

_____ **Research Report** _____

**Profile and Outcomes of Male
Offenders with ADHD**

Ce rapport est également disponible en français. Pour en obtenir un exemplaire, veuillez vous adresser à la Direction de la recherche, Service correctionnel du Canada, 340, avenue Laurier Ouest, Ottawa (Ontario) K1A 0P9.

This report is also available in French. Should additional copies be required, they can be obtained from the Research Branch, Correctional Service of Canada, 340 Laurier Ave. West, Ottawa, Ontario K1A 0P9.

Profile and Outcomes of Male Offenders with ADHD

Amelia Usher

Lynn Stewart

Geoff Wilton

&

Alard Malek

Correctional Service of Canada

November 2010

Acknowledgements

The authors would like to thank Colette Cousineau for her help with the data for this report and Dianne Zakaria for her helpful guidance throughout the analysis phase of the project. We would also like to thank Jenelle Power and Brian Grant for their thoughtful comments on earlier drafts of the report. A very special thanks to the team at the Regional Reception and Assessment Centre in the Pacific region (RRAC) that so conscientiously collected the data that form the basis of this research.

Executive Summary

Key words: *attention deficit hyperactivity disorder; adult ADHD self-report scale.*

Attention Deficit Hyperactivity Disorder (ADHD) is a neurobiological disorder characterized by difficulties regulating attention, activity, and impulsivity. Predominantly diagnosed in childhood and adolescence, ADHD is increasingly being recognized as a disorder that continues to affect individuals into adulthood. ADHD is associated with a number of adverse outcomes including aggression, criminality, substance abuse, and low educational attainment, and it is thought to be more prevalent in forensic populations. Currently there is no information on the level of ADHD among federal offenders, and it is hypothesized that high rates of ADHD would present challenges for CSC in terms of offender behaviour management and community reintegration. To study the relationship between ADHD and a number of variables related to correctional outcomes, the Adult ADHD Self-Report Scale (ASRS) was administered to a sample of offenders newly admitted to CSC.

Over a 14 month period, 497 male offenders completed the ASRS at the Regional Reception Centre in the Pacific region (RRAC). It was determined that 16.5% of offenders met the clinical criteria for ADHD, while a further 25% scored in moderate range for this disorder. A significant relationship was discovered between ADHD and a number of demographic and profile variables. ADHD was found to be associated with unstable job history, presence of a learning disability, lower educational attainment, substance abuse, higher risk and need levels, and other mental health problems. ADHD was also found to predict institutional misconduct; offenders with the highest levels of ADHD were 2.5 times more likely to receive an institutional charge than offenders without these symptoms. Additionally, offenders with high levels of ADHD fared poorly on release to the community. Within six months of release, they were more likely to have returned to custody than offenders with no symptoms of ADHD.

The current study improves our understanding of the impact of ADHD in forensic populations. The rate of the disorder found in this study was considerably higher than prevalence rates cited in the general population, but in line with estimates from other correctional jurisdictions. Results indicate that high levels of ADHD can present challenges for CSC in terms of offender institutional management and transition into the community. A secondary purpose of this study was to evaluate the ASRS as a screening tool for ADHD in offenders. Findings indicate that the ASRS is a brief measure that can easily be administered at intake to identify offenders who may need additional services or adapted interventions because of this disorder.

Table of Contents

Acknowledgements.....	ii
Executive Summary.....	iii
Table of Contents.....	iv
List of Tables	v
List of Figures.....	vi
List of Appendices	vii
Introduction.....	1
Method	5
Participants.....	5
Measures/Material.....	8
Procedure/Analytic Approach.....	9
Results.....	11
ADHD Prevalence and Symptom Endorsement.....	11
Demographics and Profile.....	12
Program Completion.....	14
Institutional Behaviour.....	15
Returns to Custody.....	17
Co-occurrence of Substance Abuse Problems and ADHD.....	20
Discussion.....	22
Conclusions.....	25
References.....	27
Appendices.....	31

List of Tables

Table 1 <i>Demographic Variables for RRAC Sample and CSC Population</i>	6
Table 2 <i>Profile of RRAC Sample and the CSC Population</i>	7
Table 3 <i>Distribution of Scores on the ASRS (N = 497) Based on Two Scoring Methods</i>	11
Table 4 <i>Distribution of ASRS Scores by Aboriginal Status</i>	12
Table 5 <i>Demographic Variables Broken Down by ASRS Rating</i>	13
Table 6 <i>Inter-Correlations between ASRS Score and Profile Variables</i>	14
Table 7 <i>Mean Proportion of Programs Completed Grouped According to ADHD Level</i>	15
Table 8 <i>Logistic Regression of Institutional Charges as a Function of ADHD Level</i>	17
Table 9 <i>Number of Offenders who Returned to Custody for any Reason</i>	18
Table 10 <i>Number of Offenders who Returned to Custody with an Offence</i>	19
Table 11 <i>Estimates of Co-occurring Disorders Using ASRS and CASA Results</i>	21

List of Figures

- Figure 1.* Proportion of Offenders Remaining in the Community According to ASRS Rating... 19
- Figure A1* Proportion of Offenders Remaining in the Community According to ASRS Rating . 37

List of Appendices

Appendix A: Results of analyses using the 6-item ASRS screener.....	31
---	----

Introduction

The effective management and reintegration of federal offenders is a priority for the Correctional Service of Canada (CSC). Integral to this process is the accurate assessment and accommodation of offenders who present with unique needs relating to psychological and learning difficulties. Attention Deficit Hyperactivity Disorder (ADHD) is thought to be more prevalent in forensic populations and is associated with disruptive behaviour, aggression, criminality, substance abuse, and the development of antisocial and other personality disorders (Westmoreland et al, 2010; Gunter, Arndt, Riggins-Capsers, Wenman & Cadoret, 2006). Potentially, high rates of ADHD in CSC's offender population would present a challenge with respect to management of offenders' impulsive and aggressive behaviours, as well as their decreased ability to participate and succeed in correctional and educational programs.

ADHD is a neurobiological disorder characterized by difficulties in regulating attention, activity and impulsivity. ADHD is defined in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) as a "persistent pattern of inattention and/or hyperactivity-impulsivity that is more frequently displayed and more severe than is typically observed in individuals at a comparable level of development" (APA, 2000, p.85). It is one of the most commonly diagnosed psychiatric disorders among children and adolescents, with symptoms persisting into adulthood for a large proportion of individuals. A clinical diagnosis of adult ADHD requires current and persistent symptoms originating in childhood (Pary et al, 2004; Wilens, Biederman & Spencer, 2002). Research has recently established that while high levels of ADHD are required to reach threshold for a clinical diagnosis of the disorder, problems associated with ADHD are evident with lower levels of symptomology as well. This suggests that the disorder actually exists on a continuum, with severe symptoms at the upper end of the spectrum (Levy, Hay, McStephen, Wood, & Waldman, 1997; Lubke, Hudziak, Derks, van Bijsterveldt, & Boomsa, 2009).

Despite the fact that ADHD is thought to affect a significant proportion of adults, it has only recently been the focus of adult clinical research (Kessler et al, 2006; Pary et al, 2004). Recent epidemiological studies estimate the adult prevalence rate of ADHD in the general population to be 2-5% (Faraone, Sergeant, Gillberg, & Biederman, 2003; Kessler et al. 2006; Rosler et al, 2004; Simon, Czobor, Balint, Meszaros & Bitter, 2009). Rates are typically higher

for males than for females; it is estimated that approximately 5% of the adult male population has ADHD as compared to 3% of adult women (Kessler et al., 2006). There is currently no information on the prevalence of ADHD in CSC's offender population; however, research on offenders in other jurisdictions report rates of ADHD ranging from 17% to 40% (Eme, 2009; Eyeston & Howell, 1994; Rassmussen, Almvik & Levander, 2001; Retz et al, 2004; Westmoreland et al., 2010).

There are a number of potential explanations for why the incidence of ADHD is much higher in the offender population. Low self-control has been theoretically and empirically linked to criminal behaviour. Failure to inhibit impulses and general poor self regulation is the basis of Gottfredson and Hirschi's (1990) explanation of the underpinnings of criminal behaviour. Subsequent research has confirmed that low levels of self-control were predictive of a variety of anti-social and criminal behaviours (Longshore, 1998; Vazsonyi, Pickering, Junger & Helsing, 2001). A meta-analysis conducted by Pratt and Cullen (2000) found that low self-control was consistently one of the strongest correlates of crime, regardless of how self-control was measured. Studies specifically measuring ADHD in relation to criminal behaviour have found similar results. Given that impulsivity and low self-control are symptoms of ADHD, it is not surprising that the disorder has been empirically linked to delinquency. A recent meta-analysis found ADHD to be an important risk factor in crime with the authors concluding that there is a broad trend in the literature supporting the general impact of ADHD on criminal behaviour (Pratt, Cullen, Blevins & Unnever, 2002).

