



# The impact of childhood symptoms of conduct disorder on driving after drinking in adulthood



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## ABSTRACT

**Objectives:** While some existing studies suggest that conduct disorder (CD) significantly increases risk of driving after drinking, outcomes have typically been assessed only up to age 21 years. Therefore, the current study sought to assess the relationship between symptoms of CD during childhood (before age 15 years) and the risk of engaging in driving after drinking during adulthood.

**Methods:** Data are taken from interviews with 5299 respondents derived from the 2011–2013 cycles of the *Monitor*, an ongoing cross-sectional telephone survey of adults aged 18+ years in one Canadian province. A hierarchical-entry binary logistic regression analysis of driving after drinking in the previous year was conducted, consisting of measures of demographic characteristics (sex, age, marital status, education, region), driving exposure, problem alcohol use, symptoms of attention deficit hyperactivity disorder (ADHD), and childhood (before age 15 years) symptoms of CD.

**Results:** Childhood symptoms of CD significantly increased the odds of reporting driving after drinking in adulthood ( $OR=2.59$ , 95%  $CI=1.67, 4.03$ ,  $p < 0.001$ ). Even after adjusting for demographic characteristics, driving exposure, problem alcohol use, and symptoms of ADHD, childhood symptoms of CD significantly increased the odds of the behaviour ( $OR=1.67$ , 95%  $CI=1.00, 2.79$ ,  $p=0.05$ ).

**Conclusions:** Results from a general population survey in one Canadian province suggest that symptoms of CD during childhood are associated with significantly increased odds of driving after drinking in adulthood. These findings add to a growing literature, and could suggest that within treatment for CD special attention should be focused on driver safety. Additional implications for injury prevention will be discussed.

## 1. Introduction

In 2010, 31.0% of fatally injured drivers in Canada had a blood alcohol concentration over the legal limit of 0.08%. It is estimated

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that 2733 persons were seriously injured and 984 persons died in alcohol-related crashes (Traffic Injury Research Foundation, 2013). The impact of substance use disorders on driving after drinking has been the focus of significant research (e.g., Lapham et al., 2001; Mangold et al., 2008; Vingilis, 1983), and in fact, driving after drinking is considered a diagnostic marker of an alcohol use disorder (American Psychiatric Association (APA), 2013). However, the association between other mental health disorders and driving after drinking has received less empirical attention.

### 1.1. Conduct disorder

Characterized by extreme externalizing behaviour, conduct disorder (CD) is diagnosed based on a persistent and repetitive pattern of antisocial behaviour involving the violation of others' basic rights or primary age-appropriate societal norms or rules (APA, 2013). The age of onset for CD is typically early in childhood or adolescence (Moffitt, 1993). CD is characterized by a number of antisocial behaviours such as deceitfulness or theft, serious rule violations, destruction of property, and aggressive conduct toward others (APA, 2013). Population prevalence of CD has been estimated to range from 2% to more than 10%; 4% has been the median estimate (APA, 2013; Costello et al., 2005). Longitudinal studies have found that CD is associated with a number of negative outcomes including reduced educational success (Fergusson and Horwood, 1998; Fergusson et al., 2005); increased rates of unemployment or financial difficulty (Colman et al., 2009; Fergusson and Horwood, 1998; Fergusson et al., 2005); increased involvement with criminal activity (Fergusson et al., 2005); greater sexual risk-taking (Bardone et al., 1998; Fergusson et al., 2005); higher rates of separation or divorce (Colman et al., 2009; Olino et al., 2010); reduced coping skills, peer support, life satisfaction, and global functioning (Colman et al., 2009; Olino et al., 2010), and; earlier mortality (Laub and Vaillant, 2000). The association between CD and many of these negative psychosocial outcomes in adulthood is partially or fully mediated by adult antisocial behaviour (Olinio et al., 2010). Thus, efforts to cease or reduce the progression from conduct problems in adolescence to antisocial behaviour in adulthood have the potential to significantly improve psychosocial outcomes.

