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Neurocognitive characteristics of DUI recidivists

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Abstract

Individuals who drive under the influence (DUI) of alcohol may be at greater risk for neurocognitive impairment because of their exposure to multiple sources of neurological risk. This could contribute to the persistence of DUI behaviour and influence the effectiveness of remedial interventions. The objectives of this study were to clarify the neurocognitive characteristics of DUI recidivists and the nature of potential impairments, and to explore relationships between these characteristics and the frequency of past DUI convictions. One hundred male recidivists were evaluated for visuospatial constructional abilities and visual memory, verbal fluency, attention skills, cognitive flexibility, spatial planning, and verbal and movement inhibition. Results indicated that a majority of recidivists showed signs of neurocognitive impairment on several dimensions. Impairment was most marked on visuospatial constructional abilities and visual memory. In contrast to previous studies, no participants were found to have impulse control problems. Measures of memory and cognitive efficiency were significantly associated with the frequency of past convictions. Finally, exploratory analyses of two potential sources of impairment, alcohol exposure and head trauma, suggested the role of excessive alcohol use as the most obvious associated factor. Overall, the findings indicate that neurocognitive impairments are a common feature in recidivists and may contribute to DUI persistence. Development of a DUI-specific neurocognitive assessment and greater understanding of how neurocognitive status influences DUI risk could lead to remediation strategies better adapted to the individual characteristics of recidivists.

Keywords: Driving while impaired; Neurocognitive function; Neuropsychology; Assessment; Alcohol

1. Introduction

Driving under the influence (DUI) of alcohol is a behaviour with significant individual, social, and health consequences. In the United States, traffic crashes represent the most frequent cause of death in individuals between one and 44 years of age (Centers for Disease Control and Prevention, 2002). Across North America, about 35–40% of all fatal motor crashes are related to alcohol (Mayhew et al., 2002; National Highway Traffic Safety Administration, 2004). Following a first conviction for DUI, most offenders will not recidivate. Unfortunately, approximately 33% of those convicted during a one-year period are recidivists (Fell, 1995). Hence, understanding the factors associated with recidivism is critical to our capacity for better detection of high risk offenders, and our ability to orchestrate effective countermeasures.

Research has identified several characteristics associated with DUI offenders. These include: male gender, alcohol abuse and dependence (Brinkmann et al., 2002; Wieczorek et al., 1992); drug problems (Lapham et al., 2001); hostility, sensation seeking, and psychopathic characteristics (McMillen et al., 1992); psychosocial dysfunction and disrespect for laws, legal authorities, and sanctions (MacDonald and Pederson, 1990); and a family history of alcoholism and antisocial behaviour (Harwood and Leonard, 1989). In addition, recidivists are

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difficult to engage and retain in treatment, and their outcome from intervention is controversial (Wells-Parker et al., 1995; Voas and Marques, 2004).

One characteristic of DUI offenders that has received less attention is neurocognitive functioning. This is surprising as they are exposed to multiple sources of neurological risk. Alcohol misuse, considered a sentinel characteristic of DUI, has been associated with mild to moderate impairments in executive functions, visuospatial abilities, declarative memory, language skills, and motor and perceptual abilities (Crews et al., 2005; Parsons, 1998). These impairments may be related to both the duration and severity of problem drinking, as well as length of abstinence, although the findings in alcoholic samples in this regard have been inconsistent (Davies et al., 2005; Zinn et al., 2004). Furthermore, head trauma leading to loss of consciousness, which may be associated with diffuse neurocognitive disturbances, could be a common event in DUI samples (Glass et al., 2000).

Data on the neurocognitive functioning of DUI offenders are scant but suggestive. Fine and Steer (1979) found that 57% of offenders had scores indicative of the presence of memory problems, compared to 21% in normative samples. More recently, Glass et al. (2000) found that 73% of 134 recidivists attending a second offence court-mandated residential program had impairments in one or more cognitive domains. As in substance misuse samples, they found that the performance of recidivists at tasks reflecting memory and executive functioning was inferior to that of normative groups. However, as in many studies of DUI offenders, their research was conducted with individuals participating in a remedial program. The high rate of non-compliance in this population (Brown et al., 2002) raises certain doubts concerning the generalizability of data derived solely from treatment compliers.

The possibility of neurocognitive impairment in recidivists is important to consider as it may contribute to determining the outcome of DUI countermeasures. In the alcoholism treatment literature, neurocognitive impairment has been found to negatively influence outcomes (Glenn and Parsons, 1991). Accordingly, the present descriptive, cross-sectional study investigated the neurocognitive functioning of a non-clinical sample of DUI recidivists. Analyses investigated whether neurocognitive performance was systematically related to the frequency of past DUI convictions. It was hypothesized that individuals with more convictions would show greater impairment. Finally, exploratory analyses examined the relationships between neurocognitive functioning and alcohol misuse duration and severity, and the experience of head trauma.

2. Method

2.1. Recruitment procedures and sample selection

Recruitment and testing were conducted at the Addiction Research Program at the Douglas Hospital Research Centre in Montreal, Canada. Participants signed the Informed Consent forms describing the research protocol, which had been approved by the Douglas Hospital Research Ethics Board. Participants were drawn from a larger study investigating the biopsychosocial characteristics of 183 male and female DUI offenders. Detailed recruitment procedures are provided in a previous publication (Brown et al., 2005). In brief, participants were recruited in collaboration with the *Société de l'assurance automobile du Québec* (SAAQ) [Quebec Licensing and Insurance Bureau], which identified offenders who met study inclusion criteria from their administrative database. Selected individuals were sent an information package that described the study and its demands, details of compensation ($160.00 CDN), as well as the name and telephone number of the project coordinator. Complete independence between the SAAQ and the study team was explicitly stated. To enhance the generalizability of the findings, the recruitment strategy specifically targeted a non-clinical sample with both offenders who had participated in remedial measures as well as those who had not.

For this study, inclusion criteria were: a history of at least two previous DUI convictions, aged 18 years or older, male gender (i.e., due to the small number of female recidivists and the likelihood that they are distinct from males; Lapham et al., 2000), and residence within a 50 km radius from Montreal. Exclusion criteria at the laboratory were: a Breathalyzer® test indicating alcohol use on the day of testing that could impair experimental test performance (i.e., BAC > 0.04% or 40 mg/dl), reading skills of less than sixth grade level, and evidence that participation in the study presented significant medical risk to the participant. Individuals with a BAC surpassing the exclusion criterion would be invited to return on another day. Medical risk was determined through observation, diagnostic assessment, and clinical evaluation by the team's research physician. However, no participants were affected by these contingencies.

2.2. Measures

Interviews and assessments were undertaken by psychology and criminology graduate students. Training and supervision for neurocognitive assessment was provided by the team neuropsychologist in accordance with the standard procedures presented in the reference manuals related to each selected test.

2.2.1. Neurocognitive functioning

Seven tests were selected in order to provide a broad appraisal of neurocognitive functioning while limiting administration time to less than an hour. In the case of delayed tasks, individual test components were administered after the required time delay. The tests were administered in the presentation order employed below.

The Rey Complex Figure Test (RCFT) was used to measure visuospatial constructional ability and visual memory (Meyers and Meyers, 1995). Participants were presented a complex figure composed of 18 elements and were required to draw it at three different occasions. Five subtests were employed: Copy Accuracy, Time to Copy, Immediate Recall, Delayed Recall, and Recognition.

The Standard Form of the Verbal Fluency Test (Delis et al., 2001) measured fluent productivity in the verbal domain. Letter Fluency is the number of words generated in 60 s with each of the letters F, A, and S.