A strong association has also been documented between ADHD and antisocial personality disorder (Westmoreland et al., 2010; Young et al., 2009). Collins and White (2002) report that studies have found rates of antisocial personality disorder to be ten times higher in adults with a childhood diagnosis of ADHD as compared to controls. An Icelandic study found antisocial personality disorder to be the best predictor of current ADHD symptoms in male inmates (Einarsson, Sigurdsson, Gudjonsson, Newton & Bragason, 2009). Similarly, a prospective study of 158 males found that participants who had been diagnosed with ADHD in childhood were significantly more likely to be diagnosed with antisocial personality disorder in adulthood (Mannuzza, Klein, Bessler, Malloy & LaPadula, 1998).

High rates of psychiatric comorbidity have also been found in the literature. A German study with a sample of 70 adults with ADHD reported that at 77%, psychiatric comorbidity rates

were significantly higher than in a control group. Other studies have confirmed this high rate of lifetime psychiatric comorbidity (Biederman, 2004; Kessler et al., 2006). Research with offenders also demonstrates similar results. A study involving 319 randomly selected offenders found higher rates of psychiatric comorbidity among offenders with ADHD compared to a control group (Westmoreland et al., 2010). Comorbidity rates were highest for mood disorders (87%) and anxiety disorders (68%).

Research has generally shown a link between ADHD and substance abuse, although some conflicting findings exist. Mannuzza et al (1998) reported that adults who had been diagnosed with ADHD in childhood were more likely to have non-alcoholic substance use disorder than a control group. Similarly, Biederman, Wilens, Mick, Faraone and Spencer (1998) reported that adults with ADHD were twice as likely to have psychoactive substance use disorder. Increased risk for nicotine, alcohol and drug dependence was reported by Sullivan and Rudnik-Levin (2001). A recent study with offenders did not find any difference in substance abuse between offenders with and without ADHD, although this result could be due to the generally high prevalence of substance use disorders among offenders in general (Westmoreland et al, 2010).

There is a lack of research on the precise relationship between adult ADHD and recidivism. Studies in this area have focused predominantly on young offenders, with results generally supporting the finding that ADHD is a risk factor for recidivism in youth (Putnins, 2005). However, there is some evidence that ADHD is only predictive of recidivism in the presence of conduct disorder (Soderstrom, Sjodin, Carlstedt & Forsman, 2004). Although few studies have been conducted with adult offenders, it is possible that ADHD increases the risk of reincarceration, particularly when combined with antisocial personality disorder.

It is also unclear what the impact of ADHD might be on participation in correctional programming. No studies to date have examined the relationship between the disorder and level of participation or success in correctional programs. Based on the literature correlating ADHD with learning disabilities and low educational attainment (Barkley, 2002; Einat & Einat, 2008; Loe & Feldman, 2007), it may be inferred that offenders with ADHD are likely to have higher rates of program drop out and poorer performance on measures of treatment change due to difficulties with attention and learning. There is evidence, however, that individuals with ADHD respond well to interventions based on cognitive behaviour principles (Safren et al., 2004). The

majority of programming delivered by CSC is based on a cognitive behavioural model.

Given the indication that rates of ADHD are higher in correctional populations, ADHD could present challenges within CSC in terms of population management and offender rehabilitation. Although it has been well-established in the literature that ADHD is prevalent in correctional populations, few studies to date have examined the influence of ADHD on a range of correctional outcomes for adult offenders as well as its implications for institutional management. Offenders with ADHD may have more trouble adjusting to the constraints of incarceration as well as increased difficulty following the rules of the institution and managing relationships with other offenders (Pratt et al., 2002). A recent study of incarcerated male offenders in the UK found that ADHD had a significant effect on the total number of critical incidents as well as the severity of incidents occurring in a Scottish prison (Young et al., 2009).

The purpose of the present study is to examine the relationship between ADHD and a number of correctional outcomes including institutional misconducts, performance in correctional programming, and returns to custody in adult male offenders. Based on the literature examined to date, it is hypothesized that offenders with high levels of ADHD symptoms will have poorer outcomes with respect to program participation, institutional behaviour, and success upon release. It is also hypothesized that high levels of ADHD symptoms will be associated with a number of profiling characteristics such as younger age, lower educational attainment, job instability, increased substance abuse, and mental illness. In addition, this research report presents results of the Adult ADHD Self-Report Scale (ASRS) as a screening tool for ADHD in male offenders. Prevalence rate, demographic profile, and outcomes are presented based on level of ADHD symptom endorsement. A discussion of the recommended scoring of this instrument is also included.

Method

Participants

Federally sentenced male offenders newly admitted to the Pacific region's Regional Reception and Assessment Centre (RRAC) over a 14 month period were asked to participate in this study. In total, 527 male offenders were approached to complete the ASRS after having signed a consent form. Of these, 30 offenders either refused or produced invalid results. As a result, between 2006 and 2007 a total of 497 male offenders completed the ASRS. Mean age of the participants in the sample was 34.67 ($SD = 10.05$). Length of sentence for the group averaged 3.35 years ($SD = 1.98$).

Typically, over a 12 month period, CSC receives nearly 5,000 offenders with new sentences. Tables 1 and 2 present the profiles of offenders assessed at RRAC as compared to all other new admissions to CSC during the same time period. In order to determine whether the participants sampled from RRAC for the current study were representative of the total national population of incoming offenders, demographic profiles were compared for the two groups. Generally, there was no consistent pattern of differences between the two groups based on key profiling variables although the RRAC sample had slightly higher need ratings than offenders in the rest of CSC ($\chi^2(2) = 11.21, p < 0.01$). Additionally, the percentage of Aboriginal offenders in the RRAC sample was slightly higher than in the rest of the CSC admission population ($\chi^2(1) = 4.45, p < 0.05$). Given that RRAC is in the Pacific region where the proportion of Aboriginal offenders is higher than in other regions with the exception of the Prairie region, it would be expected that the proportion of incoming Aboriginal offenders would be slightly higher than for CSC as a whole.

Table 1

Demographic Variables for RRAC Sample and CSC Population

	New admissions to RRAC %	All other new admissions to CSC %
Race	<i>N</i> = 524	<i>N</i> = 4760
Non-Aboriginal	78.8	82.6
Aboriginal	21.2	17.4
Marital Status	<i>N</i> = 504	<i>N</i> = 4813
Single	46.6	50.9
Common Law	33.3	30.7
Married	7.7	7.7
Other	12.3	10.7
Education level at last admission	<i>N</i> = 457	<i>N</i> = 4339
Less than Grade 8	16.2	25.1
Grade 8 to Grade 9	20.8	27.3
Grade 10 to Grade 12	32.6	24.7
High School or more	30.4	22.9
Unstable Job History	<i>N</i> = 458	<i>N</i> = 4631
Yes	69.9	61.2
No	30.1	38.8
Current offence (major)	<i>N</i> = 499	<i>N</i> = 4750
Homicide	7.8	6.0
Sexual offence	7.0	12.0
Robbery	11.8	17.7
Assault	11.8	13.5
Drugs related	18.0	22.6
Other non-violent	34.1	28.2
Sentence Length	<i>N</i> = 504	<i>N</i> = 4813
Less than two years	0.6	1.3
Two to less than five years	80.4	81.3
Five to less than ten years	12.9	12.7
Ten or more years	2.0	1.6
Indeterminate ¹	4.2	3.1

¹Includes life sentences

Table 2

Profile of RRAC Sample and the CSC Population

	New admissions to RRAC %	All other new admissions to CSC %
Overall Risk	N = 459	N = 4674
Low	13.5	15.9
Medium	39.2	41.3
High	47.3	42.8
Overall Need	N = 459	N = 4674
Low	7.6	9.8
Medium	27.0	32.9
High	65.4	57.3
Alcohol Dependence (ADS)	N = 490	N = 4483
None	52.2	49.6
Low	36.5	35.7
Moderate	4.9	8.2
Substantial	4.3	4.4
Severe	2.0	2.1
Alcohol Problems (PRD)	N = 490	N = 4483
No	62.0	57.6
Some	13.9	14.8
Quite a few	13.9	15.3
A lot	10.2	12.4
Drug Abuse (DAST)	N = 490	N = 4483
None	26.3	33.3
Low	20.8	22.1
Moderate	20.6	18.2
Substantial	21.4	18.5
Severe	10.8	7.8

