
* When predictor added to equation.

*Figure 1 - Percent of late starters compared with non-offenders*




Note: *ROC* (Receiver Operating Characteristic) *curve analysis*: AUC = .71; SE = .042; $p < .0001$

*Figure 2 - Percent of early starters compared with late starters*




*Note: ROC* (Receiver Operating Characteristic) *curve analysis*: AUC = .76; SE = .038; $p < .0001$

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