Alcohol, the brain and drink driving: behavioural and psychological perspectives

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University of Tasmania
This is what you get when you google “alcohol factoid”
What do we know about drink driving rates in Australia?

% “binge” (>4 STD Drinks on single occasion, at least monthly)

% drinkers reporting past year drink driving

Source: National Drug Strategy Household Survey
What do we know about Tasmania?
(Matthews & Bruno, 2012 community survey, n=1362)

7% of past year drinkers reported DUI alcohol
What are the predictors of drink driving? (in Tas community sample, n=1362)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sig</th>
<th>OR(95%CI)</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex (Male)</td>
<td>***</td>
<td>2.98 (1.98-4.48)</td>
<td>5</td>
</tr>
<tr>
<td>Age (younger)</td>
<td>ns</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How often drive in average week</td>
<td>*</td>
<td>1.38 (1.08-1.76)</td>
<td>1.2</td>
</tr>
<tr>
<td>Held licence more than 5 years</td>
<td>*</td>
<td>0.39 (0.17-0.92)</td>
<td>10</td>
</tr>
<tr>
<td>Self-reported Driving Behaviour last 12 mths (DBQ)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Violations</td>
<td>**</td>
<td>1.08 (1.02-1.14)</td>
<td>1.3</td>
</tr>
<tr>
<td>Lapses</td>
<td>ns</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Errors</td>
<td>ns</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trait Driving Anger (DAS)</td>
<td>***</td>
<td>1.04 (1.02-1.06)</td>
<td>2.4</td>
</tr>
<tr>
<td>Driving Anger expression (DAXI)</td>
<td>.082</td>
<td>1.02 (0.99-1.05)</td>
<td>0.5</td>
</tr>
<tr>
<td>Adaptive Anger expression (DAXI)</td>
<td>ns</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
What do we know about other populations?

Source: Matthews, Bruno et al (submitted)
Crash risk perception is a strong predictor of behaviour.
What does alcohol do to the brain and behaviour?
How does alcohol affect the brain?

Alcohol Molecule

Dopamine Molecule

i.e. It is a lot smaller than most neurotransmitters so it can interact in different ways.
Multiple, complex actions, not currently well understood
May occur through changes in ion flow

Alcohol Actions in the Brain

- Inhibited action of glutamate at NMDA receptors (-)
- Inhibited action of glutamate at kainate receptors (-)
- Inhibition of voltage-sensitive Ca^{2+} channels (-)
- Enhanced GABA action at GABA A receptors (-)

- Enhanced action of 5-HT at 5-HT3 receptors (+)
- Enhanced action of acetylcholine at nicotinic acetylcholine receptors (+)

\[2(+) + 4(-) = 2(-)\]
<table>
<thead>
<tr>
<th>BLOOD ALCOHOL CONCENTRATION (BAC)</th>
<th>TYPICAL EFFECTS</th>
<th>PREDICTABLE EFFECTS ON DRIVING</th>
</tr>
</thead>
</table>
| **.02%**                         | ▶ Some loss of judgment  
                                ▶ Relaxation  
                                ▶ Slight body warmth  
                                ▶ Altered mood | ▶ Decline in visual functions  
                                (rapid tracking of a moving  
                                target)  
                                ▶ Decline in ability to perform  
                                two tasks at the same time  
                                (divided attention) |
| **.05%**                         | ▶ Exaggerated behavior  
                                ▶ May have loss of small-muscle  
                                control (e.g., focusing your eyes)  
                                ▶ Impaired judgment  
                                ▶ Usually good feeling  
                                ▶ Lowered alertness  
                                ▶ Release of inhibition | ▶ Reduced coordination  
                                ▶ Reduced ability to track moving  
                                objects  
                                ▶ Difficulty steering  
                                ▶ Reduced response to  
                                emergency driving situations |
| **.08%**                         | ▶ Muscle coordination becomes poor  
                                (e.g., balance, speech, vision, reaction time, and hearing)  
                                ▶ Harder to detect danger  
                                ▶ Judgment, self-control, reasoning, and memory are impaired | ▶ Concentration  
                                ▶ Short-term memory loss  
                                ▶ Speed control  
                                ▶ Reduced information processing capability (e.g., signal detection, visual search)  
                                ▶ Impaired perception |
| **.10%**                         | ▶ Clear deterioration of reaction time and control  
                                ▶ Slurred speech, poor coordination, and slowed thinking | ▶ Reduced ability to maintain lane position and brake appropriately |
| **.15%**                         | ▶ Far less muscle control than normal  
                                ▶ Vomiting may occur (unless this level is reached slowly or a person has developed a tolerance for alcohol)  
                                ▶ Major loss of balance | ▶ Substantial impairment in vehicle control, attention to driving task, and in necessary visual and auditory information processing |