Measures/Material

The data for this study were collected from the Offender Management System (OMS), the Offender Intake Assessment (OIA), and the Adult ADHD Self-Report Scale (ASRS). The OMS is an automated database used by CSC to manage information on federal offenders. Risk variables were drawn from the Offender Intake Assessment (OIA) which is a comprehensive evaluation conducted on all incoming offenders in CSC. The Dynamic Factors Identification and Analysis (DFIA) component of the OIA assesses a wide variety of dynamic risk factors grouped into seven domains, with each domain consisting of multiple indicators. The DFIA yields ratings of need levels for each domain, as well as an overall level of dynamic need ranging from low to considerable (high). The principal tool used for assessing risk level in federal male offenders is the Statistical Information on Recidivism (SIR) Scale which is based on static risk factors. The final score provides estimates of risk from very good to very poor. In addition to this tool, the Static Factors Assessment (SFA) provides comprehensive information pertaining to the criminal history and risk factors of each offender yielding an overall level of low, medium, or high static risk assigned to offenders at their time of admission. CSC policy does not permit the use of the SIR for Aboriginal offenders. Therefore, for this study, the estimate of risk for Aboriginal offenders is provided through the overall static risk rating. In addition to the risk and need assessment, the OMS contains information on the offenders' progress on the correctional plan, their performance while under warrant with respect to participation in programs or institutional charges as well as background information on such factors as age, marital status, education level, mental health status, and work history. The presence of a learning disability is flagged on files if the offenders report a school history of learning problems or if the educational level is very low relative to cognitive functioning.

The CASA (Computerized Substance Abuse Assessment) is the part of the intake assessment that evaluates the extent of substance misuse and its relationship to offending. This assessment procedure includes the results of several well validated measures of substance misuse including the 20-item Drug Abuse Screening Test (DAST) (Skinner, 1982) and the Alcohol Dependency Scale (ADS) (Skinner & Horn, 1984), and the 15-item Problems Related to Drinking Scale (PRD) (Selzer, 1981). The CASA uses the ADS, the DAST and the PRD to derive overall substance abuse scores and program referral recommendations.

The Computerised Mental Health Screening System (CoMHISS) is a national electronic

psychological screening tool used to flag offenders who need mental health services follow-up. For this study, results on the psychological tests that comprise CoMHISS that produced scores of T-65 or above were considered indicative of mental health problems.

The Adult ADHD Self-Report Scale (ASRS)

The Adult ADHD Self-Report Scale (ASRS) was used to measure ADHD. The ASRS is an 18-item self-report scale that screens for ADHD based on DSM-IV criteria. Each item is presented on a five point scale ranging from “never” to “very often”. The ASRS was developed in collaboration with the World Health Organization (WHO) for inclusion in their World Mental Health Surveys (Kessler et al., 2005). Internal consistency of this measure has been reported as high with Cronbach’s alpha coefficients of 0.88 to 0.89 (Adler et al., 2006). Concurrent validity is also high, with correlations of 0.84 between the ASRS and other ADHD rating scales, including the semi-structured clinical ADHD Rating Scale (ADHD-RS) and the semi-structured clinical interview for recent DSM-IV adult ADHD (Adler et al., 2006).

The ASRS can be scored using the full scale or as a 6-item screener. Optimal scoring for both the full scale and the screener version of the ASRS was determined by the authors to be the sum of dichotomous responses (Kessler et al., 2005). In this case, dichotomous refers to a scoring method whereby each item is weighted so that positive endorsement requires meeting a threshold of either “sometimes” or “often”, depending on the symptom. Evidence presented by the authors suggests that the 6-item screening version is equally valid and may even out-perform the full scale version (Kessler et al, 2005, 2007). Both methods of scoring were used in the present study. ADHD symptom endorsement was grouped into four categories (none, low, moderate, high) based on stratification suggested by Kessler et al. (2005). Kessler et al. indicate that participants who scored in the “high” category were likely to meet clinical levels of ADHD.

Procedure/Analytic Approach

Staff members of the psychology department at RRAC administered the ASRS in paper-and-pencil format to all consenting participants. Results of the measure were entered into a database by a mental health team member.

Variables were categorized into two areas: profile and outcome. Variables included in the profile category were age, race, length of sentence, current offence, marital status, education

level, job history, risk, need, alcohol and drug problems, presence of a learning disability, SIR group, and presence of mental health problems. Chi-squares and Spearman correlations were conducted on the profile variables to determine if they were associated with level of ADHD symptom endorsement.

Variables included in the outcome category were program completion, institutional behaviour which was measured by the presence of any institutional charges and time spent in segregation, and, finally, whether the offender returned to custody after being released. ANOVAs were used to compare the proportion of completed programs between groups. Logistic regression was used to examine whether level of ADHD predicted having an institutional charge or being sent to segregation. Survival analysis was used to determine if ADHD affected the rate at which offenders returned to custody after being released into the community.

To control for the fact that offenders in this study spent differing amounts of time in the institution and in the community, time-incarcerated and time-at-risk variables were entered as covariates in the logistic regression analyses. Time-incarcerated was defined as the number of years an offender spent inside the institution. Time-incarcerated began at the date of admission to RRAC and ended at either the date the data were compiled (May 10, 2010) or the date of release. In the case of multiple releases and returns during the study period, the most recent release date was used and any time spent outside the institution was subtracted from the time-incarcerated period. The average time-incarcerated for the sample group was 1.89 years ($SD = 0.78$, range = 0.12 to 4.19).

Time-at-risk was defined as the number of years an offender was in the community post-release. Time-at-risk began at the date of first release (if applicable) and ended at the date of data pull or the first date the offender was returned to custody. Offenders who were not released during the time period examined for this study were not included in any analyses involving time-at-risk. The average time-at-risk for the sample group was 1.09 years ($SD = 0.80$, range = 0.04 to 3.42).

Results

The ASRS was scored as both the 18-item full scale and the 6-item screener. Generally the results presented in this report are based on the full scale scoring. However, as noted by the authors of the ASRS, the screener version is equally as predictive as the full scale and even outperforms it on certain variables (Kessler et al., 2005). In the present study, scores on the screener and the full scale were highly correlated ($r = .89, p < 0.01$). Appendix A presents results based on the 6-item screener. An exploration of the merits of the full scale versus the screener version is presented in the discussion section of this report.

ADHD Prevalence and Symptom Endorsement

Results of the ASRS full scale indicated that 16.5% of offenders ($n = 82$) scored in the high range for ADHD, indicating that they met clinical levels of ADHD symptom endorsement. Table 3 displays the distribution of participants according to ASRS rating. For the purposes of comparison, both scoring methods are presented. Subsequent tables will present results for the full scale only. Refer to Appendix A for full results based on the 6-item screener.

Table 3

Distribution of Scores on the ASRS (N = 497) Based on Two Scoring Methods

<i>Scoring method</i>	<i>Distribution</i> <i>% (n)</i>
18-item ASRS rating (score range)	
None (0)	20.1 (100)
Low (1-3)	38.2 (190)
Moderate (4-8)	25.2 (125)
High (9-18)	16.5 (82)
6-item ASRS rating (score range)	
None (0)	33.4 (166)
Low (1)	21.1 (105)
Moderate (2-3)	27.6 (137)
High (4-6)	17.9 (89)

Demographics and Profile

Participants were compared on a number of demographic variables according to level of ADHD. No significant differences were found with respect to Aboriginal status, age, or average sentence length (see Tables 4 and 5). With respect to marital status, a noticeable drop in the number of individuals who are married can be seen for the high ADHD group. This is consistent with the literature indicating that individuals with ADHD are more likely to be divorced or single (Barkley, 2002; Murphy & Barkley, 1996).

Type of current offence was found to be related to ASRS rating. Offenders with higher levels of ADHD were more likely to have robbery as their index offence ($\chi^2(3) = 10.01, p < 0.05$), and less likely to be incarcerated for drug offences ($\chi^2(3) = 25.93, p < 0.01$).

