The effects of neuropsychological impairment on offender performance in substance abuse treatment

A recent mental health survey[2] of Canadian federal offenders indicated a 4.3% lifetime prevalence rate of "organic brain syndrome" (a type of neuropsychological impairment).[3] However, little empirical research has been done to define the treatment implications for this group of special needs offenders. Further, many offenders who suffer from some type of neuropsychological impairment also need treatment for other problems, such as substance abuse, related to their criminal behaviour.[4]

For example, a recent substance abuse survey of Canadian federal offenders revealed that approximately 18% of those who abused multiple substances also demonstrated possible organic brain deterioration - due perhaps to their alcohol and drug use.[5]

It has been argued that offenders with some level of neuropsychological impairment have special needs that extend beyond those normally met by substance abuse treatment programs.[6] Research with non-offender populations of substance abusers indicates that (in general) neuropsychological impairment is related to poorer treatment outcomes.[7]

This study examined the effect of neuropsy-chological impairment (defined broadly as psychological or physiological problems caused by injury or damage to the brain) on offenders who completed the Offender Substance Abuse Pre-Release Program.[8] The Offender Substance Abuse Pre-Release Program (OSAPP) This program provides cognitive-behavioural substance abuse treatment designed specifically for offenders identified as having moderately severe drug or alcohol problems. Treatment modules address alcohol and drug education, self-management, problem-solving, cognitive and behavioural skills training, social skills, jobs skills refresher training, leisure and lifestyle planning, relapse prevention and pre-release planning.[9]

The program is delivered over 26 three-hour group sessions and 3 individual sessions (with a trained program facilitator). A detailed description of the program contents, selection criteria and assessment procedures can be obtained from the authors. Description of program participants The study sample consisted of 122 offenders who completed the program at Bath Institution (a minimum-security federal institution) between January 1990 and August 1992.

Almost 34% of those in the sample were incarcerated for a violent crime; 36.1%, for a non-violent offence; and 30.3%, for a drug- or alcohol-related crime. About 20% were serving their first federal term of incarceration. The average sentence length was 39.4 months, and only two offenders were serving a life sentence. Assessment of neuropsychological impairment The Trail Making Test[10] was used as a screening instrument for possible neuropsychological impairment. Although the test has been found to be a highly sensitive instrument for detecting brain dysfunction,[11] a complete neuropsychological assessment is recommended to fully explore the extent and nature of an individual's disability.[12]

In all, 26.2% [32] of the offenders in the sample exhibited signs of possible neuropsychological impairment according to standard scoring criteria.[13] Specifically, 4.1% indicated general problems with basic motor and spatial skills and the ability to count; 13.1% had either spatial problems or dominant-

hand motor problems; 7.4% had problems handling verbal material or with planning and flexibility skills; and 1.6% of the offenders were suspected of suffering from massive damage to one hemisphere of the brain.

Owing to the relatively small numbers of offenders in these different categories, offenders who demonstrated possible neuropsychological impairment were grouped together and compared with offenders (73.8%) who did not exhibit any form of brain dysfunction.

The two groups of offenders were compared in relation to their offence characteristics, the severity of their substance abuse problems, their preto post-program change, and their rate of readmission into incarceration. Offence characteristics The offenders in the two groups did not differ with respect to offence type, number of previous federal incarcerations, or sentence length. The lack of difference in offence types was somewhat surprising, since other research has found neuropsychological impairment in some groups of murderers and assaulters.(14)

The extent of the offenders' drug and alcohol problems was assessed using the Drug Abuse Screening Test,(15) the Alcohol Dependence Scale(16) and the modified Michigan Alcoholism Screening Test.(17) Average scores on each of the three substance abuse tests did not differ significantly between the offenders with and those without neuropsychological impairment.

