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Assessment of risk for juvenile compared with adult criminal onset:  
Implications for policy, prevention and intervention

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**Abstract**

Most risk assessment instruments aim to predict juvenile offending to aid effective prevention policy. The aims of this study were to explore to what extent adult onset offending can be predicted and by which different risk measures, and to examine the extent to which some psychological dynamic factors may buffer the effect of risk factors so as to delay onset and therefore promote adult onset offending.

Longitudinal data from the Cambridge Study in Delinquent Development (CSDD) were analyzed. 403 South London men, followed from ages 8-10 to ages 48-50, were divided, on the basis of conviction records, into late starters (LS = 38), early starters (ES = 129) and non-offenders (NO = 236). Four risk measures (antisocial behavior, family, socio-economic, and internalizing) were studied. The findings showed that late-onset offending, at age 21 or thereafter, was predicted by internalizing problems. Early onset offending before age 21 was predicted by antisocial behavior, family risk, and to a modest degree by socio-economic risk measures. Internalizing behavior was negatively related to early onset but positively related to late onset offending.

This is the first longitudinal investigation to show that different factors predict early or late delinquent onsets. These findings suggest that including psychological dynamic factors in the assessment of risk not only improves the prediction of future offending, but also informs prevention policies and clinical intervention. Early and late onset offending deserve separate consideration and need different risk assessment processes and instruments not only to measure the level of risk but especially to reduce it. Internalizing factors as well as externalizing factors should be targeted in intervention programs.

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*Keywords:* early starters, late starters, risk factors, delayed risk, risk assessment

## Theoretical background of the study

Predicting who will or will not behave criminally involves risk assessment (Gottfredson & Moriarty, 2006). The aim of risk assessment in current practice is to identify individuals who pose a high risk for reoffending and violence; this is useful for criminal justice purposes in targeting treatment and rehabilitation.

Risk assessment measures are mainly developed by including risk factors that are robust, significant and strong predictors of future criminality. A risk factor means a variable that predicts a high probability of offending. Each risk factor is given a specific weight depending on its presence or absence in the individual case examined and on its importance in the general pattern of risk. This research has led to the expansion of a risk-focused approach and the recognition of its rehabilitative (Farrington & Welsh, 2007) and preventive implications (Farrington, 2003). The rationale behind this approach is simple: if a risk factor is a major predictor of future criminality, the level of offending might be significantly reduced by targeting that risk factor (Farrington, Loeber, Jolliffe, & Pardini, 2008). This depends on whether the risk factor is causal or a risk marker. Research has also shown that the probability of criminal outcomes increases depending on how risk factors operate in a cumulative fashion, the so-called *dose-response relationship* (Loeber, Slot, & Stouthamer-Loeber, 2008). Research shows the aggravating impact that risk factors have depending on their number and on the duration of their influence. However, the available risk assessment measures often have three limitations regarding the generality of their outcomes.

First, the prediction of human behavior is difficult. Hanson (2009) advocates that psychological risk assessments are different from other forms of assessment because the

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targeted problem is only indirectly observed. The accuracy of prediction seems to decrease with time as it is very complex to anticipate how an offender is likely to behave in the distant future.

Second, any risk procedure focuses on high risk offenders, whose risk is likely to be assessed in a retrospective fashion. This implies an assessment that works backwards on the basis of their previous serious crimes and historical criminal career – *static factors* (e.g. age of first arrest or conviction, number of previous arrests or incarcerations, number of convictions, etc.). Most procedures are not efficient in assessing future risk in individuals who do not match the high risk criteria established, and most risk assessments are not employed for prevention. Generally high risk groups benefit most from treatment, if it is intense (Andrews & Bonta, 2010b). In contrast, low to medium risk groups are most likely to be responsive to prevention programs. Starting early – nipping criminality in the bud (Sutton, Utting, & Farrington, 2006) – is recognized as being central to prevention. Better characterization of the nature of risk for future antisocial behavior in childhood can help the development of more specific and efficient intervention to prevent children becoming either juvenile offenders or criminal adults. Success in prevention is regarded as also fostering wellbeing, psychological health, family stability, and social functioning. Program policies designed for primary prevention are likely to play a significant role in reducing the general level of criminality, and in diverting many individuals from becoming delinquents.

Third, risk assessment is often devised to examine which risk factors are present in the individual and in his or her environment, and to what extent. This examining process may well lead the assessor to gather the necessary and sufficient information to

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ascertain the risk that the individual poses to society and the likelihood of that risk being translated into criminal behavior. Notwithstanding its success, there are some restrictions in this approach. It is unidirectional in that it considers only the categorical risk dimension of crime, relying on administrative data or historical behavioral patterns, and neglects those psychological intervening factors that may nullify or reduce the risk of early onset, or may contribute to delaying criminal onset and promoting adult offending. It follows that some factors could be *promotive* (Farrington, et al., 2008) in so far as they predict a low probability of offending. More research is paramount in order to explore directly the promotive implication of certain factors and experiences over social development and adjustment. It seems that one current hindrance to risk assessment development is its neglect of adult onset offending, although longitudinal studies have been able to produce evidence to claim that early life experiences and factors are developmental precursors of adult offending (Farrington, 2005; Loeber, Slot, van der Laan, & Hoeve, 2008).

### **Risk assessment**

Professionals in the criminal justice system and mental health fields have gathered confidence in the belief that “nothing predicts behavior like behavior” (Kvaraceus, 1966, p. 53). It follows that risk assessment has become relevant in a wide range of criminal and civil decisions, such as pre-charge diversion, pretrial detention, eligibility for alternative measures, and suitability for treatment programs (Hoge, Vincent, & Guy, in press). It has been mostly employed to predict serious criminal behavior (Andrews, Bonta, & Wormith, 2006), social dangerousness (Gulotta & Vittoria, 2002), violence (Gray, Taylor, & Snowden, 2011), and criminal recidivism (Mulvey & Lidz, 1998).



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Despite the recognition of its value, risk assessment is not immune from criticism. It is seen as a *risky business* (Glazebrook, 2010, p. 88) not least because of society's preoccupation with the ascertainment and avoidance of risk, but especially because of the omnipresent "language of risk" (Horsefield, 2003, p. 376) that sees offenders only as consumers of risk assessments. Some evidence of this trend can be found in current practice where risk assessment is rarely used in prevention policy. An exception to this is the development of the EARLS (20B and 21G) (Augimeri, Walsh, Liddon, & Dassinger, 2011), which are designed to guide and assist intervention, apart from assessing the severity of risk. When assessing risk more research and policy attention is paid to "true and false positives" than to "false negatives"; more on what people *do* rather than on why people *don't*.

Risk assessment is a means and not an end. It is not simply a reactive process so that 'once a risk, always a risk'. It is meant to be, in the scientific evidence-based spirit, a proactive process of assessing those modifiable factors. Within this perspective, the *risk, need, responsivity* (RNR) model (Andrews & Bonta, 1994) has influenced the way risk factors are now seen, assessed, and explored. This is particularly relevant in the present context because it promises an integration of work on developmental criminal onsets and the identification of those offender risks and needs that represent the "active ingredients" to tailor the most appropriate intervention that addresses the criminogenic factors. Static dimensions are integrated with dynamic dimensions, and the psychological nature of some risk factors has led to the recognition of criminogenic needs which are dynamic psychological factors that can change. In this instance, change refers to "changes in the chances of criminal activity" (Andrews & Bonta, 2010a, pp. 21–22).

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The idea of integrating risks and needs, in the process of assessment, allows for a better understanding of “how the past influenced the future” (Taxman & Thanner, 2006, p. 31). *Risk* is essentially fastened to the past. A possible suggestion is to identify, as early as possible in the life of the individual, how strongly the past is likely to influence the future prosocial development of the offender. *Need* is an indicator of the extent to which either daily functioning is altered or protective factors are reduced in warding off criminal engagement. If one way to enhance prediction is to focus on risk factors and to enhance protective factors (Augimeri, Enebrink, Walsh, & Jiang, 2010), one way to serve prevention is to concentrate on a reliable process of risk assessment that looks at risks and needs in their temporal influential occurrence.

### **Delayed risk and adult offending**

Research (Kraemer, Lowe, & Kupfer, 2005) tells us that risk factors are not equal in terms of what functions they might serve, in their timing of impact, and in their ability to predict an outcome. Farrington (1995) emphasized that risk factors differ in the magnitude of their relationship with an outcome. Moreover, what longitudinal studies have shown is that risk factors rarely, if ever, operate in a social or psychological vacuum. Stouthamer-Loeber et al. (1993) have explored the double edge of risk factors for delinquency, and recognize that risk factors have two directional effects. Their argument is that risk factors may not only promote delinquency but also suppress non-delinquency.