Table 4

Distribution of ASRS Scores by Aboriginal Status

ASRS Rating	<i>Non-Aboriginal</i>	<i>Aboriginal</i>
	(<i>N</i> = 391)	(<i>N</i> = 103)
	% (<i>n</i>)	% (<i>n</i>)
None	21.7 (85)	13.6 (14)
Low	37.1 (145)	42.7 (44)
Moderate	24.8 (97)	27.2 (28)
High	16.4 (64)	16.5 (17)

Table 5

Demographic Variables Broken Down by ASRS Rating

	<i>ASRS Rating</i>			
	None	Low	Moderate	High
Demographics	<i>N</i> = 100	<i>N</i> = 190	<i>N</i> = 125	<i>N</i> = 82
Average Age (in years)	33.98	35.37	34.83	33.33
Average Sentence Length ¹ (in years)	3.59	3.47	3.16	3.11
Marital Status (%(<i>n</i>))				
Single, separated or divorced	48.0 (48)	56.8 (108)	54.4 (68)	65.9 (54)
Married or common law	49.0 (49)	40.5 (77)	43.2 (54)	29.3 (24)
Current offence (%(<i>n</i>))				
Homicide	5.0 (5)	10.0 (19)	8.0 (10)	2.4 (2)
Sexual offence	6.0 (6)	10.0 (19)	3.2 (4)	6.1 (5)
Robbery	15.0 (15)	18.4 (35)	21.6 (27)	32.9 (27)
Assault	12.0 (12)	10.5 (20)	14.4 (18)	11.0 (9)
Drug related	34.0 (34)	16.8 (32)	15.2 (19)	6.1 (5)
Other non-violent offence	27.0 (27)	32.6 (62)	36.8 (46)	41.5 (34)

¹Note: Indeterminate sentences were removed from this analysis

Spearman rank correlations were conducted on the remaining profile variables. All variables were significantly related to the score on the ASRS. The correlation matrix for these variables is displayed in Table 6. Inter-correlations were weak to moderate, indicating that ADHD accounted for a portion of the variance for these variables. As expected, higher levels of ADHD were significantly related to unstable job history, lower educational achievement and the presence of a learning disability. Offenders with higher levels of ADHD were also more likely to have substance use problems and be assessed as higher risk and need. Also as hypothesized, ADHD was strongly correlated with other mental health problems, which is consistent with the literature on psychiatric comorbidity of ADHD.

Table 6

Inter-Correlations Between ASRS Score and Profile Variables

	1	2	3	4	5	6	7	8	9	10	11
1. ASRS score	--	.13**	.16**	-.15**	.16**	.16**	.24**	.12**	.17**	-.23**	.54**
2. Unstable job history ^a		--	.20**	-.22**	.06	.07	.34**	.35**	.43**	-.54**	.13**
3. Learning disability ^b			--	-.36**	.09	.09	.08	.10*	.21**	-.12*	.12*
4. Education level ^c				--	-.16**	-.18**	-.12*	-.24**	-.28**	.24**	-.07
5. Alcohol problems (PRD)					--	.76**	.20**	.11*	.18**	.01	.18**
6. Alcohol dependence (ADS)						--	.16**	.10*	.14**	.05	.19**
7. Drug abuse (DAST)							--	.26**	.35**	-.43**	.19**
8. Overall Risk								--	.65**	-.52**	.11*
9. Overall Need									--	-.54**	.15**
10. SIR group										--	-.11*
11. Mental health problems ^d											--

Note. * $p < .05$. ** $p < .01$. ^aAs measured by an indicator on the Employment Need domain. ^bAssessed through the presence of a Learning Disability flag on the offender file. ^cAssessed based on academic grade level at Intake, ^dBased on CoMHISS scores \geq T65.

Program Completion

In addition to the relationship between ADHD and the profile variables presented above, the effects of ADHD on correctional programming, institutional behaviour, and success upon release were examined. Given the established relationship between ADHD and lower educational achievement it was hypothesized that ADHD would have an impact on an offender's ability to successfully participate and complete programs.

To examine these effects, the proportion of completed programs was compared across ASRS rating (see Table 7). An ANOVA was conducted to compare the mean proportion of completed programs between ADHD levels. Although the overall ANOVA was significant ($F(3) = 3.12, p = 0.03$), a Tukey-Kramer post-hoc test found no significant differences between groups. This suggests that although the low ADHD group appears to have a higher proportion of

completed programs than the other groups, this difference is not likely to be generalized to the greater offender population. The effect size calculated for the overall ANOVA is small, further suggesting that this difference is not meaningful ($\Omega^2 = 0.02$). This indicates that offenders with high ADHD are just as likely to complete their correctional programs as offenders with fewer ADHD symptoms.

To further explore the effect of ADHD on program completion, separate analyses were conducted for the two different assessments of offender program completion: “successful” and “attended all sessions”. Successful completion of a program is noted by the program facilitator when there is evidence of positive treatment gain. When an offender completes a program but there is no evidence of treatment gain, completion is labelled as “attended all sessions”. ANOVAs indicated no significant differences across ADHD groups with respect to the proportion of programs successfully completed or attended all sessions (successful completion: $F(3) = 1.60$, $p = 0.19$; attended all sessions: $F(3) = 0.76$, $p = 0.52$). Thus, counter to our hypothesis, offenders with higher levels of ADHD completed the same proportion of programs as offenders with low or no levels of ADHD.

Table 7

Mean Proportion of Programs Completed Grouped According to ADHD Level

	<i>ASRS Rating</i>			
	None <i>N</i> ¹ = 64	Low <i>N</i> = 133	Moderate <i>N</i> = 102	High <i>N</i> = 65
Proportion of programs completed successfully	78.2%	85.4%	77.2%	75.6%
Proportion of programs “attended all sessions”	1.6%	4.9%	2.5%	3.1%
Total proportion of programs completed	80.1%	90.3%	79.6%	78.7%

¹Note: N refers to number of offenders who were enrolled one or more programs.

Institutional Behaviour

Receiving an institutional charge and being sent to segregation were used as measures of

offender institutional behaviour. Institutional charges included both serious and minor charges, and segregation included both voluntary and involuntary transfers. Minor institutional offences are defined as any negative or non-productive inmate behaviour that is contrary to institutional rules, and can include disobeying orders or being disrespectful to staff. Serious institutional offences include breaches of security, violent or harmful acts, and repetitive violations of rules. Assaults on another inmate or staff and possession of unauthorized items are examples of serious charges. Offenders can request to be placed in voluntary segregation if it is felt that their continued presence in the general population would jeopardize their safety. Involuntary segregation refers to placement in isolation as a result of behaviours that threaten the safety and security of other offenders or staff.

The majority of offenders in the sample had received at least one institutional charge during their current sentence (64%, $n = 319$) and 40% ($n = 200$) had been sent to segregation at least once. To examine the effect of ADHD on institutional behaviour, logistic regressions were conducted to determine if rating on the ASRS could predict either being given an institutional charge or being sent to segregation.

The ASRS rating “none” was used as a reference group in the logistic regression model; it was used as a baseline to which the other ASRS rating categories were compared. The time-incarcerated variable was included in the model to control for differing amounts of time spent in the institution by each participant. Results of the analysis indicated that ADHD was a significant predictor of receiving an institutional charge after accounting for time-incarcerated (see Table 8). When comparing all ASRS ratings to the “none” group, offenders with moderate levels of ADHD were 1.8 times more likely to receive an institutional charge than offenders with no ADHD symptoms. Even more striking, offenders with clinical levels of ADHD symptoms were 2.5 times more likely to receive an institutional charge than those without any symptoms.

Table 8

Logistic Regression of Institutional Charges as a Function of ADHD Level

Variables	<i>B</i>	Wald χ^2	O.R.	95% Confidence Intervals	
				Lower	Upper
Time-incarcerated	0.69	27.47**	2.0	1.54	2.59
ASRS rating none vs. low	0.21	0.67	1.24	0.74	2.06
ASRS rating none vs. moderate	0.59	4.28*	1.81	1.03	3.2
ASRS rating none vs. high	0.69	7.15**	2.5	1.27	4.73

Note. * $p < 0.05$ ** $p < 0.01$

A second logistic regression analysis was performed to determine if ADHD could predict whether an offender would be sent to segregation during his current sentence. Voluntary and involuntary segregation types were analyzed separately as well as combined into one category. Time-incarcerated was included in the analysis to control for amount of time spent in the institution. ADHD was not found to significantly increase the likelihood of being sent to segregation for any reason ($B = 0.04$, Wald $\chi^2 = 0.20$, O.R. = 1.04, lower confidence limit = 0.867, upper confidence limit = 1.26, $p = 0.65$). Separate analyses for voluntary segregation and involuntary segregation were also non-significant.

