

**Childhood predictors of criminal offending: Results from a 19 year longitudinal
epidemiological study of boys**

Susan Young^{1*}, Eric Taylor², Gisli Gudjonsson³

¹Department of Forensic and Neurodevelopmental Sciences, Institute of Psychiatry,
King's College London, De Crespigny Park, London SE5 8AF, UK, and Broadmoor
Hospital, West London Mental Health Trust, UK.

²MRC Social Genetic and Developmental Psychiatry, Institute of Psychiatry, King's
College London, De Crespigny Park, London SE5 8AF, UK

³Department of Psychology, Institute of Psychiatry, King's College London, De Crespigny
Park, London SE5 8AF, UK, and Broadmoor Hospital, West London Mental Health Trust,
UK.

ABSTRACT

Objective: To examine the relative contribution of hyperactivity, conduct and emotional problems in predicting criminal offending.

Method: 173 boys aged 6-8 years (assessed for hyperactivity, conduct and emotional problems) were followed up 19 years later by examining criminal offence histories.

Results: Significant main effects for both total and violent convictions were found, the strongest being for violent criminal offenses. Conduct problems predicted general offending (irrespective of the type of conviction), whereas emotional problems were the single best predictor of violent convictions. Hyperactivity was not a significant predictor in the models.

Conclusion: The findings provide insight into the developmental mechanisms that mediate criminal behavior by showing that childhood emotional problems independently contribute to the risk of violent offending in later life.

Key words: offending, ADHD, conduct disorder, emotional problems, longitudinal study, crime

INTRODUCTION

A significant relationship has been found between ADHD and offending and it is important to understand the nature of this relationship and potential treatments for this population (Young et al., 2011a). The association between ADHD symptoms and offending has been investigated by two complementary approaches. The first involves studies of clinical populations among people with ADHD (Barkley, Murphy, & Fischer, 2008) which focuses on a selective clinical group and usually consists of a more severe variant of the population that has been clinically referred to health services. The second approach takes an epidemiological perspective (Gudjonsson, Sigurdsson, Sigfusdottir, & Young, in press a) which typically focuses on large community samples and consists by its nature of a less severe variant of the population. Clinical and population studies have advantages and disadvantages and both methods are important contributors to research. One of the strengths of epidemiology is that it provides the opportunity for achieving better representativeness of the general population, however it is less able to inform about specific clinical problems and their treatments.

Longitudinal epidemiological studies suggest that hyperactivity and conduct problems in childhood contribute more to the risk of adult offending (recorded by official statistics) than family and social circumstances (Brassett-Grundy & Butler, 2004; Stevenson & Goodman, 2001). In their review of the literature, Barkley *et al.*, (2008) argue that children with Attention Deficit Hyperactivity Disorder (ADHD) are at elevated risk of offending and substance use in adulthood, although the presence of childhood conduct disorder (CD) “greatly elevates these risks and, in some cases, accounts for them

entirely” (p326). This proposition was investigated by Gudjonsson *et al.* (in press a) in a cohort study of over eleven thousand Icelandic students in further education (age 16-24 years). They found that self-reported ratings of both non-violent and violent delinquency correlated significantly with all predictor measures (ADHD symptoms, conduct disorder, substance use, association with delinquent peers, emotional lability, anger problems, violent attitudes, and low self-esteem) with small to large effect sizes. Multiple regressions showed that after controlling for age and gender, ADHD contributed 8.2% and 8.8% to the variance in non-violent and violent delinquency, respectively, but these effects were largely mediated by the comorbid measures, particularly substance use, association with delinquent peers, and conduct disorder. The findings suggest that it is the presence of CD and substance use that increases the risk of criminal offending in adulthood rather than ADHD acting as an independent risk factor. In particular, the regular use of heroin has been found to be significantly associated with repeated convictions for property offences and alcohol for repeated violent offences (Young *et al.*, 2011 b).