1 Information in this table shows the BAC level at which the effect usually is first observed, and has been gathered from a variety of sources including the National Highway Traffic Safety Administration, the National Institute on Alcohol Abuse and Alcoholism, the American Medical Association, the National Commission Against Drunk Driving, and [http://www.webMD.com](http://www.webMD.com).

Source: CDC
Chronic Alcohol Use: Pathophysiology

- Alcohol appears to cause damage to neurons
- >50% of clients over 45 with extensive drinking histories will have some degree of cognitive impairment
- White matter abnormalities
  - More prominent than grey matter change; demyelinsation?
  - See enlarged ventricles, widened spaces between folds
- Grey matter abnormalities
  - Especially in dorsolateral frontal, parietal; caudate, cerebellum, limbic system
  - Reduction of dendrite elaboration in hippocampus, cerebellum
- Other effects
  - Trigger seizures; transient amnesic episodes
Cortical Atrophy in Alcohol Dependence

Chronic Alcohol Use: Cognitive Effects

- **Memory:** subtle STM & learning deficits, increase with complexity; Possibly from superficial encoding; Visuospatial learning may be more affected than verbal learning

- **Executive function:** deficits frequently observed; Decreased flexibility, simplistic problem solving, difficulties in maintaining set; Ability to abstract & generalise remains intact, but vulnerable

- **Motor function:** slowing, possibly associated with peripheral neuropathy

- **Visuospatial:** essentially intact, somewhat slowed

- **Sensorimotor:** impaired colour vision; impaired visual search

- **Severity of deficits directly related to extent of problem**

- **Similarities with ageing**
  - E.g. impairments of STM, learning, executive but subtle qualitative differences suggests distinct causes → also, MAY be somewhat reversible
Reversibility of Alcohol Induced Damage?

Control Participant

Person with Alcohol Dependence
(2 weeks abstinent)

Recruitment of more areas are required to complete even simple tasks (finger tapping)
What about the acute effects of alcohol on driving?
Relative Risk of Fatal Crash Involvement for Drivers Age 21 and Over

Zador, 2000: Relative Risk of Fatal and Crash Involvement by BAC, Age and Gender
What skills do you need to drive?

<table>
<thead>
<tr>
<th>Behaviour Domain</th>
<th>Specific Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automotive behaviour (well-learned skills)</td>
<td>Tracking, steering (compensatory activities)</td>
</tr>
<tr>
<td></td>
<td>Vigilance (staying alert for changes over long times)</td>
</tr>
<tr>
<td>Control behaviour (maintaining distance, etc)</td>
<td>Motor performance</td>
</tr>
<tr>
<td></td>
<td>Divided attention</td>
</tr>
<tr>
<td></td>
<td>Timing &amp; perception (e.g. time to collision)</td>
</tr>
<tr>
<td>Executive planning (interactive behaviours with ongoing traffic)</td>
<td>Adaptive inhibition (e.g. stopping a lane change when hearing the horn of a car in your blindspot)</td>
</tr>
<tr>
<td></td>
<td>Information processing</td>
</tr>
<tr>
<td></td>
<td>Planning and judgement</td>
</tr>
</tbody>
</table>

Guidelines for research on drugged driving

J. Michael Walsh¹, Alain G. Verstraete², Marilyn A. Huestis³ & Jörg Morland⁴
So, what do we know about functional impairment? (Zoethout, 2011)