The impact of risk events and life circumstances on the individual is not always immediate or direct, but is often mediated or moderated by specific risk factors. In the area of risk assessment, no evidence is available on the exact role of psychological

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factors in the presence of other risk factors; there are no specific findings on whether internalizing factors are promising and useful in the assessment of criminal risk. The impact of risk factors on offending is usually measured by the precocity of antisocial onset, which will be earlier if the impact of risk is greater and later if the influence of protection is greater. Some factors may in fact restrain the impact of risk to the extent that criminal onset will be postponed only to appear as a late onset.

*Delayed risk* is the probability of an outcome emerging later in time than the occurrence of the risk factor. It is a case of where the translation from antisocial potential to antisocial behavior takes a longer temporal route. This seems to occur because the impact of risk factors is mitigated by individual differences and by some psychological aspects (e.g. internalizing difficulties) that lie dormant for a certain period of development and then emerge into criminality (Kerr, Tremblay, Pagani, & Vitaro, 1997). West and Farrington (1977) spoke of a sort of latent risk process ("*sleeper effect*"), whose manifestations are delayed in time, and could be seen only later. Not all risk factors are simply negative, in so far as some internalizing factors could have a protective impact even though they are not themselves desirable. In cases like this the predictive accuracy of risk measures that are designed to identify high risk cases may be reduced because these assessments are not developed to predict delayed risk.

The pattern of theoretical linkages from this analysis indicates that, rather than each risk factor operating through the same temporal mechanism, there are likely to be multiple mechanisms influencing criminal onsets. Researchers and clinicians involved in the assessment of risk should always recognize that antisocial behavior unfolds over time, and that it is shaped by individual differences. Individual pathways to maladaptive

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adjustments respond to two order of principles. A variety of developmental experiences may in fact emerge in a given mental or behavioral problem, rather than assuming a single and common pathway to a problem. On the other hand, the same risky or protective condition may progress towards different outcomes (Cicchetti & Toth, 2009). This approach is not new in developmental psycho-criminology and supports the importance of considering *equifinality* and *multifinality* (Cicchetti & Rogosch, 1996). The rationale behind these principles is that the pathway to offending may be reached from a variety of multiple risk conditions and through different processes, and also in different times in the life course.

Research shows that while early offenders are more at risk for a longer and aggravating criminal career (Loeber & Farrington, 2001), late offenders can be at risk for a short and yet serious offending pattern. In an examination of the Cambridge Study, Farrington and colleagues (1988b) investigated a sample of boys from vulnerable backgrounds who, despite the prediction to become offenders, were in fact not convicted (“false positives”). Their findings show that some early factors prevented the vulnerable unconvicted men from offending. Those who remained unconvicted, going against all predictions, had low daring (risk-taking), few friends, and were withdrawn and shy children. In their study, Zara and Farrington (2009) found that nervousness, anxiety, neuroticism, and being a sexual virgin at age 18 had some mitigating effects against early offending, but were likely to foster adult maladjustment, life failure, and adult criminality.

We believe that knowledge of such different and parallel effects is crucial for both the identification of risk and for targeting which factors have policy implications for

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prevention and treatment. To the best of our knowledge there is no prior research in risk assessment that includes factors which especially aid the prediction of delayed risk, and emphasize prevention, as oppose to prediction per se. For instance, anxiety or nervousness are not obviously disruptive problems, and this can explain why they are not usually included in risk instruments. Internalizing disorders in children and adolescent are common; mostly they are malleable in so far as a significant number of youths escape their risk status even in the absence of active treatment, and do not show persistent symptoms of internalizing disorders thereafter. However, for a significant minority of children and adolescents, internalizing problems are persistent, and stability is evident although the expression of the disorder may change over time.

Research studies have frequently shown a high clinical interrelation amongst internalizing problems, which constitute a cluster that is the second most common pattern of developmental psychopathology. Only the cluster of externalizing problems tends to be reported more frequently. The frequency of identifying a problem and reporting it depends, however, not on the seriousness and importance of the problem per se, but on the immediacy of the consequences deriving from it. Externalizing problems are certainly more dramatically evident; they cause distress on others; they require to be contained both at home and at school. Children who manifest externalizing problems attract more often and directly the attention of adults. Children who suffer from internalizing problems do not cause concern because their suffering is silent, almost unseen and unheard; the identification of their needs often emerge later in life. Horney (1945) clinically described the difference between these children: there are those “who move against the world” (externalizing) and those “who move away from the world”

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(internalizing). This demarcation appeared to have resulted in a paucity of research on some factors such as anxiety and nervousness in the development of delinquency.

The prediction of future behavior among people who are not early onset offenders or who are not at an immediate risk is important for policy and prevention. Late onset offenders are the kind of offenders who constitute a challenge for current risk assessment. *Why?* These individuals are outside the margins of “significant extremes” and can easily pass through the sieve of risk identification without “being noticed”; they did not meet the criteria for high risk children, but nevertheless their odds of being at increased (though delayed) risk for later adverse outcomes is significant. The prediction was that they would continue being non-offenders, but nevertheless they are convicted later in life. Although rates of persistence are usually greater for conduct disorders (externalizing) than emotional and psychological disorders (internalizing), it is evident that many children with internalizing problems continue to suffer from emotional and psychological problems for a prolonged period of time, whose consequences are more likely to follow a process of accumulation of risk that will be seen only later in life.

The purpose of this paper is to address the necessity of having differential risk instruments for juvenile and adult offending, and to include psychological dynamic factors in the process of assessing delayed risk. Risk assessment is used here to intend a process to evaluate risks and needs. It is an attempt to integrate the dynamic dimensions of risk factors with the longitudinal analysis of delinquent development.

### **Empirical questions**

Despite recent empirical progress on delinquent development and antisocial onset trajectories, at least four empirical issues remain to be answered: 1) To what extent can

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late onset offenders be predicted in childhood? 2) To what extent do internalizing problems foster late onset offending? 3) What do we gain by adding internalizing problems to the composite risk? 4) Can the same risk instruments predict early onset and late onset offending?

We start by reporting the association between early onset offending, late onset offending, and a wide range of early risk factors that may play a differential role in the determination of delinquent onsets.

### **Early and late criminal onsets**

Considerable findings are available about factors influencing early antisocial onset. Criminal onset in adulthood is not fully understood and much less is known about the psychosocial and delinquent profiles of late onset offenders.

An *early criminal onset* is defined here as a criminal conviction before age 21. A *late criminal onset* is defined as criminal behavior that begins in adulthood, at age 21 or later. In England and Wales a person aged 18 to 20 is considered a young adult, and at age 21 is recognised as an adult. In all the Western world the age of 21 marks not only the full legal age of adult criminal responsibility and the beginning of cognitive maturity, but also the psychological and social mid-point of *emerging adulthood* (from late teens to mid-20s) (Arnett, 2000). Emerging adulthood, in the sense addressed by Arnett (2007a), sets the idea of a *quarterlife crisis*. It depicts a new life period in industrialized societies that distinctively reflects the completion of studies and the entry of the individual into the labor market. On the other hand, emerging adulthood is also characterized by serious mental health problems, substance use disorders, risky sexual behaviors, and problems with the criminal justice systems. Emerging adulthood has in fact become the peak age

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period for many behaviors that societies try to discourage (Arnett, 2007b). International criminal statistics, official data, self-reports and prison surveys reveal that significant numbers of offenders initiate offending when adults (Elander, Rutter, Simonoff, & Pickles, 2000). Research findings indicate that a majority of adults do not have a juvenile criminal record (McCord, 1980, 1983), and that “offending is not predominantly a teenage phenomenon” (Farrington, 1986, p. 235).

Within this broad perspective, the age of 21 is considered as a suitable age cut-off for establishing late criminal onset. McGee and Farrington (2010) show that, while the number of first-time offenders in their analysis decreased after age 21, those offenders with a first conviction at age 21 or later had qualitatively different criminal careers from early-onset offenders. If previous research has shown that differences exist in the type of individuals involved in late onset offending compared to early-onset offending (Eggleston & Laub, 2002), in their level of risk (Zara & Farrington, 2010), in their criminal activity trajectory and life-style (Harris, 2011), in their mental health (Fornari, 2008), it would be expected that to prevent the progression of adult onset offenders into a criminal career, prevention initiatives should be specifically based on knowledge about late onset offenders, and intervention policies should assist the criminogenic needs and risk of this group of offenders.