Results from longitudinal follow-up studies are inconclusive on the relative contribution of ADHD and CD to subsequent offending. A number of studies have shown that ADHD among boys predicts adult offending independently of CD (Farrington, 1990; Sourander *et al.*, 2006; Taylor *et al.*, 1996), especially when hyperactivity-impulsivity symptoms are sustained (Babinski *et al.*, 1999). In a longitudinal follow-up study of boys with ADHD, Sibley *et al.* (2011) found that regardless of comorbidity all children with ADHD are at

risk of future offending, although the greatest risk was posed by those with comorbid ADHD and CD. In contrast, Satterfield *et al.*'s (2007) 30-year prospective study of hyperactive boys found that only those with comorbid CD were at increased risk of arrest, conviction and imprisonment in adulthood. In a Norwegian follow-up study using official criminal records, Morde *et al.* (2011) found no direct relationship between ADHD and later offending.

These studies have failed to account for the potential contribution of childhood emotional problems, most likely reflecting that the role of emotional problems is less researched and established than the role of ADHD and CD in later offending (Morde *et al.*, 2011). There is evidence that children's early (aged 3) 'undercontrolled' behavioral style (i.e., irritable, impulsive and emotionally labile) predicts emotional problems at age 26 years (Caspi *et al.*, 2003). Emotional lability at age 16 (defined by a high 'neuroticism' score on the Eysenck Personality Inventory) has been found to be predictive of later offending (Farrington *et al.*, 2009). Gudjonsson *et al.*, (2009) found among adult prisoners that 'neuroticism' was a better predictor of adult ADHD symptoms than antisocial personality traits. They proposed that the key link with offending may be that neuroticism exacerbates existing propensities for poor behavioral inhibition among people with ADHD. This is consistent with the theory of Retz and Rosler (2009) that differentiates between *reactive-affective* and *proactive* types of delinquent and violent behaviors in offenders with ADHD. In this model, reactive-affective violence is characterized by unplanned, spontaneous acts, and driven by impulsivity and emotion.

Proactive offenses, by contrast, tend to be more premeditated acts that are most associated with antisocial traits.

This study aimed to investigate the relative relationship between childhood hyperactivity, emotional and conduct problems and adult criminal offending by re-analysing data that previously reported an epidemiological follow-up of boys identified in childhood with these characteristics (Taylor *et al.*, 1991; 1996) and examining their official criminal records 19 years later. This study contributes to the literature above and beyond the findings of Gudjonsson *et al.* (in press a) in two respects; firstly it is a prospective rather than a cross-sectional study and, secondly, criminal offending was obtained from official conviction records rather than self-report. We investigated which of the three predictors (hyperactivity, emotional and conduct problems) best predicted general criminal offending at outcome (i.e. any conviction), and violent and non-violent convictions. Given that conduct disorder is reported to be more directly related to offending than hyperactivity (Fergusson, Horwood, & Lynsky, 1993; Lynam, 1996), our first hypothesis was that childhood conduct problems would be the best overall predictor of general criminal offending with hyperactivity having little independent effect. Consistent with the theoretical framework of Retz and Rosler (2010) and the empirical findings of Gudjonsson *et al.*, (2009), the second hypothesis was that emotional problems would contribute relatively more to violent than non-violent criminal offending due to its association with poor behavioral control.

METHOD

This study involves a secondary analysis of data previously collected to investigate the long term risk of childhood hyperactivity and conduct problems (Taylor *et al.*, 1991; 1996). In the original study the cases were stratified into five groups (hyperactivity and conduct problems co-occurring, pure hyperactivity, pure conduct problems, inattentive without hyperactivity, and controls) and the participants in these five groups were followed up 19 years later. For the purpose of the present paper, the five groups from the original study were combined into one large group in order to maximize power and the analysis relied on the continuous scores from the Rutter A(2) parent questionnaire and the Rutter B(2) teacher questionnaire. The original survey and current follow-up are outlined below.

The original survey:

Participants

The original survey, from which all the subjects were taken, has been previously described (Taylor *et al.*, 1991). As a brief summary, the participants included all 6- and 7-year-old boys (3,215 boys), on the registers of mainstream schools in the London Borough of Newham, with the schools for severely learning disabled children excluded.