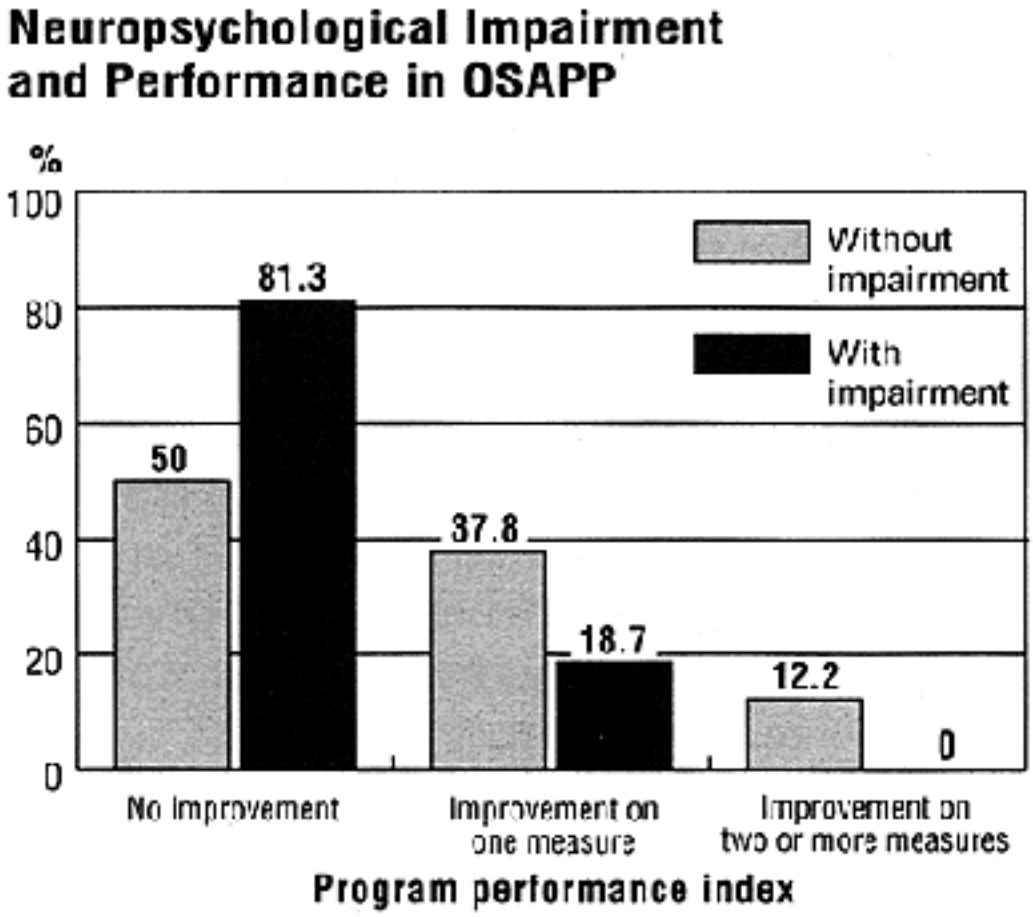
Both groups did, however, have serious substance abuse problems -78.1% of the offenders with neuropsychological impairment exhibited moderate to severe substance abuse problems, as did 82.6% of the offenders without such a disability. Intermediate treatment outcomes A battery of assessment measures(18) was administered to offenders before and after their participation in the program. The measures were designed to assess alcohol and drug knowledge, attitudes toward alcohol and drug use, effective communication skills, assertiveness, responsibility, problem-solving abilities, and employment.

Both groups demonstrated significant improvement on all but one of the measures (which assess knowledge increase, attitude change and skills development) and the groups had identical patterns of pre- to post-program improvement. In other words, there was no difference between the two groups based on their improvement as measured by these assessment measures.