<table>
<thead>
<tr>
<th>Executive</th>
<th>&lt;0.5 g l⁻¹</th>
<th>=</th>
<th>+</th>
<th>0.5–0.7 g l⁻¹</th>
<th>=</th>
<th>+</th>
<th>&gt;0.7 g l⁻¹</th>
<th>=</th>
<th>+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhibition</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Working memory</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Attention</th>
<th>&lt;0.5 g l⁻¹</th>
<th>=</th>
<th>+</th>
<th>0.5–0.7 g l⁻¹</th>
<th>=</th>
<th>+</th>
<th>&gt;0.7 g l⁻¹</th>
<th>=</th>
<th>+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Divided attention</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Focused/selective attention</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Reaction time</td>
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<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Motor</th>
<th>&lt;0.5 g l⁻¹</th>
<th>=</th>
<th>+</th>
<th>0.5–0.7 g l⁻¹</th>
<th>=</th>
<th>+</th>
<th>&gt;0.7 g l⁻¹</th>
<th>=</th>
<th>+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visuo-motor control</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Functional biomarkers for the acute CNS effects of alcohol
What about actual driving?

• As BAC increases, the magnitude of impairment increases
• There is a continuum of impairment (no ‘magic threshold’)
  • 27% of studies identify impairment <0.04
  • 49% of studies identify impairment 0.04-0.05
  • 92% of studies identify impairment at 0.08% BAC (breaking, steering, lane changing, judgement)
What about if you’re a bad driver?

Emily L.R. Harrison, Mark T. Fillmore*

Are bad drivers more impaired by alcohol? Sober driving precision predicts impairment from alcohol in a simulated driving task.

Accident Analysis and Prevention 37 (2005) 882–889

Fig. 2. Scatter plots illustrating the relationship between drivers’ initial (baseline) within-lane deviation scores and their pre- to post-treatment change in deviation scores in response to 0.65 g/kg alcohol or a placebo. Least-squares regression line is shown for each dose condition.
Acute tolerance: Schweizer, 2008

Occurrence of Acute Alcohol Tolerance and Impairment in Speed (Reaction Time) and/or Accuracy (Errors) in Cognitive Tasks Tested at Rising and Declining Blood Alcohol Concentrations (BACs)

<table>
<thead>
<tr>
<th>Cognitive tasks</th>
<th>Test BAC (mg/100 ml)</th>
<th>Impairment</th>
<th>Acute tolerance</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rise</td>
<td>Decline</td>
<td>Rise</td>
<td>Decline</td>
</tr>
<tr>
<td>Inhibition</td>
<td>71</td>
<td>71</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Information processing</td>
<td>87</td>
<td>88</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Selective attention</td>
<td>61</td>
<td>60</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Learning</td>
<td>80</td>
<td>80</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

Alcohol-Impaired Speed and Accuracy of Cognitive Functions: A Review of Acute Tolerance and Recovery of Cognitive Performance

Experimental and Clinical Psychopharmacology
### Table 1

Mean (SD) simulated driving performance, willingness to drive, and cued go/no-go measures for Test 1 and Test 2 under the alcohol and placebo conditions. Under alcohol (0.65 g/kg), Test 1

<table>
<thead>
<tr>
<th></th>
<th>Alcohol (0.65 g/kg)</th>
<th></th>
<th>Placebo</th>
<th></th>
<th></th>
<th>Significance tests</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Test 1</td>
<td>M (SD)</td>
<td>Test 2</td>
<td>M (SD)</td>
<td>Test 1</td>
<td>M (SD)</td>
</tr>
<tr>
<td>Driving measures</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LPSD (ft)</td>
<td>1.29 (0.39)</td>
<td>1.22 (0.31)</td>
<td>0.96 (0.24)</td>
<td>1.05 (0.25)</td>
<td>Sig***</td>
<td>ns</td>
</tr>
<tr>
<td>Line crossings</td>
<td>3.95 (7.06)</td>
<td>3.60 (3.65)</td>
<td>1.85 (2.13)</td>
<td>2.05 (3.40)</td>
<td>Sig#</td>
<td>ns</td>
</tr>
<tr>
<td>Steering rate</td>
<td>8.91 (3.33)</td>
<td>8.01 (2.36)</td>
<td>7.53 (1.76)</td>
<td>7.47 (2.35)</td>
<td>Sig*</td>
<td>ns</td>
</tr>
<tr>
<td>Willingness to drive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VAS ratings</td>
<td>17.1 (27.2)</td>
<td>38.9 (28.8)</td>
<td>63.6 (35.1)</td>
<td>84.0 (30.6)</td>
<td>Sig***</td>
<td>Sig***</td>
</tr>
<tr>
<td>Cued go/no-go measures</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-inhibition failures</td>
<td>0.22 (0.24)</td>
<td>0.25 (0.24)</td>
<td>0.12 (0.16)</td>
<td>0.15 (0.21)</td>
<td>Sig**</td>
<td>Sig*</td>
</tr>
<tr>
<td>Reaction time (ms)</td>
<td>343.3 (23.6)</td>
<td>346.8 (41.7)</td>
<td>327.5 (26.2)</td>
<td>335.4 (40.4)</td>
<td>Sig**</td>
<td>ns</td>
</tr>
</tbody>
</table>