Measures

The Rutter A(2) parent questionnaire and the Rutter B(2) teacher questionnaire assess hyperactivity, conduct and emotional problems, each item on a 3-point scale ('Doesn't Apply', 'Applies Somewhat', and 'Certainly Applied') rated 0, 1 or 2, respectively (see Table 1). These subscales have been validated against standardized interview measures

and psychiatric diagnosis in previous surveys and on the Isle of Wight studies (see Rutter *et al.*, 1976; Schachar *et al.*, 1981). Furthermore they have been found to identify different subgroups with good predictive and discriminative validity (Schachar *et al.*, 1981). In the present study, for the parent scale the Cronbach's α was .81 for hyperactivity, .73 for conduct problems and .62 for emotional problems. For the teacher scale the Cronbach's α was .81 for hyperactivity, .81 for conduct problems and .65 for emotional problems.

Table 1 about here

Procedure

The Rutter A(2) questionnaire was completed for 80% (N=2,572) of the children by their parents, and the B(2) questionnaire for 99% (N=3,183) by their class teachers. In total, 2,462 children had both screening questionnaires completed.

In the original design of the study, which followed the then understanding of ADHD, the groups selected for detailed study were: those with scores above cut-off for conduct disorder who also met criteria for pervasive hyperactivity (*mixed*; constituting 5.3% of the study population); those who met criteria for pervasive hyperactivity but not for conduct problems (*hyperactive*; amounting to 3.7%), those who met criteria for conduct problems but not for pervasive hyperactivity (*conduct problem*; amounting to 14%), those who showed inattentiveness but no hyperactivity (*inattentive*; amounting to 1.3%); and those not meeting criteria for either condition (*control*). Because the original study investigated

the long term risk of childhood hyperactivity and conduct problems (Taylor *et al.*, 1991; 1996), participants were excluded at this stage if they had scores of five or greater on the emotional disorder subscale of either the parent or teacher scale as it was intended to obtain 'purer' measures of childhood hyperactivity and conduct problems that were not contaminated by severe emotional problems.

The cases were stratified by behavioral group and then randomly sampled from the resulting groups, in order to give approximately equal numbers in each group for detailed study. The selected boys were traced through the schools and, after giving consent, 194 participated in the second stage measures (parental interview, test and observational measures) administered nine months after the initial screening (Taylor *et al.*, 1987). At this time, consent was also given for future follow up of Ministry of Justice records for 182 participants.

The measures used in the current (follow-up) study for association with the Rutter A(2) and B(2) criminal records were the continuous hyperactivity, emotional problem and conduct problem scales (rather than the categorical stratification). Data from the parent and teacher scales were aggregated on each of the three domains.

The follow-up study:

Participants

All 182 second stage participants who consented to future follow up of Ministry of Justice records were selected.

Procedure

The follow up for the present study was made 19 years later (i.e. participants were 25-27 years old) when official records of conviction data were requested from the Ministry of Justice who were able to provide 173 records (95%). No reason was given for the nine records that could not be located.

Outcome Measure

The Ministry of Justice Offenders Index provided official records on conviction history (i.e. the number, type and date of convictions) after reaching the age of criminal responsibility (i.e., age 10 years or older). For analysis we classified conviction history into three categories (1) any conviction (i.e. total of violent and non-violent convictions); (2) violent convictions (e.g., violence against a person, sexual offenses) and (3) non-violent convictions (e.g., theft, burglary, robbery, receiving stolen goods, criminal damage).

Statistical Analysis

For the purpose of the present study, parent and teacher ratings were aggregated for each of the three Rutter scales. Multivariate Analysis of Variance (MANOVA) was used to measure overall group differences on the three dependent measures (i.e., conduct

problems, hyperactivity and emotional problems). Its advantage is that it takes account of the correlations between the dependent variables and provides information on how much the three variables combined differentiate between the participants with and without conviction at follow-up. Those with conviction at follow-up versus those without a conviction were used as a 'fixed' (categorical) factor. The MANOVAs were followed up with Univariate (t-tests) analyses and group effect sizes were determined using Cohen's (1992) recommendations for t-tests between groups (Cohen's d: .30 = low; .50 = medium; .80 = large). A discriminant function analysis (stepwise) was conducted for the conviction outcome measures in order to find the linear combinations of the dependent variables that best discriminated between the criminal offense groups.

RESULTS

Out of the 173 boys, 43 (25%) had one or more criminal convictions (mean 1.84, s.d = 5.8, range 0-44) with 31 (18%) having more than one conviction. Out of the 43 participants with a conviction, 20 (47%; 11.5% of the total sample) had a conviction for an act of violence, 16 of whom (37%; 9% of the total sample) also had a conviction for at least one other violent criminal offense. For those boys with a conviction, the mean age at the time of first conviction was 17.5 years (s.d. = 2.3, range 13-23 years).