Returns to Custody

To examine the effect of ADHD on release outcomes, offenders were followed at three months, six months, and one year after release. Chi-squares were calculated to determine if offenders with high levels of ADHD returned to custody in greater numbers than offenders with lower levels of ADHD. The total number of offenders returning to custody for any reason was compared with the number of offenders remaining in the community. There was a noticeable trend of increasing numbers of returns to custody according to ASRS rating (see Table 9). For example, at six months post-release 38% of offenders with high levels of ADHD symptoms had

returned to custody as compared to approximately 20% of offenders in the none and low ADHD groups. At one year post-release, 47% of offenders in the high ADHD group had returned to custody as compared to approximately 30% of offenders in the none and low groups. These differences were significant (6 months: $\chi^2(3) = 14.59, p < 0.01$; 1 year: $\chi^2(3) = 9.28, p < 0.05$). A similar trend was detected at three months post-release, but the difference between ADHD groups was not significant ($\chi^2(3) = 5.98, p = 0.11$).

Table 10 presents the number of offenders who had returned to custody for an offence. As with returns to custody for any reason, offenders with higher levels of ADHD appear to be more likely to return to custody with an offence. Within one year of release, this difference was significant ($\chi^2(3) = 10.14, p < 0.05$). Similar trends are observed at three and six months post-release, however these did not reach significance (3 months: frequency too low to calculate chi square; 6 months $\chi^2(3) = 4.37, p = 0.22$).

Table 9

Number of Offenders Who Returned to Custody for Any Reason

	<i>ASRS Rating</i>			
	None	Low	Moderate	High
	% (n)	% (n)	% (n)	% (n)
Return within 3 months	$N^1 = 95$ 3.2 (3)	$N = 184$ 2.2 (4)	$N = 120$ 8.3 (10)	$N = 76$ 7.9 (6)
Return within 6 months	$N = 93$ 19.4 (18)	$N = 178$ 15.7 (28)	$N = 116$ 28.4 (33)	$N = 73$ 35.6 (26)
Return within 1 year	$N = 83$ 30.1 (25)	$N = 158$ 31.0 (49)	$N = 104$ 44.2 (46)	$N = 66$ 47.0 (31)

¹Note: N refers to the number of offenders who were released at least 3 months, 6 months, and 1 year (respectively) prior to the date of data pull.

Table 10

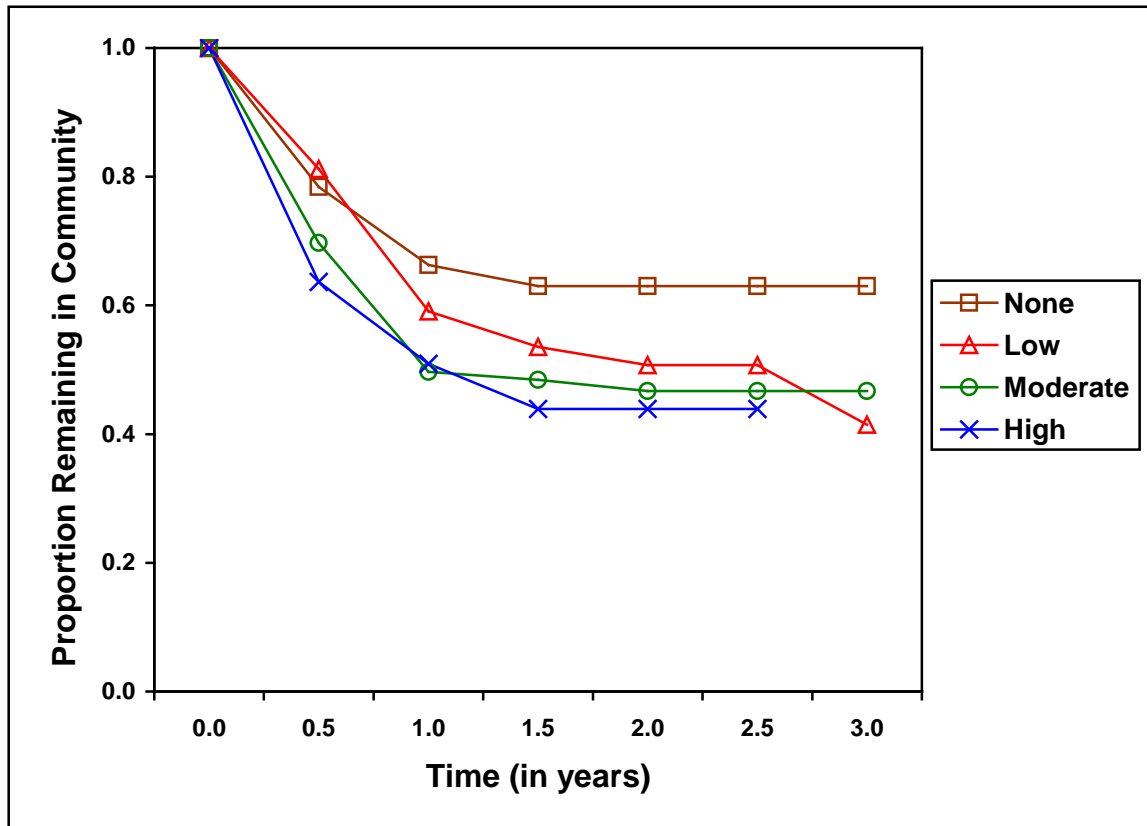
Number of Offenders Who Returned to Custody with an Offence

	<i>ASRS Rating</i>			
	None	Low	Moderate	High
	% (n)	% (n)	% (n)	% (n)
Return within 3 months	$N^1 = 95$ 0 (0)	$N = 184$ 0 (0)	$N = 120$ 0.8 (1)	$N = 76$ 6.6 (5)
Return within 6 months	$N = 93$ 4.3 (4)	$N = 178$ 4.5 (8)	$N = 116$ 4.3 (5)	$N = 73$ 13.7 (10)
Return within 1 year	$N = 83$ 9.6 (8)	$N = 158$ 12.0 (19)	$N = 104$ 5.8 (6)	$N = 66$ 19.7 (13)

¹ Note: N refers to the number of offenders who were released at least 3 months, 6 months, and 1 year (respectively) prior to the date of data pull.

A survival analysis was calculated to determine whether ADHD level was related to the rate at which offenders returned to custody. The time to failure (i.e., return to custody) was stratified according to ASRS rating. Findings confirmed a significant overall trend of returning to custody more quickly as ADHD level increased (see Figure 1). When comparing the difference between each survival curve, significant differences were found between the “none” and “high” groups ($\chi^2(3) = 5.72, p < 0.05$) and the “none” and “moderate” groups ($\chi^2(3) = 4.38, p < 0.05$). Based on these results, it would appear that higher levels of ADHD significantly increase the likelihood of being returned to custody, as well as decreasing the amount of time taken to do so.

Figure 1. Proportion of Offenders Remaining in the Community According to ASRS Rating



Co-occurrence of Substance Abuse Problems and ADHD

Co-occurrence of a substance abuse disorder and ADHD was analysed by assessing the percentage of respondents who scored in the high range on the ASRS and who also had high scores on measures of alcohol and drug abuse. Information from the ADS, DAST, and PRD subscales of the CASA was obtained from the OIA database. An analysis of co-occurring disorders was conducted by including participants with scores on the ADS, DAST and PRD at levels suggesting substantial to severe levels of abuse. A second analysis determined rates of co-occurring disorders using a more liberal formula that set the criterion for a substance abuse disorder as ratings of at least moderate on the ADS and DAST or “some problems” on the PRD.

Table 10 presents the results by individual substance abuse measure as well as an overall analysis whereby the presence of any one of the three substance abuse measures was taken as an indication of a substance abuse disorder. A stringent estimate of the rate of substance abuse disorders and a high score on the ASRS produces an estimate of co-occurring disorders of about 63 %. This rate increases to 78 % when using a more liberal cut off for a substance abuse

disorder. The rate of substance abuse problems for offenders screened in as having an ADHD problem based on the ASRS is significantly higher than for those offenders who were not screened in using either the conservative ($\chi^2(1) = 20.32, p < .01$) or liberal criterion for a diagnosis of substance abuse ($\chi^2(1) = 14.17, p < .01$).

