Styles of analysis of GENACIS data: the relation between alcohol consumption and alcohol problems

Robin Room
AER Centre for Alcohol Policy Research, Turning Point Alcohol & Drug Centre, and
School of Population Health, University of Melbourne

Kate Graham
Centre for Addiction and Mental Health, London, Ontario
and
Department of Psychology, University of Western Ontario
and
National Drug Research Institute, Curtin University, Western Australia

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1. B→C: Relation of amount & patterns of consumption to alcohol problems
2. A→C: relation of predictors to alcohol problems
3. A→C controlling for B: relation of predictors to the risk of problems for a given consumption
4. B→C controlling for A: context etc. intermediating relation of consumption & problems
B $\rightarrow$ C

Relation of amount & patterns of consumption
$\rightarrow$ alcohol problems
1.a. Relation of amount and pattern of consumption to problems: problem score

Figure 6. Average consequence index as a function of annual frequency of drinking 6+ drinks, by country. Men on the left and women on the right.

Pia Mäkelä et al., *Drinking habits in the Nordic Countries.*
1.b. Relation of amount and pattern of consumption to problems: number of harms from drinking

1.c. Relation of amount and pattern of consumption to problems:

different aspects of drinking →
   specific types of problem consequences

How much drinking is too much?
It depends on the problem
(examples of different patterns of relationship for headache/nausea, finances and fighting)

Percent of men who had a headache or nausea after drinking

usual number of drinks per occasion

maximum number of drinks per occasion

frequency of drinking 5 or more drinks
Percent of men reporting harmful effects on finances from drinking

usual number of drinks per occasion

frequency of drinking 5 or more drinks

maximum number of drinks per occasion
Percent of men who had gotten into a physical fight when drinking

**usual number of drinks per occasion**

**maximum number of drinks per occasion**

**frequency of drinking 5 or more drinks**
1.d. Relation of amount and pattern of consumption to problems: amount crossed with pattern

A $\rightarrow$ C

Relation of nondrinking predictors $\rightarrow$ alcohol problems
2.a. Relation of predictors to alcohol problems
-- gender and age

Percent of all respondents scoring 8 or more on the AUDIT by gender and age group (abstainers and light infrequent=0)

Percentages

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
</table>

Age Group: 18 to 20

Age Group: 21 to 25

Age Group: 26 to 30

Age Group: 31 to 35

Age Group: 36 to 40

Age Group: 41 to 45

Age Group: 46 to 50

Age Group: 51 to 55

Age Group: 56 to 60

Age Group: 61 to 65

Age Group: 66 to 70

Age Group: 71 to 76
Had enough to drink so that you felt the effects of the alcohol for example, your speech was slurred or you had trouble walking steadily (by gender and age group)
Found that you were not able to stop drinking once you had started (by gender and age group)
The following persons tried to get you to cut down on your drinking – partner, child or health worker/doctor (by gender and age group)
Tried to cut down or quit drinking (by gender and age group)
Driven after having 2 or more drinks in the previous hour (by gender and age group)
Gotten into a physical fight while drinking (by gender and age group)
Relation of different measures of consumption

problems in predictor categories
2b. Relation of different measures of consumption to problems in predictor categories – example of correlations between different measures of drinking and depression for males compared to females

Depression and drinking:

1. Average correlation between depression and four types of alcohol measures (frequency, volume, usual and maximum quantity and heavy episodic drinking) for males and females.
Percent of males and females who met the criteria for a diagnosis of major depression based on the CIDI by usual quantity per drinking day for past 12 months.
Percent of males and females who met the criteria for a diagnosis of major depression based on the CIDI by frequency of drinking 5 or more drinks per occasion in the past year.
A → C controlling for B

Relation of predictors to the risk of problems at a given consumption
3.a. Relation of predictors to the risk of problems for a given consumption: ratio of harm per litre/per binge

Hazardous behaviour score per drinking volume and occasions drinking five or more drinks, by age and sex (ratio with males aged 40 to 44 as baseline), National Drug Strategy Household Survey, 2004 (Livingston & Room, working paper, 2008)
3.b. A → C controlling for B: does the relation between a predictor and rate of problems disappear when consumption is controlled?

Gender differences in problem rates controlling for alcohol consumption
– Gender difference disappears for some problems but not others

Odds of experiencing problem consequences from drinking for men compared to women

- Unable to stop drinking once you had started
- Felt sick or found yourself shaking when you cut down or stopped drinking
- Tried to cut down or quit drinking?
- Been unable to remember what happened the night before because you had been drinking
- Had enough to drink that you had a headache or felt nauseated
- Felt guilt or remorse after drinking?

The extended bar shows the raw odds; the dark green bar shows the odds ratio controlling for drinking pattern and context.
Odds of reporting perceived harmful effect of drinking for men compared to women

The extended bar shows the raw odds; the dark green bar shows the odds ratio controlling for drinking pattern and context.
Odds ratios for consequences that were more likely to be reported by men than by women controlling for level of alcohol consumption

- Needed a drink in the morning after a heavy drinking session
- Gotten into a physical fight while drinking
- Driven after having 2 or more drinks in the previous hour

The extended bar shows the raw odds; the dark green bar shows the odds ratio controlling for drinking pattern and context.
B→C controlling for A

Relationship between consumption and problems controlling for predictors such as demographics and context
4.a. B → C controlling for A: Relationship between consumption and specific types of problems (drinking to intoxication, guilt or remorse, driving after drinking and trying to cut down or quit)