MANOVA showed a main effect of group differences for total convictions: Pillai's Trace: $F(1, 171) = 3.1, p < .05; \eta^2 = .052$; and violent convictions: Pillai's Trace: $F(1, 171) = 6.0,$

$p < .001$; $\eta^2 = .096$. There was no main effect for non-violent convictions: Pillai's Trace: $F(1, 171) = 0.91$, ns).

In view of the non-significant MANOVA for non-violent convictions, univariate analyses (t-tests) were conducted for total convictions ($N = 43$ vs. 130) and violent convictions ($N = 20$ vs. 153) only. The data are presented in Table 2. With regard to total convictions, only conduct problems significantly discriminated between the two groups, with a small effect size. For violent convictions all three predictors significantly discriminated between the two groups (one-tailed tests); the effect sizes were moderate for emotional problems and low for conduct problems and hyperactivity.

Table 2 about here

A discriminant function analysis showed that for total convictions, only conduct problems significantly discriminated between the two groups (Wilks' Lambda = 0.969; Chi-square $[1] = 5.3$, $p < .05$) with 76.3% of the grouped cases being correctly classified.

For violent convictions, only emotional and conduct problems discriminated significantly between the two groups (Wilks' Lambda = 0.908; Chi-square $[2] = 16.4$, $p < .001$) with 90.1% of the grouped cases being correctly classified. The respective statistics were: emotional problems (Wilks' Lambda = 0.937; $F[1,170] = 11.4$, $p < .001$, Standardised Canonical Discriminant Function Coefficient = 0.90) and conduct problems (Wilks'

Lambda = 0.908; $F[1, 169] = 8.8$, $p < .001$, Standardised Cononical Discriminant Function Coefficient = 0.59).

Spearman's rho correlation showed no significant relationship between the three predictors and age at first conviction.

DISCUSSION

The purpose of the present study was to investigate the relative contribution of childhood hyperactivity, conduct and emotional problems in predicting convictions obtained from Ministry of Justice official records. The official statistics showed that one-quarter of the sample had a criminal conviction at follow-up 19 years later, many of whom were repeatedly offending. This is generally consistent with official statistics showing 28% of 21-45 year old males have at least one conviction (Budd *et al.*, 2005).

Significant main effects were found for both total and violent convictions; the strongest being for violent convictions. As hypothesized, conduct problems significantly predicted a criminal conviction (irrespective of type of criminal offense). By contrast emotional problems, followed by conduct problems, predicted violent convictions. Hyperactivity was not a significant predictor in the models. Univariate analysis showed that emotional problems had a medium effect size on violent convictions, whereas the effect size for conduct problems was small.

The results indicate that the risk of children with hyperactivity for developing criminal convictions is predicted by their associated conduct and emotional problems rather than by their level of hyperactivity, which is consistent with the findings of the longitudinal studies of Satterfield *et al.* (2007) and Morde *et al.* (2011). Early conduct problems are clearly a salient predictor of a future conviction either independently or in conjunction with hyperactivity. The most likely mechanism is through the development of antisocial personality disorder (Lynam, 1996; Retz & Rosler, 2009), substance misuse (Young *et al.*, 2011b; 2011c), and associations with delinquent peers (Farrington *et al.*, 2009; Gudjonsson *et al.*, in press a). However, we acknowledge that we had no direct measure of antisocial personality disorder in the current study.

There was a marked difference among the predictors between a conviction for violence and conviction for any criminal offense. It was hypothesized that emotional problems would more strongly relate to violent criminal offending than general offending and this was supported. This is consistent with the findings of Gudjonsson *et al.* (in press b) who showed that mood instability was a stronger incremental predictor of self-reported 'reactive' offending in adolescents beyond antisocial personality traits and ADHD symptoms. By comparison, antisocial personality traits were the single most powerful predictor of self-reported general offending. In the Gudjonsson *et al.* (in press b) study, entering mood instability into the regression had no significant incremental effect,

whereas entering antisocial personality traits mediated almost half of the effect of ADHD symptoms on general offending.

