Examining age- and sex-related risk factors in first-time DWI offenders

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Background
DWI research has focused on younger males, consequently much less is known about female and older offenders. Quebec data demonstrate a bimodal distribution in first-time driving while impaired (fDWI) offences, a pattern also observed internationally. Males’ fDWI offences peak between the ages of 18 to 25 with a second smaller peak between 35 to 44. In contrast, females’ fDWI offences peak between 36 to 47 with a smaller peak between 20 to 27. These observations suggest that the trajectory to fDWI offending is influenced by interactions between sex and age.

Aims
This preliminary study explores how sex and age may interact to influence the trajectory to fDWI through patterning of alcohol consumption, psychological adjustment, and impulsivity.

Methods
Individuals arrested for a fDWI within the past two years were recruited. Participants were administered the AUDIT, Timeline Follow Back, MCMI, UPPS, and Stoplight and Balloon Analog Risk Tasks.

Results
Thirty-six participants were recruited: younger females (n = 9, mean age = 23.22, SD = 2.22), younger males (n = 12, mean age = 21.67, SD = 2.43), older males (n = 12, mean age = 40.08, SD = 6.31), older females (n = 3, mean age = 43.67, SD = 2.08). Younger females engaged in more binge drinking, endorsed greater symptoms of alcohol misuse, and scored higher on urgency than both younger and older males. No significant findings were observed between older females and all other groups.

Discussion and conclusion
fDWI offending among younger females appear to be related to binge drinking and emotion-related impulsivity. Younger females appear to be different than male offenders of all ages. The findings suggest that female fDWI is not analogous to male fDWI, a postulate that may need to be considered for intervention/prevention efforts with female fDWI offenders.

Introduction
Road traffic crashes (RTCs) are the 9th leading global cause of death, and are predicted to represent the 5th leading cause by 2030. Young people are particularly vulnerable: RTCs are the leading cause of death worldwide among youth (Mathers & Loncar, 2006; WHO, 2008). Female
involvement in first-time DWI (fDWI) behaviour is of increasing concern. The gender gap for fDWI offences is closing; based on observations in the U.S. from 2001 to 2010, male offences have decreased by 10.7% while female offences have increased by 35.9% (Federal Bureau of Investigation, 2010). Overall, while the impaired driving rate is half of what it was 25 years ago, further declines have stalled, and the current rate is the highest it has been in the past decade (Perreault, 2013).

Distinct patterns in the frequency distributions of fDWI offences by age and sex are seen in Quebec data from 2003 to 2008, depicted in Figure 1, which are consistent with international statistics (e.g., Jones & Holmgren, 2009). Males, especially younger males are overrepresented in Quebec’s fDWI events, whereas females represented approximately 15% of fDWI cases. Moreover, male fDWI offences peak between the ages of 18 to 25 and decrease thereafter. Rates rise once again at 35 to peak a second time at 44 years of age. A different bimodal distribution is observed among females. Rates for females peak between the ages of 36 to 47 with a smaller peak observable from 20 to 27. These observations suggest that the trajectory to fDWI offending is moderated by both sex and age. Given these sex differences, research on male offending may not accurately generalize to female offending. More exploration of female offending is warranted.

![Figure 1. Quebec, Canada population data of first-time DWI offences for males and females by age between the years 2003 and 2008.](image)

The purpose of this research project is to investigate potential age and sex moderation effects and interactions on the trajectory to a fDWI arrest.

**Alcohol consumption and DWI**

Alcohol misuse is a sentinel feature of DWI behaviour (Flowers et al., 2008/4). DWI offenders compared to the general population consume alcohol more frequently, consume greater quantities in one occasion, are more likely to meet criteria for an alcohol use disorder (AUD), and experience more alcohol-related problems (Nochajski & Wieczorek, 2000). Binge drinking is a pattern of alcohol consumption most associated to DWI, with 84% of U.S. DWI events accounted for by binge drinkers while 35% of DWI events were accounted for by heavy drinkers (Flowers et al.,
Of the patterns of alcohol consumption, binge drinking appears to be the riskiest pattern leading to a fDWI.