Program performance was also assessed using a statistically derived index.(19) Specifically, selected measures from the assessment battery (which relate generally to substance abuse knowledge, attitudes, and problem-solving and behaviourial skills) were included in a performance index. Earlier analyses suggested that improvement on these measures is linked to a reduced readmission (into the correctional system) rate. Offenders' program performance was then classified on a scale of 1-3 according to the number of measures on which they improved: 1 = no improvement, 2 = improvement on one measure, and 3 = improvement on two or more measures.

This analysis showed that the offenders with no indication of neuropsychological impairment performed significantly better in the program than the offenders who exhibited signs of such impairment (see Figure 1). In fact, none of the offenders who showed evidence of possible neuropsychological impairment improved on two or more measures.

Figure 1

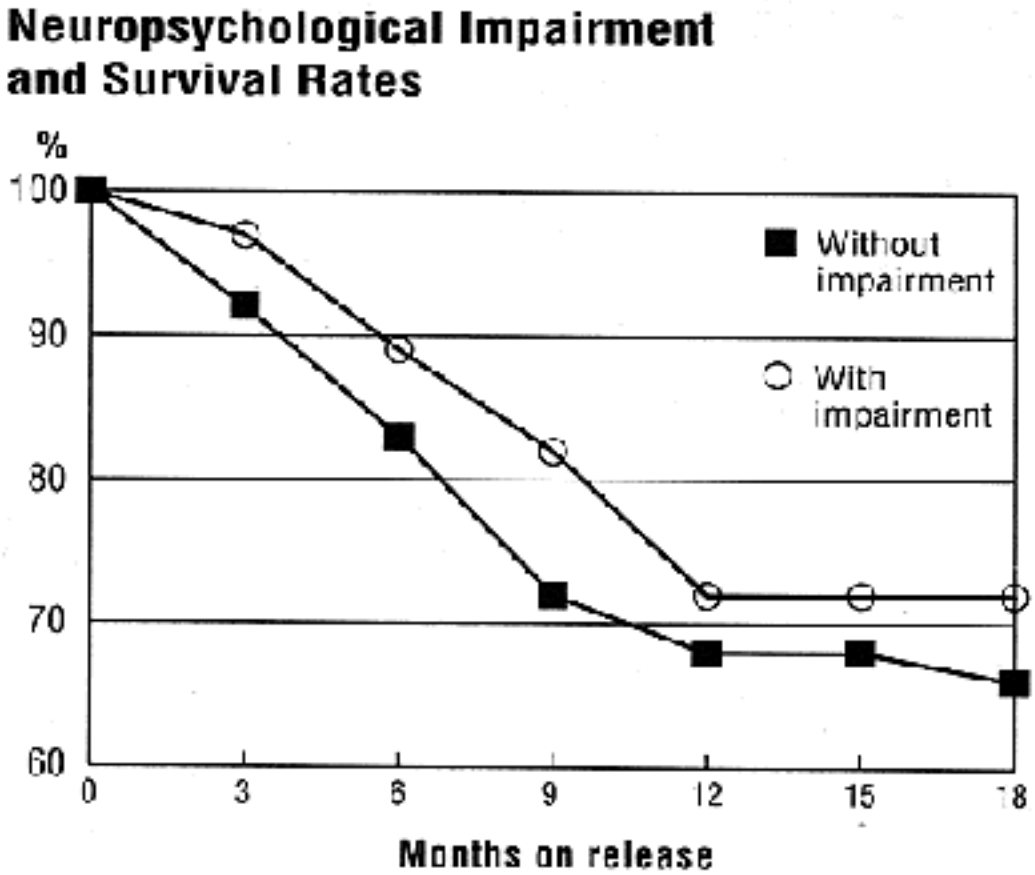


Post-release outcomes Almost 95% (115) of the offenders who completed the program were subsequently released from incarceration. The two offender groups did not differ in their average time remaining until release, the type of release granted, or their risk level as assessed by the Offender Risk/Needs Management Scale.[20]

Offenders with a possible brain dysfunction did have a readmission rate of 26.7%, compared with a rate of 32.9% for offenders with no such disability. However, this difference was not statistically significant.