What had not been anticipated was that the effects of emotional problems were considerably stronger than those of conduct and hyperactivity. The finding is striking given that participants with serious emotional problems had been excluded from the baseline survey suggesting that the influential factor may be an emotional vulnerability to environmental adversity, such as stress, rather than clinical symptoms of anxiety and depression. The findings suggest that early childhood emotional problems, even when below threshold for emotional disorder, may be a risk for mood instability in adolescence and young adulthood perhaps due to a reactive and explosive temperament. Neuroticism, which is conceptually linked to emotional problems (Eysenck & Eysenck, 1975), has been shown to develop into a stable personality trait into adulthood (Caspi *et al.*, 2003), informs on person-context interactions in everyday life in terms of negative affect and sensitivity to stress (Jacobs *et al.*, 2011). This may present as poor behavioral control in violent criminal offenders and future studies need to investigate how emotional problems in early childhood moderate feelings of anger, violent cognitions and poor behavioral control. Indeed, the development of violent cognitions is particularly pertinent to violent behavior (Unnever *et al.*, 2003).

It is noteworthy that in the current study, 80% of those with a conviction for violence also had a conviction for a non-violent criminal offense. This group of criminal offenders

is therefore likely to be the more serious and persistent offenders, which is reflected in the relatively larger amount of variance in violent vs. non-violent convictions explained by the three predictor variables than by conviction of any type (i.e. offending vs. non-offending). Those with poor behavioral control may be predisposed to engaging in unplanned, opportunistic criminal activity (Young *et al.*, 2011a), institutional aggression (Young *et al.*, 2011c; 2009), substance misuse (Gudjonsson *et al.*, 2012b; Young *et al.*, 2011b; 2011c) and motivation to engage in offending when feeling provoked (Gudjonsson *et al.*, 2011). In addition, poor behavioural control is also likely to affect their capacity to engage effectively with the criminal justice process including police interrogation (Gudjonsson *et al.*, 2007; 2008; 2012a) and the trial process (Gudjonsson & Young, 2006).

Data on treatment history during the intervening years was not available from the records of offending. At that time in England, conditions such as ADHD were seldom recognized as such, and in particular stimulant drugs such as methylphenidate were very rarely used. Indeed, a self-report study on a subset of the participants indicated that none had received medication for ADHD (Moya *et al.*, in press). From this perspective, therefore, our results contribute to the natural history of the problem. It is possible that effective treatment could have improved the outcome – though there is evidence that pharmacological treatment for ADHD does not necessarily reduce the risk of future antisocial behavior and offending (Langley *et al.*, 2010). If, however, the young people in this study had been treated effectively for ADHD, then this could have explained the

lack of prediction from hyperactive behaviors. It is not likely that such an explanation applies.

More intensive and multimodal treatments for childhood ADHD, including psychological interventions, are needed; stimulants alone are probably insufficient to reduce offending. Indeed, combined treatment approaches may be a more effective intervention as treatment effect sizes have been shown to be greater when both pharmacological and cognitive behavioral treatments are provided (Emilsson et al., 2011).

The current study's main strength is that it was a prospective epidemiological study. The participants were assessed in early childhood and followed up 19 years later using official criminal records obtained from the Ministry of Justice. The results are not influenced by medication for ADHD. The limitations are: firstly that the study is not based on an ADHD diagnosis but on behaviors determined by rating scales. Secondly, children with serious emotional problems were excluded from the original survey, which may have reduced the power of the current findings, and the current results should not be generalized to children with clinical anxiety or depression. Thirdly, the children were not identified by rigorous or objective measures of inattention in childhood (i.e., the focus was primarily on ratings of behavior). Fourthly, the sample followed up for criminal record check was small ($n = 173$) and the number of people with a conviction was small ($N=43$). Hence the further breakdown by conviction type, which was

necessary to meet the aims of the paper, reduced power and may have resulted in some non-significant results. Fifthly, the records did not include data regarding possible mediating influences on the participants in the intervening years such as their substance use or personality disorder, which means we were unable to examine the potential influence of these factors at outcome. In spite of these limitations, the findings further our knowledge about the developmental mechanisms that mediate criminal behavior by showing that symptoms of emotional problems in early childhood contribute to the risk of violent criminal offending independent of conduct problems and hyperactivity. This is a novel finding that requires further research.