**Age-related differences in alcohol consumption and DWI**

Different alcohol consumption patterns are more prevalent in certain age groups than in others. In the DWI population, the highest prevalence of binge drinking tends to be among young individuals between the ages of 18 to 24, whereas individuals 40 years of age and older tend to have the highest prevalence rate of heavy drinking not involving binging (Flowers et al., 2008/4; Jackson & Chung, 2011). These patterns of alcohol consumption might be reflected in different levels of risk, with binge drinking possibly representing the greatest risk for younger drivers.

**Sex-related differences in alcohol consumption and DWI**

Males drink in ways that are different than females. In North America, females have an overall lower prevalence rate of AUD (i.e., 2.3% of females and 8.2% of males) (Rehm et al., 2009). Within the fDWI population, the prevalence rate of lifetime diagnosis for AUD is 85% and 91% for females and males respectively (Lapham et al., 2001). Even though the female AUD prevalence rate is still lower than males’, the gap between females and males is much smaller. The proportion of female AUD in the fDWI population is significantly higher than female AUD in the general population, while the proportion of male AUD between both populations does not vary as much. It is therefore possible that AUD may be the primary risk factor for fDWI specifically among females.

**Sex-related differences in symptoms of psychopathology and DWI**

Literature has been fairly consistent in suggesting that females’ self-medicating with alcohol serves to alleviate and cope with distressing symptoms. In the fDWI population, females meet criteria for non-substance related psychiatric disorders (i.e., mood and anxiety disorders) at a higher rate than males (i.e., 50% of females and 33% of males) (Lapham et al., 2001). Drinking as a maladaptive coping mechanism for symptoms of psychopathology may be more representative of female offending than male offending.

**Impulsivity and DWI**

Heightened impulsivity is a consistent characteristic observed in DWI as it is related to risk-taking behaviour and poor decision-making (Zuckerman, 1979, 1994). Impulsivity is a multidimensional construct defined as engaging in behaviours quickly and without forethought (Whiteside & Lynam, 2001). Certain forms of impulsivity might be more prevalent or predictive in different samples. For example, the dimension lack of premeditation has been most observed in individuals with antisocial personality disorder (Lynam & Miller, 2004). It is therefore possible that a dimension of impulsivity is most observed within the fDWI population, this insight can lend to the development of targeted intervention efforts.

**Sex and age interactions in impulsivity**

Sex differences in levels of impulsivity have been observed to change over time. These differences are apparent during adolescence and young adulthood but tend to diminish with age (Cross,
Males in young adulthood engage in more driving-related risky behaviours such as speeding, and driving without a seat belt than do young female adults, an effect not observed in middle-aged groups (Liang, Shediac-Rizkallah, Celentano, & Rohde, 1999). Sex differences in impulsivity are most observable at younger ages and less so at older ages. As impulsivity plays a role in fDWI offending, it is important to explore its levels between sex and throughout age in fDWI offenders.

**Conclusion**

DWI represents a significant yet preventable public health concern. Males, especially younger males, are overrepresented in the fDWI offending population. However, females represent a growing fDWI subgroup. Epidemiological and experimental data suggest that different subgroups of fDWI offenders, based on age and sex, have different trajectories to fDWI offending. The examination of the influence of age and sex effects in fDWI offending is relevant to the design of more targeted interventions.

Accordingly, this study tests three main hypotheses: 1) older offenders will have a higher frequency of heavy drinking, 2) older female offenders will have the highest rate of problematic drinking related to symptoms of psychopathology, 3) younger offenders will have higher levels of impulsivity, and a higher frequency of binge drinking than older offenders.

**Methods**

**Participants**
Participants were recruited through Research Ethics Board approved newspaper advertisements and through a bank of participants who previously participated in studies at the Addictions Research Program (ARP). Inclusion criteria: 1) between the ages of 18 to 27 or between 35 to 50, and 2) arrested only once for a fDWI offence in the 24 months prior to testing. Exclusion criteria: under the influence of alcohol during testing the maximal allowable threshold being BAC of .01 as measured by a Breathalyzer® test.

**Measures**
The Alcohol Use Disorder Identification Test (AUDIT), Michigan Alcohol Screening Test (MAST), and Timeline Follow back (TLFB) were used to examine symptoms of alcohol misuse, and binge drinking (i.e., 5 or more or 3 or more consumptions in one occasion for males and females respectively). The Millon Clinical Multi-axial Inventory (MCMI) was used to measure symptoms of depression and anxiety, the Stoplight and Balloon Analog Risk Tasks were used to measure impulsive risk-taking, and the UPPS Scale, abbreviated for urgency, perseverance (lack of), premeditation (lack of), and sensation seeking, was used to measure impulsivity and its dimensions. Lack of premeditation (i.e., not planning and acting immediately without reflection) and urgency, (i.e., acting impulsively when experiencing negative affect) have been most related to substance use problems (Verdejo-Garcia, Bechara, Recknor, & Perez-Garcia, 2007).