- controlling for (a) drinking context and (b) respondent characteristics

<table>
<thead>
<tr>
<th>Drinking pattern, drinking context and respondent characteristics predicting consequences of drinking to intoxication (odds ratios)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Alcohol consumption variables</strong></td>
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<td>Frequency of drinking (days per year)</td>
</tr>
<tr>
<td>Usual number of drinks consumed</td>
</tr>
<tr>
<td>Maximum number of drinks consumed in a day</td>
</tr>
<tr>
<td><strong>Drinking context variables</strong></td>
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<tr>
<td>Proportion of alcohol consumed that was wine</td>
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<tr>
<td>Proportion of drinking done with meals</td>
</tr>
<tr>
<td>Proportion of drinking done at a bar</td>
</tr>
<tr>
<td>Proportion of drinking done at a restaurant</td>
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<tr>
<td><strong>Respondent characteristics</strong></td>
</tr>
<tr>
<td>Male gender (female comparison)</td>
</tr>
<tr>
<td>Age</td>
</tr>
<tr>
<td>Level of education</td>
</tr>
<tr>
<td>Whether born in Canada (not born in Canada comparison)</td>
</tr>
<tr>
<td>Population of place of residence of respondent</td>
</tr>
</tbody>
</table>

† p<.10, *p<.05, **p<.01, ***p<.001
Drinking pattern, drinking context and respondent characteristics predicting feelings of guilt or remorse after drinking

**Alcohol consumption variables**
- Frequency of drinking (days per year) 1.003***
- Usual number of drinks consumed 1.065***
- Maximum number of drinks consumed in a day 1.093***

**Drinking context variables**
- Proportion of alcohol consumed that was wine .826
- Proportion of drinking done with meals .881
- Proportion of drinking done at a bar 1.571***
- Proportion of drinking done at a restaurant .927

**Respondent characteristics**
- Male gender (female comparison) .702***
- Age .979***
- Level of education 1.044***
- Whether born in Canada (not born in Canada comparison) 1.272*
- Population of place of residence of respondent 1.022†

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Drinking pattern, drinking context and respondent characteristics predicting driving after drinking

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<tr>
<td>Frequency of drinking (days per year)</td>
<td>1.004***</td>
</tr>
<tr>
<td>Usual number of drinks consumed</td>
<td>.995</td>
</tr>
<tr>
<td>Maximum number of drinks consumed in a day</td>
<td>1.099***</td>
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<th>Drinking context variables</th>
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<tr>
<td>Proportion of alcohol consumed that was wine</td>
<td>.765*</td>
</tr>
<tr>
<td>Proportion of drinking done with meals</td>
<td>1.022</td>
</tr>
<tr>
<td>Proportion of drinking done at a bar</td>
<td>1.676***</td>
</tr>
<tr>
<td>Proportion of drinking done at a restaurant</td>
<td>1.456***</td>
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<th>Respondent characteristics</th>
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<tr>
<td>Male gender (female comparison)</td>
<td>2.163***</td>
</tr>
<tr>
<td>Age</td>
<td>1.003</td>
</tr>
<tr>
<td>Level of education</td>
<td>1.019†</td>
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<tr>
<td>Whether born in Canada (not born in Canada comparison)</td>
<td>1.340**</td>
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<tr>
<td>Population of place of residence of respondent</td>
<td>.973**</td>
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Drinking pattern, drinking context and respondent characteristics predicting trying to cut down or quit drinking

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<td>Frequency of drinking (days per year)</td>
<td>1.004***</td>
</tr>
<tr>
<td>Usual number of drinks consumed</td>
<td>1.061***</td>
</tr>
<tr>
<td>Maximum number of drinks consumed in a day</td>
<td>1.045***</td>
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<tr>
<td>Proportion of alcohol consumed that was wine</td>
<td>.913</td>
</tr>
<tr>
<td>Proportion of drinking done with meals</td>
<td>.811*</td>
</tr>
<tr>
<td>Proportion of drinking done at a bar</td>
<td>1.053</td>
</tr>
<tr>
<td>Proportion of drinking done at a restaurant</td>
<td>.939</td>
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<tbody>
<tr>
<td>Male gender (female comparison)</td>
<td>.831*</td>
</tr>
<tr>
<td>Age</td>
<td>.988***</td>
</tr>
<tr>
<td>Level of education</td>
<td>.953***</td>
</tr>
<tr>
<td>Whether born in Canada (not born in Canada comparison)</td>
<td>.985</td>
</tr>
<tr>
<td>Population of place of residence of respondent</td>
<td>1.008</td>
</tr>
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Some conclusions

• Relationship between consumption and problems varies with the measure of consumption (and the measure & type of problem)
  – multicollinearity between consumption measures as an issue
• Predictors of problems may or may not be the same as predictors of consumption
• Controlling consumption may “wipe out” relations between predictors and problems
  → Two step prediction (Lee Robins): demographics predict heavy drinking; personal history/personality predicts who among heavy drinkers get in trouble??
  → Whether you want to control for consumption depends on intended use for data:
    → You would not want to control if the objective is to identify high risk groups
    → You would want to control if the objective is to understand the relationship between demographics etc. and problem consequences from drinking

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Some conclusions continued

-- “Trouble per litre” or per heavy occasion as a way of presenting differential risk of harm for different demographics
  $ tendencies: gender differences washed out, age differences remain
-- or show different regression models side by side, with and without consumption
$ Controlling for context, etc. may intermediate relation between consumption and problems
$ There are a number of ways of presenting results from analyses across the three domains