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DECLARATION OF INTEREST

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REFERENCES

Bambinski LM, Hartsough CS, Lambert NM (1999). Childhood conduct problems, hyperactivity-impulsivity, and inattention as predictors of adult criminal activity. *Journal of Child Psychology & Psychiatry*, 40(3), 347-355.

Barkley RA, Murphy KR, Fischer M (2008). *ADHD in Adults: What the science says*. New York: Guilford.

Brassett-Grundy A, Butler N (2004). Prevalence and adult outcomes of Attention-Deficit/Hyperactivity Disorder: Evidence from a 30-year prospective longitudinal study. *Bedford Group for Lifecourse & Statistical Studies Occasional Paper: No. 2*. Institute of Education, University of London.

Budd T, Sharp C, Mayhew P (2005). Home Office Research Study 275: Offending in England and Wales: First results from the 2003 Crime and Justice Survey. *Home Office Research, Development and Statistics Directorate*.

Caspi A, Harrington H, Milne B, Amell JW, Theodore RF, Moffitt TE (2003). Children's behavioural styles at age 3 are linked to adult personality traits at age 26. *Journal of Personality*, 71, 495-513.

Cohen J (1992). A power primer. *Psychological Bulletin*, 112, 155–159.

Farrington, DP (1990). Implications of criminal career research for the prevention of offending. *Journal of Adolescence*, 13, 93-113.

Farrington DP, Ttofi MM, Coid JW (2009). Development of adolescence-limited, late-onset, and persistent offenders age 8 to age 48. *Aggressive Behavior*, 35, 150-163.

Emilsson, B, Gudjonsson, G, Sigurdsson, JF, Baldursson, G, Einarsson, E, Olafsdottir, H & Young, S (2011). Cognitive behaviour therapy in medication-treated adults with ADHD and persistent symptoms: a randomized controlled trial. *BMC Psychiatry* 11, 116.

Eysenck, HJ & Eysenck, SBG. (1975). *Manual of the Eysenck Personality Questionnaire*. London: Hodder and Stoughton.

Fergusson, DM, Horwood, LJ, & Lynsky, MT (1993). The effects of conduct disorder and attention deficit in middle childhood on offending and scholastic ability at age 13. *Journal Child Psychology and Psychiatry*, 34, 899-916.

Gudjonsson GH, Sigurdsson JF, Adalsteinsson T, Young S (in press b). The relationship between ADHD symptoms, mood instability, and self-reported offending. *Journal of Attention Disorders* (<http://dx.doi.org/10.1177/1087054711429791>). Accessed 17 February 2012.

Gudjonsson GH, Sigurdsson JF, Einarsson E, Bragason OO, Newton AK (2008). Interrogative suggestibility, compliance and false confessions among prisoners and their relationship with attention deficit hyperactivity disorder (ADHD) symptoms. *Psychological Medicine*, 38, 1037-1044.

Gudjonsson GH, Sigurdsson JF, Sigfusdottir ID, Young S (2012a). False confessions to police and their relationship with conduct disorder, ADHD, and life adversity. *Personality and Individual Differences*, 52, 696-701.

Gudjonsson GH, Sigurdsson JF, Sigfusdottir ID, Young S. (2012b). An epidemiological study of ADHD symptoms among young persons and the relationship with ciga rette smoking, alcohol consumption, and illicit drug use. *Journal of Child Psychiatry and Psychology*, 53, 304-312.

Gudjonsson GH, Sigurdsson JF, Sigfusdottir ID, Young S. (in press a) A national epidemiological study of offending and its relationship with ADHD symptoms and associated risk factors *Journal of Attention Disorders*, <http://dx.doi.org/10.1177/1087054712437584>.

Gudjonsson GH, Sigurdsson JF, Young S., Newton AK, Peersen M (2009). Attention Deficit Hyperactivity Disorder (ADHD). How do ADHD symptoms relate to personality among prisoners? *Personality and Individual Differences*, 47, 64-68.

Gudjonsson GH, Wells J, Young S (2011). Motivation for offending among prisoners and the relationship with Axis I and Axis II disorders and ADHD symptoms. *Personality and Individual Differences*, 50, 64-68.