**Procedure**
Testing was conducted at the ARP at the Douglas Mental Health University Institute, affiliated with McGill University, in Montreal, Canada. Participants were asked to complete questionnaires and computer tasks to assess alcohol consumption, driving behaviour, impulsivity, symptoms of
Results

Sample A total of 36 fDWI offenders were recruited. The sample comprised of four groups, younger females (n = 9, mean age = 23.22, SD = 2.22), younger males (n = 12, mean age = 21.67, SD = 2.43), older males (n = 12, mean age = 40.08, SD = 6.31) and older females (n = 3, mean age = 43.67, SD = 2.08). Recruiting female fDWI offenders, especially older females, proved challenging. After one year of concerted recruitment efforts, only 12 female offenders were eligible and willing to participate. Further female recruitment was deemed not feasible for the purposes of this study. Independent samples t-tests assessed the differences between groups on patterns of alcohol consumption, symptoms of anxiety and depression, and impulsivity. An alpha level of .05 was set for inferences for all statistical tests.

Alcohol Consumption Descriptively, younger females experienced more symptoms of alcohol misuse as measured by the AUDIT (M = 15.56, SD = 7.35) than younger males (M = 9.83, SD = 4.82), t(19) = -2.16, p = .04. Younger females also engaged in more binge drinking as measured by the TLFB (M = 30.89, SD = 4.85) than both younger males (M = 15.33, SD = 13.55), t(12.33) = -3.58, p = .004 and older males (M = 19.25, SD = 17.93), t(11.96) = 2.56, p = .025. There were no significant differences for binge drinking between younger and older females. When comparing sex, females engaged in more binge drinking (M = 29.92, SD = 10.22), than males (M = 17.29, SD = 15.67), t(33.83) = -3.25, p = .003 (i.e., based upon square-root transformation of TLFB data). Results indicated a trend in the predicted direction where older males scored higher on lifetime alcohol use problems as measured by the MAST (M = 17.33, SD = 10.62) than younger males (M = 10.92, SD = 5.71), t(22) = -1.58, p = .12.

Symptoms of psychopathology Older females did not significantly differ on symptoms of depression and anxiety compared to other groups.

Impulsivity Younger females scored significantly higher on the UPPS urgency impulsivity subscale (M = 30.33, SD = 6.10) than younger males (M = 24.75, SD = 5.75), t(19) = -2.15, p = .04 and older females (M = 22.33, SD = 2.08), t(10) = 2.17, p = .055. A trend in the predicted direction was found with younger males and females scoring higher on UPPS sensation seeking impulsivity subscale (M = 35.90, SD = 6.27) than older males (M = 32, SD = 9.46), t(34) = 1.5, p = .14. Younger males specifically did not differ from older males on measures of impulsivity.

Discussion

The goal of the present study was to explore whether underlying risk factors for a fDWI offence are specific to age and sex. This study revealed that sex differences in fDWI were most striking. fDWI offending in younger females was associated with binge drinking, symptoms of alcohol misuse/dependence and with the urgency dimension of impulsivity. Younger female offending appears to be related to greater alcohol misuse, such as binging, possibly to alleviate negative affect. fDWI offending in older males, on the other hand appears to reflect lifetime alcohol misuse as evidenced by their higher scores on the MAST. Younger and older males did not differ on impulsivity suggesting the stability of impulsivity throughout development in these offenders.
Limitations  There were fewer female fDWI offenders than male fDWI offenders. Females, especially older females appeared less willing to participate in this study than were males, possibly attributable to greater shame associated with female DWI. As this study’s main findings pertain to younger females, exploration of older female offending within fDWI research is imperative. Female offenders might feel embarrassed answering questions in front of researchers at a laboratory and might chose not to participate for this reason. Use of self-report questionnaires mailed to female participants for completion privately could overcome this limitation. Even though this method might not permit the use of behavioural measures, any kind of information pertaining to female fDWI would be important to gain an understanding of this subgroup.

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References


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