### **Method**

In order to explore delinquent development, various risk scales were developed from the Cambridge Study in Delinquent Development (CSDD) data. The CSDD is a prospective longitudinal survey of 411 males who have been followed-up from ages 8-10 to ages 48-50. The study began in 1961. The original aim of the study was to explore the



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development and prediction of delinquent and criminal behavior in inner-city males. 87% of the boys ( $n = 357$ ) were White in appearance and of British origin, and most grew up in working-class, two-parent families. The CSDD boys were tested in schools when they were aged 8, 10, 14, interviewed in a research office at ages 16, 18, and 21, and interviewed in their homes at ages 25, 32 and 48. The CSDD is the only longitudinal project in criminology that includes more than five personal interviews over a 40-year-follow-up period.

Data on psychological and temperamental characteristics, psychomotor impulsivity, and cognitive attainments were collected using tests in schools. Information about familial, scholastic, and occupational factors, relationships with girls and women, and life-success, along with official records and self-reports, were gathered during interviews with the males. Interviews with the boys' parents provided details on their boy's level of nervousness and daring, family matters such as income, family size, unemployment, child-rearing styles, parental supervision, the boy's temporary or permanent separations from the parents, and marital disharmony. Teachers were asked to complete questionnaires when the boys were aged 8, 10, 12 and 14. They supplied information about the boy's troublesome and aggressive behavior at school, hyperactivity and 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 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 men still alive (93 percent) (Farrington et al., 2006). The measures, tests of validity and

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reliability, and major findings have been reported in five books (Piquero, Farrington, & Blumstein, 2007; West & Farrington, 1973, 1977), and in many comprehensive publications (e.g. Farrington, 2003; Farrington, Coid, & West, 2009). These publications should be consulted for more information about the data collected.

### **Participants**

The sample in this research was selected from the original CSDD sample of 411 males. It consists of 129 early starters (ES) and 274 non-early starters (NES). The ES were those offenders whose first criminal conviction occurred before age 21. Eight males were excluded from the analysis because of death and emigration. Of the NES, 236 were non-offenders (NO) who had no criminal record, and 38 were late starters (LS) whose criminal career began with their first conviction at the age of 21 or later.

It may be argued that LS were those offenders who had been detected by the criminal justice system only as adults, but not as juveniles when they perhaps started offending, and that late onset offending is a methodological artefact of the probability of apprehension. However, a study of Zara and Farrington (2010), which focused on comparing both official and self-report criminal onsets, documented that CSDD self-report data did not show any discrepancy from official records, indicating that LS were “true” late onset offenders. No differences were found between NO and LS in self-reported delinquency at ages 14 and 18. However, LS were more likely than NO to admit offending at age 32 (OR = 4.3, 95% CI = 1.0-9.5). No difference was found between ES and LS in self-reported offending at age 32.

Differences in the criminal careers of ES versus LS were found in the duration of their criminal careers ( $M = 10.78$  and  $M = 3.28$  years respectively;  $F(1, 165) = 15.724, p$

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< .0001), in the average number of offences committed ( $M = 5.68$  and  $M = 1.97$ ;  $F(1, 165) = 16.024$ ,  $p < .0001$ ), and in the seriousness of offences committed, with LS on average committing more serious crimes. McGee and Farrington (2010), comparing the CSDD conviction and self-reported delinquency data, found that LS were relatively more often involved in offences such as sex offences, theft from work, vandalism, fraud, violence, and carrying an offensive weapon. On the other hand, for ES the commonest types of offences were burglary, theft of a motor vehicle, other thefts, and shoplifting. The odds of becoming a recidivist offender were 6 times higher for ES than for LS (OR = 6.1, 95% CI = 2.8-13.2), and yet almost 40% of LS were recidivists.

### Measures

Four risk scales were developed: the antisocial behavior (AB) scale; the family risk (FR) scale; the socio-economic (SE) scale; the internalizing (IN) scale.

The *antisocial behavior* (AB) scale consisted of 10 variables measured at ages 8-10: troublesomeness, conduct problem, difficult to discipline, dishonesty, has stolen, gets angry, daring, lacks concentration/restlessness, impulsive, and truant (see Farrington, 1991 for a full description). The *family risk* (FR) scale consisted of 6 variables, measured at ages 8-10: having a criminal parent, parental disharmony, physical neglect, child separation, poor supervision, and parental authoritarianism. The *socio-economic* (SE) scale consisted of 9 variables, measured at ages 8-10 and 12-14: large family size (measured at ages 8 and 14), overcrowded accommodation (measured at ages 8 and 14), poor housing (measured at ages 10 and 14), low family income (measured at ages 8 and 14), and father unemployed (measured at age 14). The *internalizing* (IN) scale consisted

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of 5 variables, measured between ages 8 and 18: nervousness at age 10, high anxiety at age 12, neuroticism at ages 14 and 16, no experience of sexual intercourse by age 18.

All the variables included in each risk scale have been found in previous research to be reliable and robust predictors of future offending. Specific preliminary analyses were carried out to identify those variables which were significantly associated with offending. All the redundant and overlapping items were eliminated. For instance, as Farrington (1991) suggested, to also include in the AB scale the variable “laziness”, which was indeed related to antisocial behavior, would however create some overlapping with the variable “lack of concentration”, which in fact has been included in the AB risk scale. To avoid this, the variables included in each risk scale are independent predictors of criminal onset, and the ones included are only those which reported the highest correlation value with criminal onset. The following general principles were applied in devising the 4 scales:

1. Each risk variable included was dichotomized, as far as possible, into the “worst” quarter versus the remainder. As Farrington (1991) suggested “it is difficult to summarize relationships between variables that identify less than 5 per cent of the sample and, conversely, if half or more are identified by a variable, it is hard to argue that the variable is a *measure of antisocial behavior*” (Farrington, 1991, p. 391, *emphasis added*).
2. The rationale behind the choice of dichotomous variables, to create a risk scale, has to do with the nature of the variables studied. Many variables were inherently dichotomous, like having a criminal parent. Many explanatory variables were not normally distributed but skewed.

Dichotomization helps to isolate those cases who are mostly affected by the variable under investigation, and the relative influence of all variables can be analyzed by direct comparisons. (For descriptions of the benefits of dichotomization techniques see Farrington & Loeber, 2000).

3. The use of dichotomous variables to create risk measures promotes a focus on individuals rather than on variables. At the level of cumulative risks, it is possible to identify directly those people affected by multiple risks. As Loeber and colleagues (1998) point out, the percentage of individuals influenced by a variable or a combination of variables is a rather meaningful and clear statistic. Knowledge based on individuals and on their adjustment to life, depending on the presence or absence of a certain condition, or on the accumulation of risks, is more relevant for preventive interventions.
4. Only those variables that were significantly correlated with offending were included in the scales.
5. Those variables, though conceptually distinct, that reflected an underlying pattern of risk over time, were included in a specific scale.
6. Variables were chosen to create risk scales involving not only behavioral factors, but also variables that include a broad spectrum of a child's development (psychological, familial, behavioral and socio-economic).
7. Each variable was included in only one scale.

Each item in each measure was summed to create the scale, with higher scores representing more risk exposure. All scales reported a modest to high alpha reliability

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value. The reliability values were respectively .67 for the AB risk scale, .62 for the FR scale, .78 for the SE risk scale, and .67 for the IN risk scale. These values are inevitably lower than in many psychological tests “because of the elimination of overlapping and redundant variables” (Farrington, 1991, p. 391). Reliability would have certainly increased if the number of items that made up the risk scales created for this research have had been greater. However, maximizing measured reliability was not a leading aim in constructing these scales.

### **Procedure**

Traditionally the standard statistic for reporting predictive validity was the correlation coefficient. However, research has clearly shown that one limitation of correlation coefficients is that they are influenced by the amount of variability in both the predictor and the outcome variables (Hanson, 2008). Hence, correlation coefficients are not the most sensitive method of calculating the accuracy of risk prediction measures. The best measure of predictive efficiency in an  $N \times 2$  table, relating risk scores to an outcome such as criminal onset, is the area under the ROC curve (AUC) (Zweig & Campbell, 1993) because AUCs are less dependent on the base rate of the outcome variable in the sample. Like the odds ratio (OR), the AUC is unaffected by changes in sample size (see Farrington, Jolliffe, & Johnstone, 2008). It is however important to bear in mind that AUCs are influenced by the variability in the risk scores (see Humphreys & Swets, 1991).