The rate at which the two groups remained in the community (survival rate) was also examined. The offenders who exhibited signs of neuropsychological impairment were also slightly more successful at remaining in the community than the offenders with no signs of such impairment, although again, the difference was not statistically significant (see Figure 2).

Figure 2



In earlier works,[21] the authors found that offenders who improved in this substance abuse program (according to the performance index) recidivated (committed a further criminal offence) and were readmitted into the correctional system at a lower rate than offenders who did not improve. Unfortunately, attempts to examine the relationship between neuropsychological impairment and program performance were limited by the small number of offenders exhibiting signs of such a condition who improved. Discussion Two major findings emerged in this study. Fist, even though the offenders with neuropsychological impairment and those without did not differ in pre- to post-program improvement (as indicated by the individual assessment measures), the offenders with neuropsychological problems did perform comparatively poorly according to the performance index (which combines various assessment measures).

Second, readmission rates did not differ significantly according to the presence or absence of possible brain dysfunction. This finding is important because although the intermediate program performance of offenders with neuropsychological impairment was below that of the offenders without such a disability (according to the performance index), success on release was unaffected.

Although the poor performance during treatment of offenders with neuropsychological impairment is consistent with findings in the literature,[22] the fact that there were no differences in readmission rates suggests that the Offender Substance Abuse Pre-Release Program holds promise for addressing the substance abuse treatment needs of these offenders.

Of course, these findings are preliminary, and more research needs to be done in this area. Future research should perhaps attempt to discover why the performance of offenders with neuropsychological impairment was poorer on the performance index and to examine the interactive effects of

neuropsychological impairment and program performance on post-release outcomes.

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(1) Research and Statistics Branch, Correctional Service of Canada, 4B-340 Laurier Avenue West, Ottawa, Ontario K1A 0P9. We wish to thank Diane Black and Lee Marchildon (contracted to deliver the OSAPP program at Bath Institution) and Dr. Lois Rosine (psychologist at Bath Institution) who provided us with the data that was analysed to generate the results for this article.

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(3)Broad diagnostic criteria derived from the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders* were used. See American Psychiatric Association, *Diagnostic and Statistical Manual of Mental Disorders* (New York: Masson, 1980).

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(8)Lightfoot, "The Offender Substance Abuse Pre-Release Program: An Empirically Based Model of Treatment for Offenders."

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(10)R.M. Reitan, "validity of the Trail Making Test as an Indicator of Organic Brain Damage," *Perceptual and Motor Skills*, 8 (1958): 271-276. The test is a subscale of the Halstead-Reitan Neuropsychological Battery. See R.M. Reitan, *Manual for Administration of Neuropsychological Test Batteries for Adults and Children* (Tuscon: unpublished, 1979). For copies contact R.M. Reitan, Ph.D., Neuropsychological Laboratory, 1338 Edison Street, Tuscon, Arizona 85719.

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(12)G.L. Iverson, M.D. Franzen, D.S. Demarest and J.A. Hammond, "Neuropsychological Screening in Correctional Settings," *Criminal Justice and Behaviour*, 20 (1993): 347-358.

(13)These signs were interpreted according to the standard scoring criteria. See Golden, *Clinical*

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(20)Risk was assessed by the Offender Risk/Needs Management Scale. See L.L. Motiuk and F.J. Porporino, *Field Test of the Community Risk/Needs Management Scale: A Study of Offenders on Caseload* (Ottawa: Correctional Service of Canada, 1989), Report 6.

(21)Weekes, Millson, Porporino and Robinson, "Substance Abuse Treatment for Offenders: The Pre-Release Program."

(22)See Lightfoot, "The Offender Substance Abuse Pre-Release Program: An Empirically Based Model of Treatment for Offenders." See also Miller and Saucedo, "Assessment of Neuropsychological Impairment and Brain Damage in Problem Drinkers."