Table 11

Estimates of Co-occurring Disorders Using ASRS and CASA Results

	<i>No ADHD</i>	<i>High ADHD</i>
	<i>N = 100</i>	<i>N = 82</i>
CASA variable	% (n)	% (n)
ADS		
Substantial to Severe	2.0 (2)	7.3 (6)
Moderate to Severe	6.0 (6)	13.4 (11)
DAST		
Substantial to Severe	22.0 (22)	50.0 (41)
Moderate to Severe	40.0 (40)	73.2 (60)
PRD		
Quite a Few to A Lot	16.0 (16)	31.7 (26)
Some to A Lot	28.0 (28)	46.3 (38)
Either ADS or DAST or PRD		
Substantial to Severe	30.0 (30)	63.4 (52)
Moderate to Severe	51.0 (51)	78.0 (64)

Discussion

The purpose of the present study was to create a profile of male offenders with ADHD and examine the impact that the disorder might have on institutional behaviour, program completion, and success after release. As hypothesized, results indicate that there is a significant relationship between ADHD and a number of important outcomes and variables relevant to corrections.

With respect to prevalence, 16.5% of the sample had scores on the ASRS that would meet the clinical criteria for ADHD. This is considerably higher than rates for the general adult population. Literature on prevalence of ADHD in adult incarcerated populations is inconsistent, with a wide range of prevalence rates being reported, possibly due to a variety of tools and cut off scores being used to measure the presence of the disorder. The rate found in the present study is consistent with estimates in the lower end of this spectrum (Eme, 2009; Retz et al., 2007). Nevertheless, this represents approximately 1 in 6 federal male offenders reporting a large number of ADHD symptoms. This has implications for the management of these offenders and their prospects for success upon release.

A profile of offenders with high levels of ADHD symptoms demonstrated that they were more likely to have lower educational attainment, unstable job histories and the presence of a learning disability than offenders with low or no ADHD symptoms. The strength of the associations was small but the pattern was consistent, suggesting that ADHD contributes, probably in combination with other factors, to problems that have an impact on reintegration in the community.

An examination of the relationship between ADHD level and index offence indicated that offenders with higher levels of ADHD were more likely to be currently incarcerated for robbery than offenders without ADHD. Given the impulsive nature of most robbery offences, this result is not surprising. Offenders with high levels of ADHD were less likely to be convicted for drug offences. This might be explained by the fact that the types of drug offences typically receiving a federal sentence include trafficking and exportation, offences which require a certain degree of planning. Additionally, offenders with high levels of ADHD symptoms were more likely to have substance abuse and other mental health problems. This is consistent with literature indicating a

relationship between ADHD and substance abuse, as well as psychiatric comorbidity.

As hypothesized, ADHD was associated with an increased likelihood of receiving an institutional charge while incarcerated, with offenders with the highest ADHD rating being 2.5 times more likely to be given an institutional charge. Even moderate levels of ADHD significantly predicted the probability of receiving an institutional charge. This indicates that behaviour management is more difficult for offenders who are highly impulsive and inattentive. Interestingly, these behavioural traits were not associated with an increased likelihood of being sent to segregation. The implications of these results suggest that correctional staff can expect a potential increase in behaviour management issues with these offenders.

Contrary to expectation, ADHD did not have a significant impact on program completion. Offenders with high levels of ADHD were equally as likely to successfully complete their correctional programs as offenders without ADHD symptoms. This finding is somewhat counterintuitive given that these same offenders were found to have lower levels of educational attainment and a higher risk of learning disability. The fact that they were equally as successful as their non-ADHD counterparts in remaining in programs may be explained by the accommodations already put in place by many of CSC's program facilitators. In fact, ADHD has been recognized by CSC as a special need in the context of program delivery. To that end, facilitators are provided with information on recommended accommodations for offenders who may be exhibiting ADHD-like symptoms in the Responsivity Portal, an on-line resource guide with links to more in-depth information. It is possible that even though no formal screening for ADHD has yet taken place, program facilitators are already providing appropriate accommodations for offenders who need additional support.

Another significant finding was the impact of ADHD on returns to custody. At six months post-release, offenders with high levels of ADHD had returned to custody in greater numbers than offender with lower levels of ADHD. This difference remained significant at one year post-release. This indicates that offenders with ADHD are likely to return to custody and to do so more quickly than their non-ADHD counterparts, which was confirmed by the survival analysis. Given that the rate of return for offenders with ADHD is higher than for those without ADHD, it would be beneficial for CSC to be able to identify ADHD as a potential factor for increased risk of return to custody. Identification of offenders more likely to recidivate because of problems with impulsivity and inattention can allow parole staff, correctional educators, shop

instructors and program officers to facilitate the reintegration process through targeted coaching strategies. These strategies have been shown to be effective in mitigating the most serious effects of ADHD (Solanto, Marks, Mitchell, Wasserstein & Kofman, 2008). Such interventions include coaching on self-management skills, problem solving, goal setting, and guided self-talk, all of which are included in existing CSC correctional programming and can be incorporated into individual counseling or educational sessions.

A secondary purpose for this study was to determine the usefulness of screening for ADHD upon admission to CSC, and whether the ASRS would be an appropriate tool for conducting this screening. The results of this research indicate that ADHD has an impact on success upon release as well as implications for institutional offender management. While the magnitude of the relationship of ADHD to delinquency and crime is not large, knowledge of the presence of the disorder does provide an additional piece of information for the complex task of offender case management within CSC. Although offenders with high ADHD were found to be equally successful in completing programs as those with low or no symptoms, the study did not assess the actual progress of the offenders in treatment or their outcomes as a result of program participation. We do know that offenders with high levels of ADHD had more institutional misconducts and were more likely to return to custody after release. This suggests that while program facilitators are currently able to accommodate offenders with impulsivity and attentional difficulties to the extent that they do not drop out of programs more than other offenders, their outcomes remain poorer than their non-ADHD counterparts. The evidence suggests that it would be worthwhile to screen for this disorder in order to make the appropriate accommodations for those offenders in need of extra support, particularly for those who may have ADHD in combination with other mental health problems or substance abuse issues. If information on offenders' level of symptoms of ADHD could be provided to program facilitators, educators and case management team members through CoMHISS reports, a more targeted correctional plan and intervention strategies could be developed. Current guidelines on the use of information from CoMHISS specify that its results should be included in psychologists' reports and be made accessible to those working with the offenders on a "need to know" basis.¹

The ASRS is a brief and easy to administer measure that has been used in international

¹ Computerised Mental Health Screening System, National Guidelines. Mental Health Branch (undated).

studies of ADHD. Further research would need to be conducted in order to validate it on CSC's offender population (including women offenders); however, given that it is a screening tool, it could be a useful addition to the Computerized Mental Health Intake Screening System (CoMHISS) battery. Ease of administration makes the ASRS useful for this purpose, especially given that it can be used as either the full scale or as a 6-item version. Results of the current study indicated that the full scale and the shorter screener version were highly correlated. In addition, the results of our analyses did not change when using the screener as opposed to the full scale (see Appendix A). Depending on the situation, it could be advantageous to use the shorter version if administration time is a concern.

Conclusions

From an operational point of view, these results indicate that offenders with high levels of ADHD symptoms present a challenge in terms of institutional management and success upon release. Practically speaking, there would be a benefit to addressing the symptoms of impulsivity and inattention that are the features of the disorder in order to assist these offenders to adjust to an institutional environment and make a more successful transition into the community. Currently, correctional programs in CSC use a treatment model well suited to addressing the symptoms of ADHD. Although no specific ADHD intervention is in place, the Responsivity Portal² developed through Reintegration Programs provides a description of intervention strategies for working with individuals with ADHD that have some evidenced-based support.

With respect to the measurement of ADHD, the ASRS is a quick measure that has been shown to be a valid measure of the disorder and could easily be incorporated into the mental health screening system already in place at intake (i.e. CoMHISS). Through CoMHISS reports, results of the ADHD screening could be relayed to the case management team, mental health professionals, and facilitators working with the offenders who are in a position to provide the necessary specialized support.

Preliminary estimates of rates of co-occurring ADHD and substance abuse indicate a strong link between the two confirming the literature on high rates of co-morbidity with various psychiatric diagnoses. Future research should explore the extent to which co-occurring substance abuse and mental health problems might further impede the rehabilitation of offenders

² The Responsivity Portal can be accessed at <http://infonyet/SoloSites/ResponsivityPortals/home.htm?lang=en>

with ADHD and identify methods to assist ADHD offenders and mitigate the impact of the disorder.