Gudjonsson GH, Young S (2006). An overlooked vulnerability in a defendant: Attention Deficit Hyperactivity Disorder (ADHD) and a miscarriage of justice, *Legal and Criminological Psychology*. (2006) 11, 211-218

Gudjonsson GH, Young S, Bramham J (2007). Interrogative suggestibility in adults diagnosed with attention-deficit hyperactivity disorder (ADHD). A potential vulnerability during police questioning. *Personality and Individual Differences*, 43(4), 737- 745.

Jacobs N, van Os J, Derom C, Thiery E, Delespaul P, Wichers M (2011). Neuroticism explained? From a non-informative vulnerability marker to informative person-context interactions in the realm of daily life. *British Journal of Clinical Psychology*, 50, 19-32.

Langley et al. (2010). Adolescent clinical outcomes for young people with attention-deficit hyperactivity disorder. *British Journal of Psychiatry*, 196, 235-240.

Lynam DR (1996). Early identification of chronic offenders: Who is the fledgling psychopath? *Psychological Bulletin*, 120, 209-234.

Mordre M, Groholt B, Kjelsberg E, Sandstad B, Myhre AM (2011). The impact of ADHD and conduct disorder in childhood on adult delinquency: A 30 years follow-up study using official crime records. *BMC Psychiatry*, 11, 57.

Moffitt TE (1993). Adolescence-Limited and Life-Course-Persistent Antisocial Behavior: A Developmental Taxonomy. *Psychological Review*, 100 (4), 674-701.

Moyá J, Stringaris AK, Asherson P, Sandberg S, Taylor E (in press). The Impact of Persisting Hyperactivity on Social Relationships: A Community-Based, Controlled 20-Year Follow-Up Study. *Journal of Attention Disorders*, DOI: 10.1177/1087054712436876.

Pratt TC, Cullen FT, Blevins KR, Daigle L, Unnever JD (2002). The relationship of Attention Deficit Hyperactivity Disorder to crime and delinquency: a meta-analysis. *International Journal of Police Science & Management*, 4 (4), 344- 360.

Retz W, Rosler M (2009). The relation of ADHD and violent aggression: what can we learn from epidemiological and genetic studies? *International Journal of Law and Psychiatry*, 32, 235–243.

Retz W, Rosler M (2010). Association of ADHD with reactive and proactive violent behaviour in a forensic population. *ADHD Attention Deficit Hyperactivity Disorder*, 2, 195–202.

Rutter M, Tizard J, Yule W, Graham P, Whitmore K (1976). Isle of Wight studies, 1964-1974. *Psychological Medicine*, 6, 313-332.

Satterfield JH, Faller KJ, Crinella FM, Schell AM, Swanson JM, Homer LD (2007). A 30-year prospective follow-up study of hyperactive boys with conduct problems: adult criminality. *Journal of the American Academy of Child and Adolescence Psychiatry*, 46, 601-610.

Schachar RJ, Rutter M, Smith A (1981). The characteristics of situationally and pervasively hyperactive children: implications for syndrome definition. *Journal of Child Psychology & Psychiatry*, 22, 375-92.

Sibley MH, Pelham WE, Molina BSG, Gnagy E,M, Waschbusch DA, Biswas A, MacLean MG, Babinski DW, Karch KM (2011). The delinquency outcomes of boys with ADHD with and without comorbidity. *Journal of Abnormal Child Psychology*, 39, 21-32.

Sourander A, Elonheimo H, Niemelä S, Nuutila A-M, Helenius H, Sillanmäki L, Piha J, Tamminen T, Kumpulainen K, Moilanen I, Almquist F (2006). Childhood predictors of male criminality: A prospective population-based follow-up study from age 8 to late adolescence. *Journal of the American Academy of Child and Adolescent Psychiatry*, 45, 578-586.

Stevenson J, Goodman R (2001). Association between behaviour at age 3 years and adult criminality. *British Journal of Psychiatry*, 179, 197-202.

Taylor E, Chadwick O, Heptinstall E, Danckaerts M (1996). Hyperactivity and conduct problems as risk factors for adolescent development. *Journal of the American Academy of Child and Adolescent Psychiatry*, 35, 1213-1226.