The receiver operating curve (ROC) analysis indicates the degree to which the total prediction is accurate; the maximum value of the AUC equals 1 (there is a perfect separation of the values of the two groups under investigation: late offenders vs. non-

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offenders or early offenders vs. non-early offenders; in other words a value of  $1$  indicates that there is no overlapping of the distributions); the chance value is  $0.5$ . The ROC curve plots the probability of a true positive (“hit”) (e.g. the fraction of late offenders identified at each cut-off point) against the probability of a false positive (“false alarm”) (e.g. the fraction of non-offenders identified at each cut-off point).

### **Analysis**

The analysis was in two stages. The first stage was to explore to what extent the risk scales constructed were able to predict early offending versus non-early offending, early versus late offending, and late offending versus non-offending. In the second stage, the identified risk factors were summed into cumulative risk scales. It was expected that predictive accuracy would be higher with the increase in cumulative risk exposure. For this analysis, each risk factor was given a weighting of  $1$ .

### **Results**

#### **Risk Scales**

##### **Antisocial behavior (AB) scale.**

The risk measure of AB (from  $0$  = no risk to  $10$  = high risk) was first employed to examine the accuracy of prediction of ES compared with NES. As expected the AB scale was the most significant predictor of early onset offending. Figure 1 shows that the proportion of ES increased from  $15.9\%$  for those with  $0$  risk factors (13 out of 82) to  $73.7\%$  for those with  $7$  or more risks (14 out of 19). The area under the ROC curve (AUC) indicates how well the risk measure discriminated between ES vs. NES. The AUC value was  $.722$  ( $SE = .028$ ,  $p < .0001$ ), indicating that a prediction of group membership on this basis would be correct in  $72\%$  of the cases. The level of predictability of the AB

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scale was also significant but less strongly when comparing ES and LS. The AUC value was .629 (SE = .049,  $p < .015$ ). The proportion of ES increased from 72.2% for those with 0 risk (13 out of 18) to 92.3% for those with 7 or more AB risks (12 out of 13). Conversely, it decreased respectively from 27.8% (5 out of 18) to 7.7% (1 out of 13) for LS.

The AB scale also predicted LS compared with NO. The AUC value was .638 (SE = .046,  $p < .006$ ). Figure 1 shows that the proportion of LS increased from 5.8% for those with no risk factors (4 out of 69) to 26.7% for those with 6 or more risk factors (4 out of 15)<sup>1</sup>. Table 1 reports the results of all the ROC (AUC) analyses: the values; the SE; the  $p$ -values for each comparison.

FIGURE 1 HERE

TABLE 1 HERE

#### **Family risk (FR) scale.**

The risk measure of FR (from 0 = no risk to 6 = high risk) predicted early onset offending. The AUC value was .679 (SE = .030,  $p < .0001$ ). The percentage of those who became ES rose from 20.7% for those with no risk (29 out of 140) to 75% for those with 5 or more risks (12 out of 16). When comparing ES and LS, family risk had only a very modest significant level of predictability. The AUC value was .606 (SE = .050,  $p < .052$ ). The proportion of ES increased from 72.5% for those with 0 risk (29 out of 40) to 92.3% for those with 5 or more FR risks (12 out of 13). Conversely, it decreased respectively from 27.5 % (11 out of 40) to 7.7 % (1 out of 13) for LS.

However, family risk was not significant in predicting late onset offending versus non-offending. The AUC value was .597 (SE = .052,  $p < .060$ ).



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**Socio-economic (SE) scale.**

The risk measure of SE (from 0 = no risk to 9 = high risk) significantly predicted early onset offending. The AUC value was .648 (SE = .030,  $p < .0001$ ). The proportion of ES increased from 20.7% for those with no risk (28 out of 135) to 73.1% for those with 7 or more risks (19 out of 26). In contrast, when comparing ES and LS, socio-economic risk was an insignificant predictor of offending (AUC = .590, SE = .051,  $p < .095$  n.s.). The proportion of ES increased from 73.7 % for those with 0 risk (28 out of 38) to 82.6% for those with 7 or more SE risks (19 out of 23), and conversely it decreased respectively from 26.3% (10 out of 38) to 17.4 % (4 out of 23) for LS. The probability of early onset increased especially at the high risk (7 or more) end.

Socio-economic risk did not significantly predict late onset offending vs. non-offending (AUC = .571, SE = .049, n.s.). The proportion of LS increased from 9.3 % (10 out of 107) to 20.6 % with 1 risk (13 out of 63) to decrease again to 5.6% with 5 risks (1 out of 18); there was an increased probability at the high risk (6 or more) end, but this was based on small numbers (5 out of 14).

**Internalizing (IN) scale.**

The IN scale (from 0 = *no delayed risk* to 5 = *high delayed risk*) was negatively and not significantly related to early onset offending (AUC = .540, SE = .031, n.s.). Figure 2 shows that the proportion of ES decreased from 36.7%, when no internalizing factors were present (51 out of 139), to 27.8% with 3 internalizing factors (10 out of 36). There was a slight increase to 33.3% with 4 or more internalizing factors (3 out of 9), but this was based on small numbers. IN risk significantly predicted late offending when comparing ES and LS. The proportion of ES decreased from 87.9% for those with 0 risk

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(51 out of 58) to 50.0% for those with 4 or more IN risks (3 out of 6). Conversely, it increased from 12.1% (7 out of 58) to 50.0% (3 out of 6) for LS. The AUC value was .650 (SE = .051,  $p < .005$ ).

IN significantly and positively predicted late onset offending vs. non-offending (AUC = .633, SE = .050,  $p < .008$ ). Figure 2 shows that the proportion of LS increased steadily from 8%, when no internalizing characteristics were present (7 out of 88) to 23.1% with 3 internalizing factors, and jumped to 50% with 4 or more internalizing factors being present, but based on small numbers (3 out of 6).

#### FIGURE 2 HERE

The results show that the AB scale predicted both early and late onset, while the FR and SE scales predicted only early onset, and the IN scale predicted only late onset. Whether this pattern of results holds independently in specifically predicting the different antisocial onsets is unclear. To explore this issue we regressed the risk scales for the onset outcomes. The results of two maximum-likelihood estimation logistic regressions are provided in table 2. The first predictive model shows that antisocial behavior, family risk, and socio-economic risk were significant positive predictors of early onset offending. Internalizing problems were significant but negatively related. The second model shows that internalizing problems were a significant and independent predictor when comparing late offenders and non-offenders. The third model shows that internalizing problems were significantly and independently predictive of late onset offending in comparison with early onset offending.

#### TABLE 2 HERE

#### **Composite risk plus internalizing.**

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A composite risk measure was developed by summing the different risk scores of the three different risk scales (antisocial, familial and socio-economic) (from 0 = no risk to 25 = high risk). As expected, this composite risk score was significantly related to early onset offending, and the predictive accuracy was greater than for AB alone (AUC = .745, SE = .027,  $p < .0001$ ). The proportion of ES increased from 11.5% for those with no risk (3 out of 26) to 56.6% for those with 7 or more risks (81 out 143). When comparing ES and LS, the proportion of ES increased from 50.0% for those with 0 risk (3 out of 6) to 85.3% for those with 7 or more cumulated risks (81 out of 95). Conversely, it decreased respectively from 50.0 % (3 out of 6) to 14.7 % (14 out of 95) for LS. The AUC value was .642 (SE = .051,  $p < .008$ ).

Figure 3 shows that when late onset offending vs. non-offending was predicted, using this composite measure, the predictive accuracy was significant (AUC = .629, SE = .050,  $p < .011$ ). The proportion of LS increased from 5.4% for those with no risk (3 out of 56) to 22.6% for those with 7 or more cumulated risks (14 out 62).

In a second analysis, when IN was added to the cumulative risk scale, the predictive accuracy increased (AUC = .670, SE = .047,  $p < .001$ ). Figure 3 shows that when IN was added the curve was more linear, suggesting that higher levels of internalizing problems contribute significantly to the risk of becoming a late starter. The proportion of LS increased from 7.4% for those with no risk (2 out of 27) to 21.1% for those with 7 or more cumulated risks (19 out 90).