**Acute tolerance to alcohol impairment of behavioral and cognitive mechanisms related to driving: drinking and driving on the descending limb**

Jessica Weaver • Mark T. Fillmore

Acute tolerance and chronic tolerance

People that are ‘bingers’ recover faster across multiple behavioural domains
But I only had a shandy!
What affects BAC?

- Number of drinks
- How fast you drink
- Biological sex
- Weight
- Food in stomach
- Drinking history
- Other things that affect impairment
  - Expectancies
  - Genetics
Kloeden et al, 1994: Adelaide, n=5765 comparison of estimated and roadside BAC
Does your drinking level affect perception of intoxication?

Brumback et al, 2007: heavy binge social drinkers vs light social drinkers
Controlling for BAC, sex, family history
What impact does underestimation have on your decisions?

<table>
<thead>
<tr>
<th></th>
<th>Over-estimators (49%)</th>
<th>Under-estimators (32%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak BAC</td>
<td>0.07</td>
<td>0.11*</td>
</tr>
<tr>
<td>Frequency drinking (/week)</td>
<td>2.7</td>
<td>3.9*</td>
</tr>
<tr>
<td>Rating of intoxication @ peak</td>
<td>6.4</td>
<td>4.8*</td>
</tr>
<tr>
<td>Lifetime DUI</td>
<td>57%</td>
<td>77%*</td>
</tr>
<tr>
<td>Max drinks you can have and still legally drive</td>
<td>2.7</td>
<td>3.8*</td>
</tr>
<tr>
<td>Would you drive &gt;0.80 (in situ, not abstract)</td>
<td>24%</td>
<td>74%*</td>
</tr>
<tr>
<td>How serious is it to DUI (5=extremely)</td>
<td>3.7</td>
<td>3.4*</td>
</tr>
</tbody>
</table>

Beirness, 1987: n=72 (range 20-57 yr), ad lib social drinking session (Canada)
So, can you train people to better estimate BAC?

- **In alcohol-dependent** ss (e.g. Lovibond & Caddy, 1970)
  - Training: ad lib drink, BAC feedback*, aversive conditioning at high BAC (!)
  - Internal (interoceptive cues) vs. external (facts about estimated absorption)*
  - General conclusion: ineffective

- **In social drinkers**
  - Requires: pairing of external (inc. accurate info about dose) + internal + BAC feedback
  - General conclusion: can be effective

- **In naturalistic settings**: results are mixed
Clinical aspects

Perceptions

Guilt and shame

Normative perceptions
Qualitative interviews with drink drivers (Fynbo, 2011) [Denmark]

- Drink driving as a non-decision
  - “I didn’t think, it just happened”
  - “…after the first 3 or 4 drinks I probably had a small dispute with myself, should I driver or should I not? But after that, no, I didn’t give it a thought”

- Drink driving as strategic behaviour
  - Behaviour carefully planned in order not to be apprehended

- Drink-driving and control
  - “I didn’t make mistakes or anything. I drove very nicely…the police actually told me I drove well – they just stopped me because I had a problem with my headlights”

- Drink-driving and ‘normalcy’ (social identity)
  - …most people DUI now and then
  - … “we are the carpenters”
  - I drink less than my partner! (M drives → M too drunk → late delegation to F)

Key: sense of neutralisation - don’t choose to DUI, exceptionally good and safe drivers when DUI; and DUI=common

