Relatively drunk: subjective intoxication and estimated health consequences of alcohol consumption are conditional on the presence of less intoxicated individuals, not level of intoxication

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ALCOHOL-RELATED JUDGEMENTS

- Aim:
  - Application of cognitive science to understand how drinkers make judgements relating to their use of alcohol

- Judgements:
  - Perceived intoxication
  - Perceived risk

- Broad Implications:
  - Applicable to BIs as much as policy (e.g. outlet density) and "social norm" interventions

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THREE HYPOTHESES RELATING TO ALCOHOL JUDGEMENTS

- 1 - consumers form judgements based on actual consumption metrics
    - the more they consumed the more at risk they believe they are

- 2 - consumers compare their drinking to the mean or median of some comparison group
    - perceiving excess consumption as normal mitigates risk

- 3 - according to the Relative Rank Hypothesis it is not the mean of the comparison set that influences judgements but the perceived rank relative to other consumers
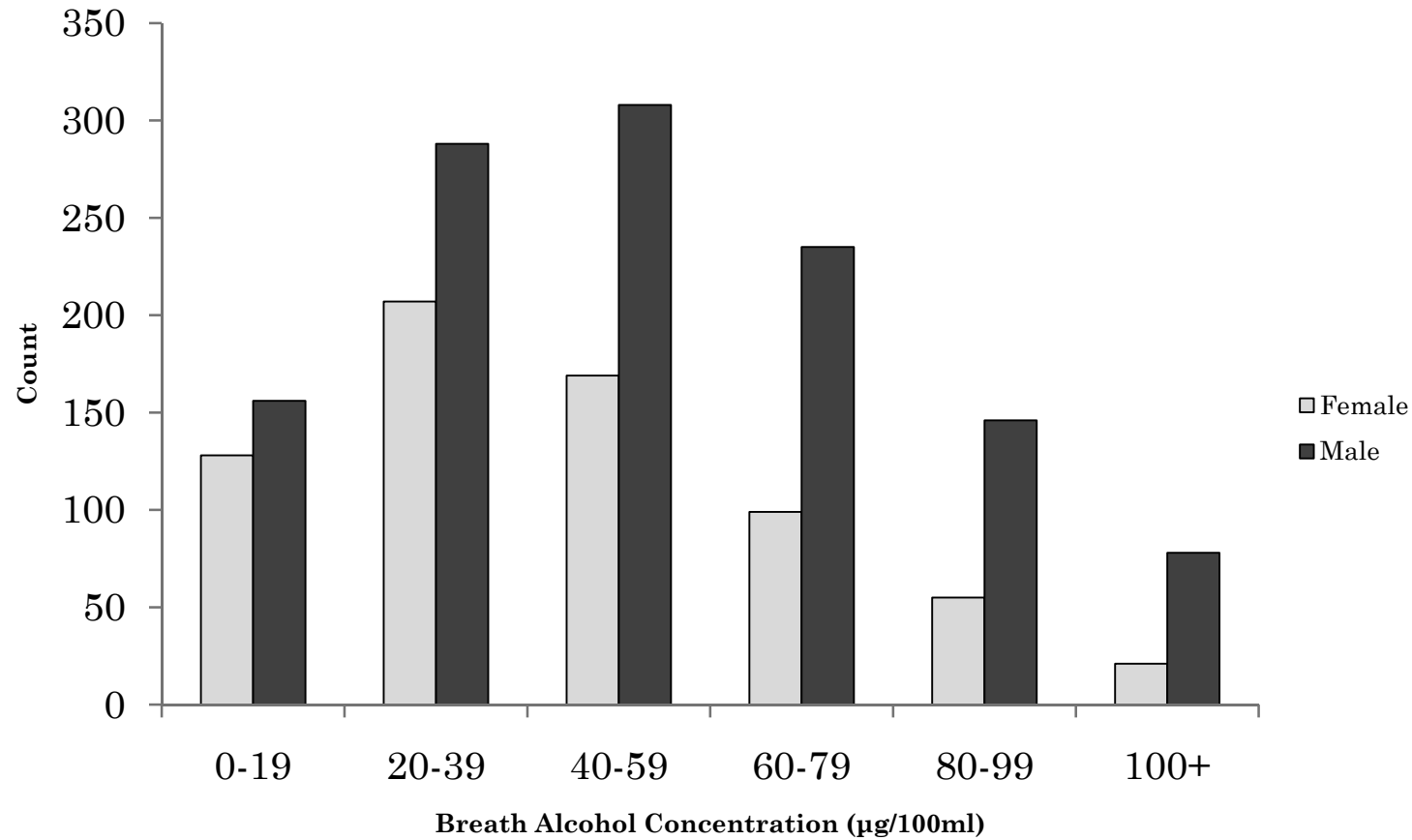
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DATA

- Breathalyser street survey
- 12 months
- As a part of an exploratory trial of a premises-level intervention looking at how we might reduce violence and alcohol misuse
- Location – Five towns/cities in South Wales, UK
  - Grouped into four because two were co-terminous
- Alcometer readings were collected from a breathalyser survey of 1,999 respondents
  - two scores =195 µg/100ml were judged to be outliers and dropped

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A "Normal" Environment for Alcohol Misuse?

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SOCIAL NORMS?