When comparing ES and LS, the proportion of ES increased from 60.0% for those with 0-1 risk (3 out of 5) to 81.7% for those with 7 or more cumulative risks plus IN risk (85 out of 104). Conversely, for LS cumulative risk plus IN had a more *zigzag* (uneven)

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curve decreasing from 40.0% (2 out of 5) for those with 0-1 risk to 23.7 for those with 2-4 cumulative risks plus IN (9 out of 38), to increase once again up to 40.0% for those with 5-6 risks plus IN (8 out of 20), and decreasing again to 18.3 % (19 out of 104) for those with 7 or more cumulative risks plus IN. The AUC value was .589 (SE = .051,  $p < .097$ ).

Table 1 shows that the predictive accuracy for ES compared with NES was lower than when the cumulative risk scale was employed on its own (AUC value = .722, SE = .028,  $p < .0001$ ). The proportion of ES increased from 10.0% for those with 0-1 risk (3 out of 30) to 48.6% for those with 7 or more cumulative risks plus IN risk (85 out of 175).

Conversely, for NES the cumulative risk plus IN decreased from 90.0% (27 out of 30) for those with 0-1 risk to 51.4 % for those with 7 or more cumulative risks plus IN (90 out of 175). More analyses are certainly necessary to shed some light on the type of risks at the basis of different onsets.

FIGURE 3 HERE

### **Discussion**

The major conclusions that can be gathered from these findings are as follows. Psychological factors play a significant part in the development of late onset offending. Internalizing problems, which were negatively related to early onset offending, were the best independent predictors of late onset offending. This shows that different risk factors should be recognized when assessing and targeting different stages of criminal careers. Not surprisingly, early antisocial behavior was the best predictor of early onset offending. While the probability of later offending increased with the number of risk factors, it was

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useful to take account of the specific impact of internalizing factors in delaying criminal onset.

### **Antisocial behavior scale**

Behavioral problems in childhood cast a long shadow, and a growing body of research indicates that early antisocial behavior has one of the highest continuity patterns into adulthood of all the measured human features except intelligence (Scott, 2004). The AB scale emerged as a significant predictor of early delinquency, and was moderately significant in predicting late onset offending. This result is in line with previous research. Fergusson and colleagues (2005) in the Christchurch study found that when the most problematic children in their cohort displayed serious conduct problems at age seven, their chance of future criminal involvement increased from 1.5 to 19 times by age 26.

### **Family risk**

Extensive literature provides evidence that family risk factors affect life development and long-term behavior. Accordingly, our research findings suggest that family risk significantly affects early onset offending and, less significantly, late onset offending.

### **Socio-economic risk**

It is not unusual that antisocial children come from poor housing and from a low income family where the father is unemployed. In contrast, SE risk in this study did not have any significant predictability for late onset offending. Problematic socio-economic conditions may perhaps set off different reactions in nervous, anxious and neurotic children. It was beyond the scope of this paper to investigate the interaction effects between different types of risks.

**Internalizing problems**

Internalizing problems seem to inhibit early offending, and contribute to delaying criminal onset. It may also be that these children with internalizing problems were more likely to be cocooned by their families until adulthood, adding a mitigating affect and extra protection against early antisocial onset (Thornberry & Krohn, 2003). Alternatively, internalizing problems may protect against antisocial peer influence. No one is claiming that a practice of successfully preventing early onset offending should be “making people nervous, more anxious or neurotic”. Yet, prevention services should not dismiss the critical role played by mental health and psychological well-being upon life adjustment and life success. According to recent CSDD findings (Zara & Farrington, 2010), LS constituted a group with a low externalized and problematic profile when they were children and adolescents. As adults, they became similar to ES in behavior and life failure. More research is needed to investigate this risk path, and to identify those mediating variables between internalizing problems and delayed criminal onset.

**Accumulation of risk**

The associations between explanatory variables and criminal onset variables were significant and often nonlinear, so that the risk of delinquency increased considerably at high levels of risk. This evidence fits in with a risk perspective of delinquent development, in that the cumulative effects of risk can be directly explored and measured.

Very few studies (Loeber, Farrington, Stouthamer-Loeber, & White, 2008) have investigated whether the dose-response relationship also applies when different types of risk factors are summed. Internalizing problems moderately contributed to increase the

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predictability efficiency, so far as they seemed to exercise a sort of prevention against early offending, and delayed the risk of criminal onset until adulthood.

### **Adult onset offenders: the delayed risk of offending**

Late starters represent an atypical offending group, in so far as they seem to get involved in a life of crime despite all the indications to the contrary. Because of their apparent good beginning, LS deserve a special scrutiny. One may wonder whether in their early life there was any sign that could have constituted a *red flag* for late offending. In the lives of many LS involved in this study there were many of these flags, even though they were not hoisted. This raises social concerns over the early life of the adult population involved in crime.

For example, *man 471* was born in 1953. He started his criminal career at age 32, which lasted for 15 years. He committed various offences that led to 3 convictions, one for shoplifting at age 32, and two for sexual violence at ages 37 and 47. At age 8 he did not particularly attract the attention of family members or teachers, in so far as he was a timid and nervous boy and at age 10 he was rated as neurotic and impulsive, and was unpopular among his peers. It is likely to hypothesized that this contributed to his social isolation. He did not have any delinquent siblings and there was no suggestion of a criminal background. The rearing climate in the family was neither authoritarian nor harsh. Like many children from a vulnerable background he came from a large family and was brought up in a poor house, which meant dilapidated and dirty premises.

According to his mother he was a nervous adolescent, a frequent liar, highly anxious, and lacked concentration. Despite not reporting unsuccessful scholastic attainment, by age 18 he had not taken or passed any examinations. As a young man, he did not have a good

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relationship with his parents, and was still sexually a virgin. What is interesting to note in the life development of this late offender is that with age his psychological characteristics became more pervasive and start affecting more directly his social and relational functioning. The aggravation of these problems coincided with his criminal onset. At age 32, he became highly antisocial, started to have alcohol problems (CAGE), was anxious and depressed (GHQ), and impulsive. He started to use drugs and was often involved in drunk driving. He had an unstable job history, and reported a high level of life failure<sup>2</sup>. He was separated and was not involved in any personal relationship. Figure 4 shows the developmental factors prior to his adult criminal career. However, as gloomy it may sound, this pattern of late criminal onset is adherent to most of those of the late offenders in this study.

FIGURE 4 HERE

### **Recalibrating the Focus of Risk Assessment Practice: Policy Proposals**

Risk assessment research has made some substantial progress in the last decades. The rationale behind risk assessment is germane to the conception of research in the service of humanity. Three aspects seem relevant to disentangle the aim of assessing the risk from unrealistic expectations of forecasting human behavior.

The first aspect refers to the very nature of risk assessment: it is a method of evaluating the risk of antisocial onset, and not an answer for how to eradicate it. A method implies a process through which factors that enhance and sustain the risk for an antisocial onset can be successfully identified. Because early and late antisocial onsets are sustained by different risk processes, risk assessment should entail not only the identification of which factors encourage an early onset and which others delay the onset



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until adulthood, but also making clinical decisions that can have significant preventive and intervention consequences.

The second aspect refers to the concept of predictability: it is defined as understanding the changing manifestations of patterns of adaptation over time, and the links between these patterns across time and situations.

The third aspect concerns the gaps between scientific knowledge and practice, and prevention and treatment. Clinical practice is distant from scientific findings, and research may be minimally related to the actualities of everyday clinical life. This should not be the case. Douglas and colleagues (1999) introduced risk assessment schemes as calls for collaboration among researchers and clinicians, and as beneficial for some convicted individuals, patients, children at risk for future maladjustments, their families and the community. Prediction can indeed be enhanced through knowledge of theory and evidence-based research (Andrews & Bonta, 2006). Identifying the “active risk ingredients” of offending is only part of the process of risk assessment and policy.

Our findings are in line with other research results in suggesting that there are a series of drawbacks related to investing only on high risk and to adopting a diagnostic perspective for assessments of risk. A *diagnostic approach*, which allocates subgroups into different categories and treats them as reified entities, fails to recognize that risks do not unload their influence upon individuals equally, and do not act similarly in different periods of development. The most relevant shortcoming, in terms of prediction accuracy, already pointed out by Fergusson and colleagues (2005), is that those individuals who fall below diagnostic thresholds are unlikely to be always “true negatives” and even if they are, they are unlikely to constitute a homogeneous group of “true negatives”. It is instead

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likely that they vary in the exposure to risk and protective factors, in behavioral problems, and in social outcomes.