‘THE BEST DRIVERS IN THE WORLD’
BRIT. J. CRIMINOL. (2011) 51, 773–788
Lars Fynbo® and Margaretha Järvinen
Perceptions of safety and countermeasures

- Drivers who perceive safe consumption levels as higher than the legal BAC, perceive
  - ↓ caught DUI
  - ↓ accident
  - ↓ impairment by alcohol when driving
  - ↑ alcohol volume when driving

Table 1. Mean perceived chances of apprehension and accident involvement when impaired by alcohol and likelihood of accident involvement when sober across safe and legal limit consumption differential groups

<table>
<thead>
<tr>
<th>Condition</th>
<th>Apprehension</th>
<th>Impaired accident</th>
<th>Sober accident</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capable &gt; legal</td>
<td>1/4509^a</td>
<td>1/5300^b</td>
<td>1/46227</td>
</tr>
<tr>
<td>Mean</td>
<td>1.45</td>
<td>1.42</td>
<td>1.31</td>
</tr>
<tr>
<td>SD</td>
<td>185</td>
<td>185</td>
<td>185</td>
</tr>
<tr>
<td>n</td>
<td>185</td>
<td>185</td>
<td>185</td>
</tr>
<tr>
<td>Legal &gt; capable</td>
<td>1/1706^a</td>
<td>1/403^b</td>
<td>1/39482</td>
</tr>
<tr>
<td>Mean</td>
<td>1.62</td>
<td>1.43</td>
<td>1.31</td>
</tr>
<tr>
<td>SD</td>
<td>276</td>
<td>276</td>
<td>280</td>
</tr>
<tr>
<td>n</td>
<td>276</td>
<td>276</td>
<td>280</td>
</tr>
<tr>
<td>Capable = legal</td>
<td>1/2180</td>
<td>1/1643^b</td>
<td>1/50536</td>
</tr>
<tr>
<td>Mean</td>
<td>1.47</td>
<td>1.51</td>
<td>1.30</td>
</tr>
<tr>
<td>SD</td>
<td>387</td>
<td>385</td>
<td>388</td>
</tr>
<tr>
<td>n</td>
<td>387</td>
<td>385</td>
<td>388</td>
</tr>
<tr>
<td>Sample total</td>
<td>1/2358</td>
<td>1/1341^b</td>
<td>1/45709</td>
</tr>
<tr>
<td>Mean</td>
<td>1.52</td>
<td>1.52</td>
<td>1.30</td>
</tr>
<tr>
<td>SD</td>
<td>848</td>
<td>846</td>
<td>853</td>
</tr>
<tr>
<td>n</td>
<td>848</td>
<td>846</td>
<td>853</td>
</tr>
</tbody>
</table>

^a = Significant between-subjects effect, p < 0.01.
^a,b = Means show significant post hoc group differences, p < 0.05.
Do social perceptions really influence you THAT much?

Oei, 1990: UQ, social drinking in a lab ‘bar’ with confederates (male & female) instructed to regale with stories.
## Shame vs Guilt: Treeby

**Shame**
- Feel badly about **self**
- Extremely aversive
- Sense of shrinking, exposure, feeling small
- Motivation to hide, avoid conceal, deny, lie, externalize blame
- “I did that horrible thing”

**Guilt**
- Feel badly about a **specific behaviour**
- Moderately aversive
- Sense of tension, remorse
- Motivation to “fix” the situation; to learn from the failure
- “I **did** that horrible **thing**”

---

Tangney and Dearing (2002)
# Shame vs Guilt: Treeby

<table>
<thead>
<tr>
<th>Shame</th>
<th>Guilt</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Consistently related to maladaptive functioning</td>
<td>□ Consistently related to adaptive functioning</td>
</tr>
<tr>
<td>▪ Psychopathology, ↓ self control; ↓ anger regulation; recidivism</td>
<td>▪ ↑ empathy, ↑ self control</td>
</tr>
<tr>
<td>□ Shame proneness assoc^n</td>
<td>□ ↓ antisocial, ↓ recidivism</td>
</tr>
<tr>
<td>▪ ↑ AUDIT, loss of control</td>
<td>□ Guilt proneness assoc^n</td>
</tr>
<tr>
<td>▪ Drinking to down-regulate negative affect (to cope)</td>
<td>▪ ↓ AUDIT, ↑ protective strategies when drinking</td>
</tr>
<tr>
<td></td>
<td>▪ Inversely associated with drinking to manipulate mood</td>
</tr>
</tbody>
</table>