Taylor E, Sandberg S, Thorley G, Giles S (1991). *The Epidemiology of Childhood Hyperactivity*. Maudsley Monograph Series. Oxford: Oxford University Press.

Taylor E, Schachar R, Thorley G, Wieselberg HM, Everitt B, Rutter M (1987). Which boys respond to stimulant medication? A controlled trial of methylphenidate in boys with disruptive behaviour. *Psychological Medicine*, 17, 121-143.

Unnever JD, Cullen FT, Pratt TC (2003). Parental management, ADHD, and delinquent involvement: reassessing Gottfredson and Hirschi's general theory. *Justice Quarterly*, 20, 471-500.

Young S, Misch P, Collins P, Gudjonsson GH (2011c). Predictors of institutional behavioural disturbance and offending in the community among young offenders. *The Journal of Forensic Psychiatry and Psychology*, 22, 72-86.

Young S, Wells J, Gudjonsson GH (2011b). Predictors of offending among prisoners: the role of attention-deficit hyperactivity disorder and substance use. *Journal of Psychopharmacology*, 25, 1524 - 1532.

Young S, Adamou M, Bolea B, Gudjonsson GH, Müller U, Pitts M, Thome J, Asherson P (2011a). The identification and management of ADHD offenders within the criminal justice system: a consensus statement from the UK Adult ADHD Network and criminal justice agencies, *BMC Psychiatry*, 11: 32 <http://www.biomedcentral.com/1471-244X/11/32>

Young S, Gudjonsson GH, Wells J, Asherson P, Theobald D, Oliver B, Scott C, Mooney A
(2009). Attention Deficit Hyperactivity Disorder and critical incidents in a Scottish prison
population. *Personality and Individual Differences*, 46, 265-269

Table 1. *Item Content of Rutter A(2) and B(2) for Hyperactivity, Conduct and Emotional Problem Scales*

	Rutter A(2)	Rutter B(2)
Hyperactivity	<ol style="list-style-type: none"> 1. Very restless, has difficulty staying seated for long. 2. Squirmy, fidgety child. 3. Cannot settle to anything for more than a few moments. 	<ol style="list-style-type: none"> 1. Very restless, has difficulty staying seated for long. 2. Squirmy, fidgety child. 3. Cannot settle to anything for more than a few moments.
Conduct problems	<ol style="list-style-type: none"> 1. Often destroys own or other's property. 2. Frequently fights or is extremely quarrelsome with other children. 3. Is often disobedient. 4. Often tells lies. 5. Bullies other children. 	<ol style="list-style-type: none"> 1. Often destroys own or other's property. 2. Frequently fights or is extremely quarrelsome with other children. 3. Is often disobedient. 4. Often tells lies. 5. Bullies other children. 6. Has stolen things on one or more occasions in the past 12 months. 7. Truants from school
Emotional problems	<ol style="list-style-type: none"> 1. Often worried, worries about many things. 2. Often appears miserable, unhappy, tearful or distressed. 3. Tends to be fearful or afraid of new things or new situations. 4. Fussy or over-particular child. 	<ol style="list-style-type: none"> 1. Often worried, worries about many things. 2. Often appears miserable, unhappy, tearful or distressed. 3. Tends to be fearful or afraid of new things or new situations. 4. Fussy or over-particular child. 5. Unresponsive, inert or apathetic. 6. Has had tears on arrival at school or has refused to come into the building in the past 12 months.

Table 2. Mean Scores, t-Value and Effect Size on the Three Rating Scales for Those with Conviction and No Conviction, Grouped into Total Convictions and Violent Convictions

	Conviction		No Conviction		t-value	Cohen's d
	Mean (SD)	N	Mean (SD)	N		
Total convictions		43		130		
Conduct Problems	4.0 (4.3)		3.5 (2.7)		2.33*	.36
Hyperactivity	5.8 (3.1)		4.9 (3.5)		1.58	.29
Emotional Problems	3.7 (2.6)		3.1 (2.4)		1.50	.26
Violent convictions		20		153		
Conduct Problems	5.1 (5.0)		3.7 (2.9)		1.94*	.35
Hyperactivity	6.4 (3.1)		5.0 (3.5)		1.78*	.43
Emotional Problems	4.9 (2.8)		3.0 (2.3)		3.39**	.74

*p<.05. **p<.001.