*A dimensional approach* would be better able to detect these differences. It would examine a problem using dimensional measures that rank subgroups from low to high (or none to severe), and consider changes in the presence and absence, or the intensity of the problem, or the escalating or de-escalating changes in the level of risk in time.

Internalizing behavior is often not targeted in intervention programs, but the present study shows that, even if it does not predict offending in the short term, it does predict later offending and it should be targeted.

The introduction of psychological/internalizing factors into evaluation practice may offset the influence of children's exposure to multiple risk factors. This leads to the importance of considering the threat that *delayed risk* poses in the life development of late offenders. *Delayed risk* can have consequences as grievous as those posed by *immediate risk* for early offenders.

*Do the same risk scales predict early and late offending?* Our findings suggest *no*. Early and late onset offending deserves separate consideration and different risk assessments. Improving risk assessment methods is not merely an academic task. It is a practical exercise to reduce crime and to improve people's lives such as those real lives of the men involved in this study (Farrington, 2000).

Predictors of durable change are poorly understood at this time. Hence the diversification of risk measures and assessments for different types of offenders and outcomes is not only necessary, but can considerably facilitate the understanding of delinquent development and the efficiency of prediction. The ratio of economic and other

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benefits to the cost of programs could not be calculated in this study. Yet, the spectrum of problems (from antisocial behavior and internalizing problems, to criminal onset) that could be identified by diverse risk instruments and prevented by early interventions suggests that the benefit-cost ratio would be in favor of such interventions. Advances in our knowledge about risk assessment must be translated into prevention programs. This may require modification of the philosophy and practice of assessing the risk, which in turn may require revising the current assessment scales or may involve developing new ones.

### **Targeting internalizing factors**

Our results suggest that children and adolescents who reported a high level of internalizing problems had a greater risk of an adult onset and a level of life failure as serious as that of early onset offenders. This suggests that comorbid problems are not entirely separate entities but impact upon individual's social functioning and well-being, manifesting themselves differently depending on the stage of development and life circumstances. The comorbidity of anxiety disorders with affective disorders, and their influence upon behaviour and social adjustment to life, requires clinical intervention. Given these findings, it is suggested that such vulnerabilities, combined with environmental hardships (e.g. poor housing, marital disharmony, child neglect, social isolation, and school failure), could encourage the emergence of late antisocial onset.

Early clinical and psychosocial interventions should target these children at risk of late antisocial onset: a combination of intervention is required to deal with both the internalizing problems and psychosocial stressors. Given these findings, two questions emerge, which we hope will lead to further investigation: 1. When does the argument for

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prevention necessitate identification? 2. Which type of intervention seems most appropriate?

The first question can simply be answered with “as early as possible”. It is relevant to add that early prevention will allow for a more immediate improvement of the quality of life of children suffering from internalizing problems, a proximate improvement of the family dynamics between children and parents, and a more long-term improvement deriving from building up a healthier and solid quality of life. Personal support from parents and family members is a crucial aspect of ameliorating individual development, and facilitating prosocial adjustment. Resources invested in parental training and building parental harmony enhance stability, that in turn can aid individual and familial health. Such support must act as a buffer to antisocial initiation and relapse, and must minimize the effects of destabilizers that can ignite antisocial behaviour or aggravate it.

There is a growing body of scientific evidence on the effectiveness of the “never too early” approach to prevent later offending. According to Andrews and Bonta (2010b) crime prevention efforts that neglect, disregard, dismiss or simply deny the psychology of criminal behavior, and keep using risk assessment tools simply to measure the high risk of re-offending, will miss the whole strength of crime prevention.

The second question concerns treatment. In cases such as late onset offending, when there is a high presence of psychological and internalizing problems, effective treatment is identified with the behavioral and cognitive-behavioral therapies (CBT) that seem to produce not only short-term change, but in some instances long-term effects when they are combined with intervention focused on familial dynamics and social

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integration. CBT studies suggest that, for instance, parent involvement in the treatment of the child's anxiety and nervousness may enhance positive outcomes (Chase & Eyber, 2008).

Risk assessment practice should: inform treatment and management decisions; sustain prevention; accompany communication of risk in such a way as to inspire governments to invest in research and intervention with the goal of preventing children becoming tomorrow's criminals, and their parents living with the shadow of their familial failures. Successful risk assessment is not the practice that makes a person's life restricted within the perimeter of their *zone of risk*, but rather the practice that informs intervention, attempts changes, and sustains prevention by identifying rewarding alternatives of living. From a public policy perspective if assessment of risk of future antisocial onset is not based on research findings it is unsound and fallacious; if it does not inform clinicians it is unpractical; if it falls outside the range of application it is unhelpful; if it is not tailored to the individual's criminogenic needs it is unethical.

This perspective could find its ground in a "national risk-focused, evidence-based strategy for early prevention" in the United States and in Europe (Farrington & Welsh, 2007) within which the evaluation of who should receive services, should be an assimilated preventive, clinical and counseling psychology independent practice, administered outside the criminal justice system.

### **Limitations of the Study**

This study is not without limitations. It is based on a sample of working-class males from a small area in London, who grew up in 1960s. It is also based on a small sample of late onset offenders. It would be important to examine whether and to what

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extent early and late criminal onsets are likely to occur in middle or upper class environments, and which risk factors are significant in different cultural contexts. It would appear paramount that further research focuses on exploring which protective measures are required to counterbalance the strength of cumulative risk over time, and on examining the reduction in risk when protection is present.

It could also be informative to investigate whether the patterns of early and late female criminal careers are influenced by similar risk factors. Also whether there are cultural and ethnic differences in criminal onsets.

Being aware that some possible biases might have been introduced by the use of predictor variables chosen at early ages, it is however believed that any possible bias was minimized. Predictors were always identified before the offending outcome and therefore they could not be influenced by this knowledge.

It would have been interesting to explore the strength of the association between risk factors and outcomes on the basis of temporal proximity. Even though it may seem plausible to assume that some risk factors measured in closest proximity to an outcome are more likely to have a stronger association with that outcome, the strength of these relations were somewhat hard to interpret at comparative levels between early and late offending groups, and between late offenders and non-offenders. However, because the predictors involved in the design of the risk scales of this study were demonstrated to be independent and significant predictors of offending at some point of development (Zara & Farrington, 2009), the analysis carried out in this study was not to demonstrate the strength of their association with the outcome, but their significance in predicting the offending outcomes. Further studies are paramount to test, on other samples and in other

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countries, the extent to which early factors can help to discriminate between non-offending, early and late onset offending in the process of anticipating or delaying the external manifestation of their influence. More research is needed to explore the role of protective and promotive factors over antisocial development, both precocious and delayed. More research is especially needed on why early internalizing factors predict late onset offending.

Bearing these limitations in mind, to the best of our knowledge this is the first attempt to explore late onset offending by focussing on the usefulness of risk assessment for prevention. More research is needed to explore: which other factors are strong buffers against risk factors; which may exercise some protection against early onset; which others may be better at nullifying the risk for late onset offending. Internalizing problems tend to have some stability over time.

### **Conclusions**

Internalizing problems in childhood and adolescence tend to go undetected and are often under-diagnosed (McGee, Feehan, & Williams, 1995). This occurs because the symptoms are not always directly observable and even when noticeable they are not considered problematic: they do not affect others; they do not present behavioral management challenges for parents, teachers or mental health professionals (Reynolds, 1992).

At this stage we did not examine the impact of internalizing problems separately for each age group. Further studies may be interested in exploring to what extent the effects of internalizing problems at *time 1* (childhood) are carried forward into *time 2* (adolescence) and *time 3* (adulthood), and whether this carrying mechanism involves an

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accumulative risk. We can speculate that primary treatment, that involves psychological resilience, parental competence, education, and socio-economic stability would reduce late offending, but the extent of the potential effect cannot be determined in this study.

If AB and FR predict a high likelihood of early onset offending, then they should be targeted to reduce early crime. If IN problems predict late onset offending, then IN problems should be targeted to reduce late onset offending. In both conditions, primary interventions seem promising measures to reduce crime in the life course, and to promote psychological well-being.

These findings are most directly applicable to social policies that seek protective interventions prior to adulthood in order to address family and socio-economic vulnerabilities, to prevent the exacerbation of internalizing features into mental problems, and to divert children from entering the path of criminality. An expansion of social services is unlikely to reach all the children with internalizing problems who do not pose an immediate risk. New ways of assessing the different risks and their different temporal impacts may provide more children and families with effective primary interventions.