Finally, it should be pointed out that the picture for those with significant symptoms of ADHD is not entirely negative. While high rates of ADHD, particularly in combination with conduct disorder and substance abuse, can increase the chance of a variety of adverse outcomes, many adults with symptoms of ADHD are high functioning, creative, and lead prosocial and productive lives (Adler, 2004; Rad, Constantinescu, Nicolae, & Dobrescu, 2008). There is also some indication that ADHD may serve a protective factor for some adults. Ohan and Johnston (2002) note that individuals with ADHD are likely to project high self-esteem creating a positive impression in social situations. These individuals also tend to be overly optimistic when estimating their performance in future endeavors which is a factor linked to persistence and resilience (Diener & Milich, 1997).

Individuals who are high functioning despite their ADHD symptoms have discovered strategies or been provided with the assistance required to channel their high energy levels and focus their attention. These are the types of strategies that could be part of interventions that assist in mediating the effects of ADHD among offenders.

References

- Adler, L.A. (2004). Clinical presentations of adult patients with ADHD. *Journal of Clinical Psychiatry*, 65, 8-11.
- Adler, L.A., Spencer, T., Faraone, S.V., Kessler, R.C., Howes, M.J., Biederman, J., & Secnik, K. (2006). Validity of pilot adult ADHD self-report scale (ASRS) to rate adult ADHD symptoms. *Annals of Clinical Psychiatry*, 18(3), 145-148.
- American Psychiatric Association (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text revision). Washington, DC: Author.
- Barkley, R.A. (2002). Major life activity and health outcomes associated with attention-deficit/hyperactivity disorder. *Journal of Clinical Psychiatry*, 63(12), 10-15.
- Collins, P. & White, T. (2002). Forensic implications of attention deficit hyperactivity disorder (ADHD) in adulthood. *Journal of Forensic Psychiatry*, 13(2), 263-284.
- Diener, M.B. & Milich, R. (1997). Effects of positive feedback on the social interactions of boys with attention deficit hyperactivity disorder: A test of the self-protective hypothesis. *Journal of Clinical Child and Adolescent Psychology*, 26(3), 256-265.
- Einarsson, E., Sigurdsson, J.F., Gudjonsson, G.H., Newton, A.K., & Bragason, O.O. (2009). Screening for attention-deficit hyperactivity disorder and co-morbid mental disorders among prison inmates. *Nordic Journal of Psychiatry*, 63, 361-367.
- Einat, T. & Einat, A. (2008). Learning disabilities and delinquency: A study of Israeli prison inmates. *International Journal of Offender Therapy and Comparative Criminology*, 52(4), 416-434.
- Eme, R.F. (2009). Attention-deficit/hyperactivity disorder and correctional health care. *Journal of Correctional Health Care*, 15(1), 5-18.
- Eyestone, L.L. & Howell, R.J. (1994). An epidemiological study of attention-deficit hyperactivity disorder and major depression in a male prison population. *Bulletin of the American Academy of Psychiatry and the Law*, 22, 181-193.
- Gottfredson, M.R. & Hirschi, T. (1990). *A general theory of crime*. Stanford, CA: Stanford University Press.
- Gunter, T.D., Arndt, S., Riggins-Caspers, K., Wenman, G., & Cadoret, R.J. (2006). Adult outcomes of attention deficit hyperactivity disorder and conduct disorder: Are the risks independent or additive? *Annals of Clinical Psychiatry*, 18, 233-237.

- Kessler, R.C., Adler, L., Ames, M., Demler, O., Faraone, S., Hiripi, E., ... Walters, E.E. (2005). The World Health Organization adult ADHD self-report scale (ASRS): A short screening scale of use in the general population. *Psychological Medicine*, 35, 245-256.
- Kessler, R.C., Adler, L., Barkley, R., Biederman, J., Conners, C.K., Demler, O. Zaslavsky, A.M. (2006). The prevalence and correlates of adult ADHD in the United States: Results from the national comorbidity survey replication. *American Journal of Psychiatry*, 163(4), 716-723.
- Kessler, R.C., Adler, L.A., Gruber, M.J., Sarawate, C.A., Spencer, T., & Van Brunt, D.L. (2007). Validity of the World Health Organization adult ADHD self-report scale (ASRS) screener in a representative sample of health plan members. *International Journal of Methods in Psychiatric Research*, 16(2), 52-65.
- Levy, F., Hay, D.A., McStephen, M., Wood, C., & Waldman, I. (1997). Attention-deficit hyperactivity disorder: A category or a continuum? Genetic analysis of a large-scale twin study. *Journal of the American Academy of Child and Adolescent Psychiatry*, 36(6), 737-744.
- Loe, I.M. & Feldman, H.M. (2007). Academic and educational outcomes of children with ADHD. *Journal of Pediatric Psychology*, 32(6), 643-654.
- Longshore, D. (1998). Self-control and criminal opportunity: A prospective test of the general theory of crime. *Social Problems*, 45(1), 102-113.
- Lubke, G.H., Hudziak, J.J., Derks, E.M, van Bijsterveldt, T.C., & Boomsma, D.I. (2009). Maternal ratings of attention problems in ADHD: Evidence for the existence of a continuum. *Journal of the American Academy of Child and Adolescent Psychiatry*, 48(11), 1085-1093.
- Mannuzza, S., Klein, R.G., Bessler, A., Malloy, P., & LaPadula, M. (1998). Adult psychiatric status of hyperactive boys grown up. *American Journal of Psychiatry*, 155(4), 493-498.
- Murphy, K. & Barkley, R.A. (1996). Attention deficit hyperactivity disorder adults: Comorbidities and adaptive impairments. *Comprehensive Psychiatry*, 37(6), 393-401.
- Ohan, J.L. & Johnston, C. (2002). Are the performance overestimates given by boys with ADHD self-protective? *Journal of Clinical Child and Adolescent Psychology*, 31(2), 230-241.
- Pary, R., Lewis, S., Matuschka, P.R., Radzinskiy, P., Safi, M. & Lippmann, S. (2002). Attention deficit disorder in adults. *Annals of Clinical Psychiatry*, 14(2), 105-111.
- Pratt, T.C. & Cullen, F.T. (2000). The empirical status of Gottfredson and Hirschi's general theory of crime: A meta-analysis. *Criminology*, 38(3), 931-964.

- Pratt, T.C., Cullen, F.T., Blevins, K.R., Daigle, L., & Unnever, J.D. (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.
- Rad, F., Constantinescu, C., Nicolae, L., & Dobrescu, I. (2008). ADHD: From child to adult. *Romanian Journal of Psychiatry*, 10(3), 71-78.
- Rasmussen, K., Almvik, R., & Levander, S. (2001). Attention deficit hyperactivity disorder, reading disability, and personality disorder in a prison population. *Journal of the American Academy of Psychiatry and the Law*, 29, 186-193.
- Retz, W., Retz-Junginger, P., Henges, G., Schneider, M., Thome, J., Pajonk, F. Rosler, M. (2004). *European Archives of Psychiatry and Clinical Neuroscience*, 254, 201-208.
- Rosler, M., Retz, W., Retz-Junginger, P., Henges, G., Schneider, M., Supprian, T. Thome, J. (2004). *European Archives of Psychiatry and Clinical Neuroscience*, 254, 365-371.
- Safren, S.A., Otto, M.W., Sprich, S., Winett, C.L., Wilens, T.E., & Biederman, J. (2004). *Behaviour Research and Therapy*, 43, 831-842.
- Selzer, M.L. (1981). The Michigan Alcoholism Screening Test: The quest for a new diagnostic instrument. *American Journal of Psychiatry*, 127, 1653-1658.
- Simon, V., Czobor, P., Balint, S., Meszaros, A., & Bitter, I. (2009). Prevalence and correlates of adult attention-deficit hyperactivity disorder: Meta-analysis. *British Journal of Psychiatry*, 194(3), 204-211.
- Skinner, H.A. (1982). The Drug Abuse Screening Test. *Addictive Behaviours*, 7, 363-371.
- Skinner, H.A. & Horn, J.L. (1984). *Alcohol Dependence Scale (ADS): User's Guide*. Toronto: Addiction Research Foundation.
- Soderstrom, H., Sjodin, A., Carlstedt, A., & Forsman, A. (2004). Adult psychopathic personality with childhood-onset hyperactivity and conduct disorder: A central problem constellation in forensic psychiatry. *Psychiatry Research*, 121, 271-280.
- Solanto, M.V., Marks, D.J., Mitchell, K., Wasserstein, J., & Kofman, M.D. (2008). Development of a new psychosocial treatment for adult ADHD. *Journal of Attention Disorders*, 11(6), 728-736.
- Vazsonyi, A.T., Pickering, L.E, Junger, M., & Hessing, D. (2001). An empirical test of general theory of crime: A four-nation comparative study of self-control and the prediction of deviance. *Journal of Research in Crime and Delinquency*, 38(2), 91-131.