Comorbidity with other mental health disorders is common amongst those diagnosed with CD. For instance, oppositional defiant disorder (ODD) is commonly identified as a precursor to childhood-onset CD (Pardini et al., 2010), and symptoms of CD often overlap with those of ODD (Maughan et al., 2004). Revisions in the most recent edition of the Diagnostic and Statistical Manual (DSM-5) now allow diagnoses of CD and ODD to be given simultaneously when criteria for both disorders are met (APA, 2013). CD is seen in as many as one quarter of children or adolescents diagnosed with attention deficit hyperactivity disorder (ADHD), depending on age, setting, and disorder subtype (Willcutt et al., 2012). CD also co-occurs with substance-related disorders. Based on one population-level survey, 41.6% of men and 22.8% of women suffering from alcohol dependence had a history of CD (Kessler et al., 1997).

### 1.2. Conduct disorder and driver behaviour

There is an indication in the existing literature that CD is related to a number of risky driver behaviours. A series of cohort studies, based on two longitudinal surveys conducted in New Zealand, suggested that adolescents and young adults with a history or current diagnosis of CD are also more likely to engage in reckless and aggressive driving. The Dunedin Multidisciplinary Health and Development Study (DMHDS) followed a cohort of children born between April 1, 1972 and March 31, 1975 at a hospital in Dunedin, New Zealand. Nada-Raja et al. (1997) found that, relative to male drivers without CD at age 15 years, those with CD at that age reported more offences related to the graduated driver licensing system (GDLS), more licence offences unrelated to the GDLS (e.g., driving without a licence), and more alcohol-related driving offences. These drivers were also more likely to report having been charged with one or more offences. Although based on a very small sample size, limiting the conclusions that can be drawn, female drivers with CD at age 15 years were more likely than female drivers without CD to have committed more licence offences unrelated to the GDLS. Also based on the DMHDS, Begg et al. (1999) found that female drivers with CD at age 15 years were more than twice as likely as other female drivers to be involved in a motor vehicle collision by age 21 years, whereas male drivers with CD at age 15 years were less likely to be involved in a crash by this age. Although both male and female drivers with CD at age 18 years were more likely to experience a serious injury unrelated to driving, they were no more likely to be involved in a crash. Within the male sample, collinearity between CD and attention deficit disorder may have accounted for this inconsistency in results.

The Christchurch Health and Development Study (CHDS) followed a cohort of children born over a 4-month period in Christchurch, New Zealand during 1977. The CHDS findings indicated that conduct problems identified at 13 years of age contributed to several subsequent negative driving-related outcomes. Specifically, conduct problems were a significant covariate in the prediction of impaired driving arrests, traffic violations, and number of police contacts for driving offences (Woodward et al., 2000). Also based on the CHDS, Fergusson et al. (2003) reported a linear trend between conduct problems at age 8 years and risky driving behaviours between ages 18 and 21 years, although the trend was not significant in the multivariate analyses.

In another cohort study, Vassallo et al. (2007) examined data from the Australian Temperament Project, a large longitudinal community-based study which followed 2443 families from 1983 onward. When participants reached ages 19–20 years, the survey collected data on driving experiences and behaviour. Cluster analysis identified three groups with differing profiles of risky driving behaviour. The smallest cluster, representing just 7% of the sample, constituted the high risk driving group. Members of this group almost always drove above the speed limit, and drove more than 25 km/h above the speed limit more often than the other groups. The high risk group drove when tired more frequently and reported more frequent alcohol- and drug-impaired driving than the low and moderate risk driving groups. Subsequent comparisons of parents' and teachers' reports from infancy to early adulthood for all three groups found that members of the high risk driving group were more aggressive and less cooperative as children and demonstrated more aggressive and antisocial behaviour as adolescents. These and other differences are consistent with various

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