To sum up, while early onset offenders are at a high risk of continued behavioral problems and antisocial outcomes (*homotypic continuity*), late onset offenders face a variety of difficulties and outcomes (*heterotypic continuity*), which contribute to differing effects upon social functioning and psychological well-being. Risk conditions for offending are likely to be multiple and not single; they are cumulative rather than ‘one-off’ effects; they are often persistent over time. ES are likely to be antisocial children and come from problematic families and deprived socio-economic backgrounds. LS tend to be drawn from children who suffer from internalizing problems. Those who persist



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antisocially from childhood to adulthood are well considered in scientific research because they are a great concern for society. Others, however, follow a different path: they may “transit” from a relatively “cocooned” condition in the population to a more unsteady and difficult one. The exploration of factors accounting for this instability is a critically important task for future research focused on addressing mental health and social adjustment to life.

As shown from these findings, internalizing problems seem to have long-term implications over the life of many individuals in the CSDD sample. Independently of the offending behavior per se, a life restrained by one’s own social isolation, limited by one’s sense of nervousness and anxiety, and influenced by one’s neuroticism and depression, and by lack of sexual intimacy, may still deserve to be taken into account especially when it is then associated with adult life failure and maladjustment. Risk-assessment developers should consider the inclusion of psychological and internalizing problems in their tools, so as to provide clinicians with different instruments specifically appropriate to the variety of criminogenic needs of the individuals they assess.

These findings can make a significant contribution at many levels, from showing us which children are falling through gaps in services, and how early psychological health of children and family well-being should be addressed, to how assessment practice should be organized, and to which risk assessments should be employed in order to inform crime prevention policy.

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## Footnotes

<sup>1</sup> For the prediction of late onset offenders, the AB scale was truncated at 6 + risks because of small numbers.

<sup>2</sup> A measure of social success was based on nine criteria: successful accommodation; successful employment; successful cohabitation; successful with children; not involved in fights in the last five years; not a substance abuser; no self-reported offences in the last five years (other than theft from work or tax evasion); GHQ score of four or less; no convictions for offences committed in the last five years. For more details see Farrington, Gallagher, Morley, St Ledger, & West, 1988a, p. 167; Farrington, Coid, Harnett, Jolliffe, Soteriou, Turner, & West, 2006. GHQ = General Health Questionnaire, designed to detect non-psychotic psychiatric illness (anxiety/depression) (see Goldberg, 1978).

**Declaration of Conflicting Interests**

The authors declared no conflicts of interests with respect to the authorship and/or publication of this article.

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Table 1

*Comparisons of the AUC Values for the Different Risk Measures*

Comparison groups	ES vs. NES			ES vs. LS			LS vs. NO		
	AUC	SE	p ≤	AUC	SE	p ≤	AUC	SE	p ≤
Risk measures									
AB	.722	.028	.0001	.629	.049	.015	.638	.046	.006
FR	.679	.030	.0001	.606	.050	.052	.597	.052	.060
SE	.648	.030	.0001	.590	.051	.095	.571	.049	n.s.
IN	.540	.031	n.s.	.650	.051	.005	.633	.050	.008
Composite risk	.745	.027	.0001	.642	.051	.008	.629	.050	.011
Composite risk + IN	.722	.028	.0001	.589	.051	.097	.670	.047	.001

*Note.* ES = Early starters; LS = Late starters; NO = Non-offenders.

AB = Antisocial behavior; FR = Family risk; SE = Socio-economic; IN = Internalizing problem.

Composite risk = AB + FR + SE

AUC = Area under the ROC curve.

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Table 2

*Forward Stepwise Logistic Regression Results Predicting Early and Late Onsets*


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Model 1						
ES vs. NES						
Predictors	LRCS Change*	B	SE(B)	Wald	$\beta$	95%CI
AB	53.29***	.309	.062	24.687	1.36***	1.21–1.54
FR	14.49***	.260	.097	7.212	1.30**	1.07–1.57
IN (-)	5.47**	.277	.120	5.324	.758**	.599–.959
SE	4.20*	.119	.058	4.218	1.13*	1.01–1.26
Constant			.240			

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Model 2						
LS vs. NO						
Predictors	LRCS Change*	B	SE(B)	Wald	$\beta$	95%CI
IN	8.49**	.421	.159	6.983	1.52**	1.12–2.08
AB	5.05*	.207	.090	5.282	1.23*	1.03–1.47
Constant			.349			

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## Model 3

ES vs. LS

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Predictors	LRCS Change*	B	SE(B)	Wald	$\beta$	95%CI
AB	8.67**	.248	.095	6.739	1.28**	1.06–1.54
IN (-)	7.66**	.531	.170	9.712	.588**	.421–.821
Constant			.374			

*Note.* Non-early starters (NES) are the reference group in the first model; Non-offenders (NO) are the reference group in the second model; Late starters (LS) are the reference group in the third model.

AB = Antisocial behavior; FR = Family risk; SE = Socio-economic; IN = Internalizing problems

\* $p < .05$ , \*\*  $p < .01$ , \*\*\* $p < .0001$ .

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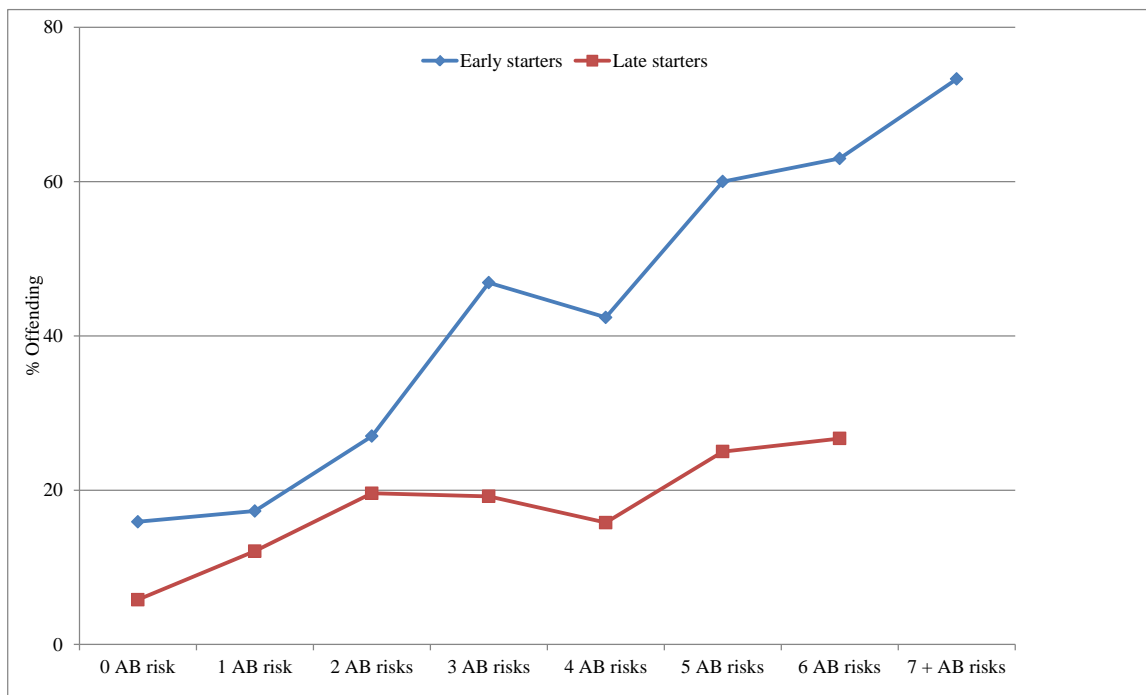


Figure 1. Percent Early Starters and Late Starters vs. Antisocial Behavior Risk Scores.