- Westmoreland, P., Gunter, T., Loveless, P., Allen, J., Sieleni, B., & Black, D.W. (2010). Attention deficit hyperactivity disorder in men and women newly committed to prison: Clinical characteristics, psychiatric comorbidity, and quality of life. *International Journal of Offender Therapy and Comparative Criminology*, 54(3), 361-377.
- Wilens, T.E., Biederman, J., & Spencer, T.J. (2002). Attention deficit/hyperactivity disorder across the lifespan. *Annual Review of Medicine*, 53, 113-131.
- Young, S., Gudjonsson, G.H., Wells, J., Asherson, P., Theobald, D., Oliver, B. Mooney, A. (2009). Attention deficit hyperactivity disorder and critical incidents in a Scottish prison population. *Personality and Individual Differences*, 46, 265-269.

Appendices

Appendix A: Results of analyses using the 6-item ASRS screener

Table A1

Distribution of Scores on the ASRS (N = 497)

<i>ASRS rating (score range)</i>	<i>Distribution % (n)</i>
None (0)	33.4 (166)
Low (1)	21.1 (105)
Moderate (2-3)	27.6 (137)
High (4-6)	17.9 (89)

Table A2

Distribution of ASRS Scores by Aboriginal Status

	<i>Non-Aboriginal (N = 391)</i>	<i>Aboriginal (N = 103)</i>
<i>ASRS Rating</i>	<i>% (n)</i>	<i>% (n)</i>
None	34.3 (134)	30.1 (31)
Low	21.0 (82)	21.4 (22)
Moderate	27.6 (108)	28.2 (29)
High	17.1 (67)	20.4 (21)

Table A3

Demographic Variables Broken Down by ASRS Rating

	<i>ASRS Rating</i>			
	None	Low	Moderate	High
Demographics	<i>N</i> = 166	<i>N</i> = 105	<i>N</i> = 137	<i>N</i> = 89
Average Age (in years)	34.76	35.36	34.90	33.04
Average Sentence Length ¹ (in years)	3.34	3.58	3.22	3.29
Marital Status (%(<i>n</i>))				
Single, separated or divorced	53.6 (89)	50.5 (53)	56.9 (78)	65.2 (58)
Married or common law	44.6 (74)	45.7 (48)	40.1 (55)	32.6 (29)
Current offence (%(<i>n</i>))				
Homicide	6.0 (10)	10.5 (11)	8.8 (12)	3.4 (3)
Sexual offence	10.2 (17)	4.8 (5)	5.1 (7)	5.6 (5)
Robbery	14.5 (24)	19.0 (20)	23.4 (32)	31.5 (28)
Assault	10.8 (18)	12.4 (13)	12.4 (17)	12.4 (11)
Drug related	27.1 (45)	18.1 (19)	15.3 (21)	5.6 (5)
Other non-violent offence	30.7 (51)	32.4 (34)	34.3 (47)	41.6 (37)

¹Note: Indeterminate sentences were removed from this analysis

Table A4

Inter-Correlations Between ASRS Score and Profile Variables

	1	2	3	4	5	6	7	8	9	10	11
1. ASRS score	--	.15*	.16*	-.17**	.12*	.11*	.29*	.09	.15**	-.25**	.44*
		*	*				*				*
2. Unstable job history ^a		--	.20*	-.17**	.06	.08	.34*	.35**	.43**	-.54**	.13*
			*				*				*
3. Learning disability ^b			--	-.36**	.08	.09	.08	.10*	.21**	-.12*	.12*
4. Education level ^c				--	-.16**	-.18**	-.12*	-.24**	-.28**	.24**	-.07
5. Alcohol problems					--	.75**	.23*	.11*	.18**	.01	.20*
							*				*
6. Alcohol dependence						--	.18*	.10*	.15**	.04	.20*
							*				*
7. Drug abuse							--	.26**	.35**	-.42**	.18*
											*
8. Risk								--	.65**	-.52**	.12*
9. Need									--	-.54**	.15*
											*
10. SIR group										--	-.11*
11. Mental health problems ^d											--

Note. * $p < .05$. ** $p < .01$. ^aAs measured by an indicator on the Employment Need domain. ^b Assessed through the presence of a Learning Disability flag on the offender file. ^c Assessed based on academic grade level at Intake, ^dBased on CoMHISS scores \geq T65.

Table A5

Mean Proportion of Programs Completed Grouped According to ADHD Level

	<i>ASRS Rating</i>			
	None <i>N</i> ¹ = 109	Low <i>N</i> = 80	Moderate <i>N</i> = 99	High <i>N</i> = 76
Proportion of programs completed successfully	82.1%	79.0%	82.0%	76.2%
Proportion of programs “attended all sessions”	2.3%	6.3%	2.0%	3.3%
Total proportion of programs completed	84.6%	85.2%	84.1%	79.5%

¹*Note:* N refers to number of offenders who were enrolled in a program.

Table A6

ANOVA Analyses Comparing Program Completion Variables with ASRS Rating

<i>Variable</i>	<i>F</i>	<i>df</i>	<i>p</i>
Proportion of programs completed successfully	0.54	3	.65
Proportion of programs “attended all sessions”	1.22	3	.30
Total proportion of completed programs	0.51	3	.68

Table A7

Logistic Regression of Institutional Charges as a Function of ADHD Level

Variables	B	Wald χ^2	O.R.	95% Confidence Intervals	
				Lower	Upper
Time-incarcerated	0.70	27.70**	2.02	1.55	2.62
ASRS rating none vs. low	-0.01	0.00	1.00	0.60	1.67
ASRS rating none vs. moderate	0.67	7.07**	1.95	1.19	3.19
ASRS rating none vs. high	1.05	11.5**	2.85	1.56	5.23

Note. * $p < 0.05$ ** $p < 0.01$

Table A8

Number of Offenders who Returned to Custody for any Reason

	ASRS Rating			
	None	Low	Moderate	High
	% (n)	% (n)	% (n)	% (n)
Return within 3 months	$N^1 = 159$ 3.8 (6)	$N = 100$ 2.0 (2)	$N = 133$ 6.8 (9)	$N = 83$ 7.2 (6)
Return within 6 months	$N = 157$ 19.2 (27)	$N = 95$ 18.9 (18)	$N = 129$ 25.6 (33)	$N = 79$ 34.2 (27)
Return within 1 year	$N = 141$ 31.9 (45)	$N = 84$ 38.1 (32)	$N = 115$ 33.9 (39)	$N = 71$ 49.3 (35)

¹Note: N refers to the number of offenders who were released at least 3 months, 6 months, and 1 year (respectively) prior to the date of data pull.

Table A9

Chi-Square Analyses for Number of Offenders who Returned to Custody for any Reason

<i>Variable</i>	χ^2	<i>df</i>	<i>p</i>
Return within 3 months	2.65	3	.45
Return within 6 months	13.05	3	< .01
Return within 1 year	6.69	3	.08

Table A10

Number of Offenders who Returned to Custody with an Offence

	<i>ASRS Rating</i>			
	None	Low	Moderate	High
	% (n)	% (n)	% (n)	% (n)
Return within 3 months	<i>N</i> ¹ = 159 0 (0)	<i>N</i> = 100 0 (0)	<i>N</i> = 133 1.5 (2)	<i>N</i> = 83 4.8 (4)
Return within 6 months	<i>N</i> = 157 4.5 (7)	<i>N</i> = 95 7.4 (7)	<i>N</i> = 129 2.3 (3)	<i>N</i> = 79 12.7 (10)
Return within 1 year	<i>N</i> = 141 10.6 (15)	<i>N</i> = 84 15.5 (13)	<i>N</i> = 115 5.2 (6)	<i>N</i> = 71 16.9 (12)

¹ Note: *N* refers to the number of offenders who were released at least 3 months, 6 months, and 1 year (respectively) prior to the date of data pull.

Table A11

Chi-Square Analyses for Number of Offenders who Returned to Custody with an Offence

<i>Variable</i>	χ^2	<i>df</i>	<i>p</i>
Return within 3 months	4.23	3	.24
Return within 6 months	8.22	3	< .05
Return within 1 year	6.16	3	.19

Figure A1

Proportion of Offenders Remaining in the Community According to ASRS Rating