(Dearing et al., 2005, 2012; Meehan et al., 1996; Treeby & Bruno, 2012)
Shame - substance use - shame spiral hypothesis

Shame-proneness (Negative Affect)

Using to Cope

Negative consequences / Impaired control / Dependence

(Dearing et al., 2005; Potter-Efron, 2002; Stuewig & Tangney, 2007; Tangney & Dearing, 2002; Wiechelt, 2007)
Shame and guilt in a Tasmanian sample of young adults (Treeby & Bruno, n=430/280)

<table>
<thead>
<tr>
<th></th>
<th>Shame (residual)</th>
<th>Guilt (residual)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUDIT (alcohol problems)</td>
<td>.11*</td>
<td>-.19**</td>
</tr>
<tr>
<td>Alcohol Problem Severity Index</td>
<td>.11*</td>
<td>-.17**</td>
</tr>
<tr>
<td>Drinking to cope with anxiety</td>
<td>.30**</td>
<td>-.10*</td>
</tr>
<tr>
<td>Drinking to cope with depression</td>
<td>.30**</td>
<td>-.16**</td>
</tr>
<tr>
<td><strong>Protective Strategy</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stopping/limiting</td>
<td>-.05</td>
<td>.16**</td>
</tr>
<tr>
<td>Manner of drinking</td>
<td>-.14*</td>
<td>.23**</td>
</tr>
<tr>
<td>Serious harm reduction</td>
<td>.00</td>
<td>.20**</td>
</tr>
<tr>
<td>Total protective behavioral strategies</td>
<td>-.09</td>
<td>.24**</td>
</tr>
</tbody>
</table>

*Note. * p < .05. ** p < .01.*
So, what do you do with this?

Minimise shame

- Praise process (e.g. strategy use) c.f. performance variables (e.g. abstinence)
- CBT-type techniques
  - restructure, reframe, ‘responsibility pie’
- DBT-type techniques
  - Chain analysis

Cautiously harness guilt

- MI-type techniques
  - Build discrepancy between self and use
- If pre-contemplative
  - Use assessment to increase problem awareness (norms, LFT, consequences)
- Pre-emptive problem solving
  - Shifting behaviour
Briefly: Is alcohol the only thing we need to be concerned about?
Harms: Blood samples of patients transferred to the Alfred (Vic) following non-fatal MVA (n=436)

Ch’ng et al (2007)
Benzodiazepines increase risk of MVA and likelihood of responsibility

Responsibility analysis in Victorian MVA deaths (Ogden, 2009)

Meta analysis of benzodiazepine risk (Dassanayake et al, 2011)

- Risk of traffic accident
  - OR: 1.59 (1.1-2.3) [case-control]
  - OR: 1.81 (1.4-2.4) [cohort]
  - OR: 7.69 (4.3-13.7) [if combined with alcohol]

- Accident responsibility
  - OR: 1.41 (1.0-1.9)
Alprazolam (1mg) and driving [Verster, et al. 2002]

Increased SD of Lateral Position

↑ excursions into adjacent lane
↑ excursions into road shoulder (<1 vs 6)

↑ subjective mental effort
↓ subjective driving quality
↓ tracking
↓ information processing speed
↓ divided attention

100km highway drive (!!)
N=20

Figure 1. The Standard Deviation of Lateral Position (SDLP).
Summary

- Drink driving rates are declining (but could certainly come down further!)
  - Drink-drivers perceive lower legal, crash risk, and that they’re better drivers (but they break more rules!)

- Alcohol has generalised effects across the brain
  - Every 0.02% increase in BAC roughly doubles risk of fatal crash
  - Deficits, but subtle <0.05; very marked deficits >0.08

- Estimating your impairment (or BAC) is fraught
  - Tendency to underestimate at high BAC
  - Issue of acute tolerance in descending limb
  - Underestimators more likely to drink drive

- Drink drivers have ‘neutralising’ beliefs
  - Driving control; socially normative
  - ?shame may underlie externalisation, contribute to recidivism; guilt may support change

- Alcohol is not the only issue we need to think about in DUI