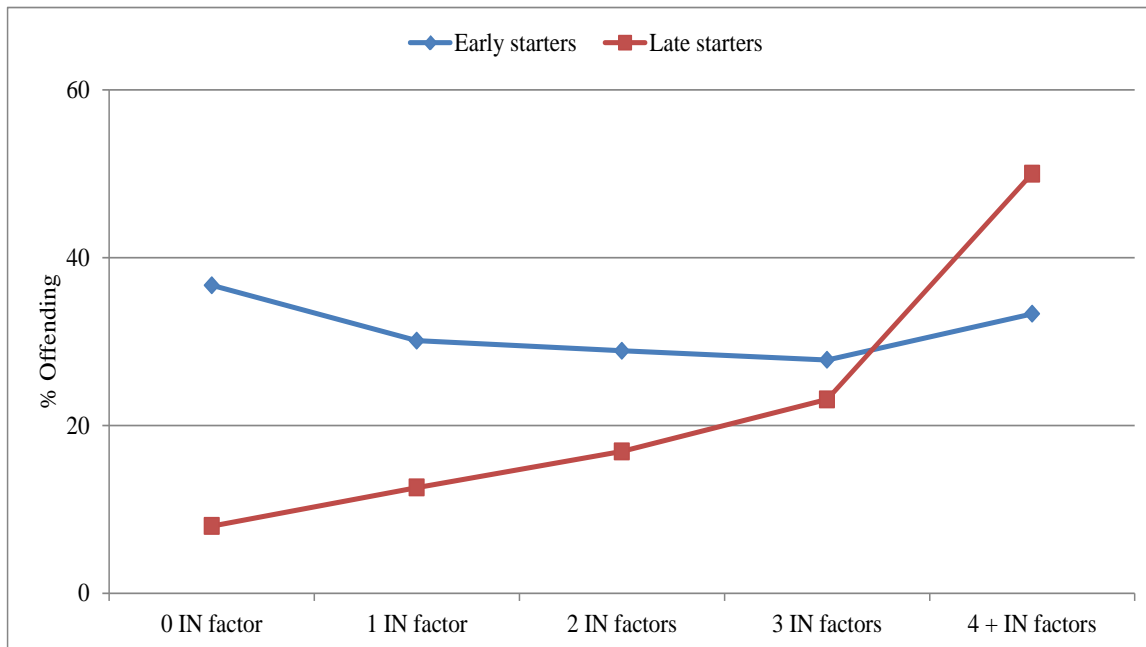
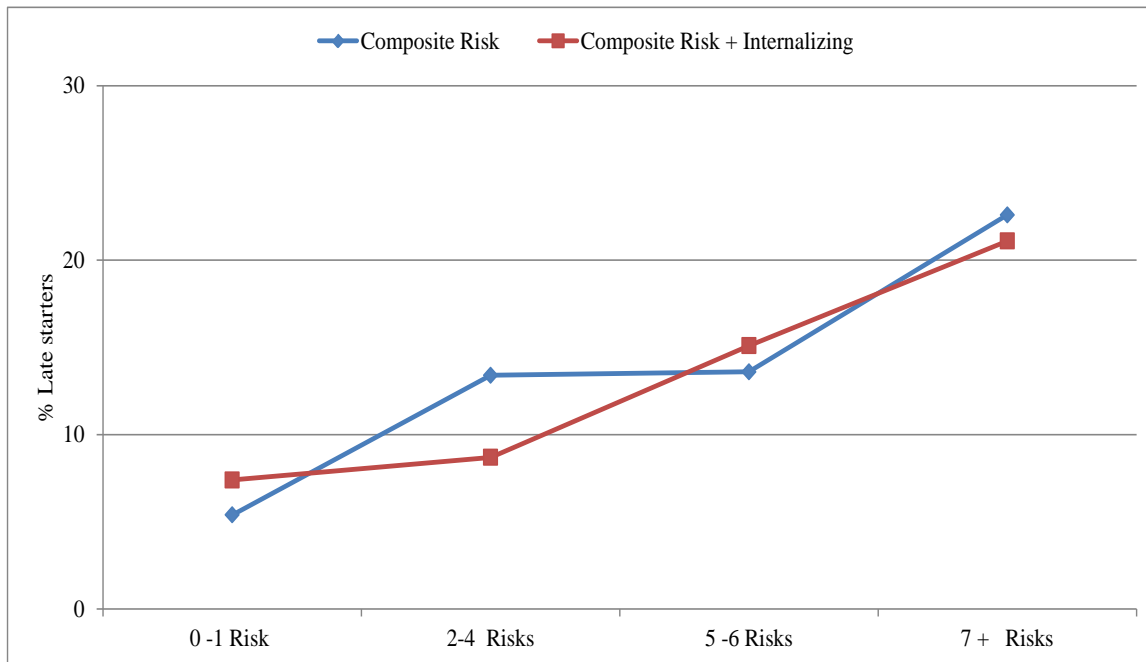


Figure 2. Percent Early Starters and Late Starters vs. Internalizing Problems Scores.



*Figure 3.* Percentage Late Starters vs. Composite Risk and Composite Risk + Internalizing Scores.



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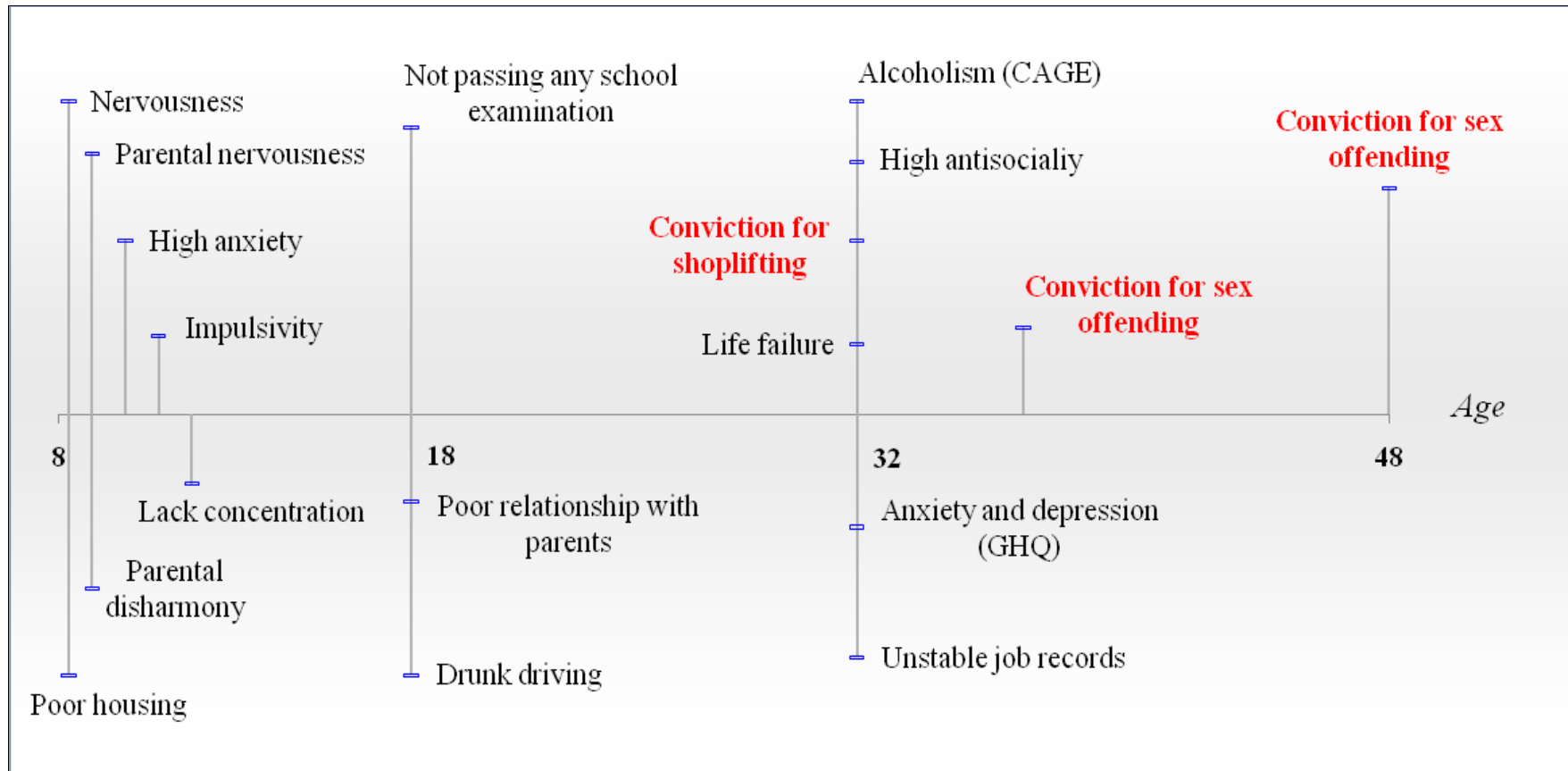


Figure 4. The delinquent development of an adult onset offender.