- Most examples of Social Norm theory used in respect of alcohol misuse comes from research involving students

- Students miss-perceive how much others are drinking (normally through overestimation) (e.g., Perkins, Haines, & Rice, 2005)

- Some successful interventions have been developed that reduce drinking through changing people's perceptions of drinking norms (Moreira, Smith, & Foxcroft, 2009).

- None of this research has shown how people compare their levels of drinking with others – the cognitive mechanism of this relative judgment remains unknown

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HOW LONG IS A PIECE OF STRING?

- Our RRH originates from the branch of psychology that quantitatively investigates relationships between physical stimuli and mental phenomena

- Decision by sampling (Stewart, Brown & Chater; also Parducci, 1995)

- Usually, no objective information to directly imply subjective value (e.g. whether a piece of string is long or short)

- **Money and happiness** (Boyce, Brown, G & Moore, 2010. Money and happiness: rank of income, not income, affects life satisfaction. Psychological Science, 21(4), 471-475)

- Reference set, from what is observed and from memory

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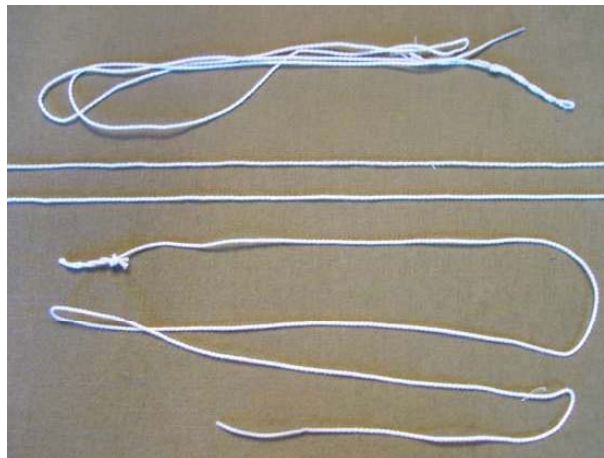
RELATIVE RANK HYPOTHESIS

- Relative comparisons
  - "social norms" based, through a person comparing their consumption to the average drinker's,
  - or rank based, through a person ranking their consumption among other drinkers.
- The average based comparison has been the assumption of almost health research, as historically it was within cognitive science (except for the past 50 years).
- In all previous research that compares rank verses average based comparisons, and across a wide variety of domains, rank is the better predictor of judgment and choice.

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METHODS

- Exploratory study
- Alcometers, calibrated to ±3µg alcohol/100 ml breath, recorded respondents' BrAC (µg alcohol/100 ml breath)
- Questions
  - "how drunk are you right now, on a 1 ("totally sober") to 10 ("completely drunk") scale?"
  - extreme drinking, "how extreme has your drinking been tonight, on a 1 ("not at all") to 10 ("completely extreme") scale?"
  - long-term health, "if you drank as much as you have tonight every week how likely is it that you will damage your health in the next 15 years, on a 1 ("definitely will not") to 10 ("definitely will") scale?"
  - liver cirrhosis, "if you drank as much as you have tonight every week how likely is it that you will get cirrhosis of the liver in the next 15 years, on a 1 ("definitely will not") to 10 ("definitely will") scale?"

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RANK, NORM AND BrAC

- Actual consumption: BrAC was derived directly from alcometer score
- Reference group comparisons:
  - We need a reference group
  - Explored several configurations
    - Gender, location, time (pre- and post-11pm)
  - Social mean, mean BrAC for reference group
  - Rank…

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- Rank was expressed as a ratio that gives the individual a relative rank (Ri) normalised between 0 and 1.

$$R_i = \frac{(i-1)}{(n-1)}$$

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FROM ALL RESPONDENTS

Variable	Proportion or Mean	SD
Perceived drunkenness	4.48	1.98
Extreme drinking	4.53	2.26
Long-term health	6.40	3.21
Liver cirrhosis	6.17	3.32
BrAC	47.31	27.71
Session duration (hours)	5.36	3.62
Surveyed after 11pm	0.60	
Male	0.64	
FAST	6.18	3.49
Age (years)	26.28	8.78

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N = (680, 410)	Perceived Drunkenness β (95% CI)	Extreme Drinking β (95% CI)	Long-term Health β (95% CI)	Liver Cirrhosis β (95% CI)
Model 1				
R_i	3.63 (1.54 - 5.73)**	3.86 (1.37 - 6.36)**	4.07 (0.46 - 7.67)*	4.36 (0.67 - 8.05)*
BrAC	-0.01 (-0.03 - 0.01)	-0.02 (-0.05 - 0.01)	-0.02 (-0.06 - 0.02)	-0.02 (-0.06 - 0.01)
Group Mean BrAC	-0.01 (-0.08 - 0.06)	<0.01 (-0.09 - 0.08)	0.11 (-0.02 - 0.23)	0.13 (0.00 - 0.25)
Session duration	0.09 (0.04 - 0.14)**	0.09 (0.03 - 0.15)**	0.07 (-0.02 - 0.16)	0.02 (-0.06 - 0.11)
After 11pm	0.74 (0.16 - 1.33)*	0.51 (-0.18 - 1.21)	0.16 (-0.85 - 1.17)	0.13 (-0.90 - 1.16)
Gender (male = 1)	0.26 (-0.46 - 0.99)	-0.04 (-0.91 - 0.83)	-1.29 (-2.54 - -0.04)*	-1.68 (-2.96 - -0.39)*
FAST	0.01 (-0.05 - 0.06)	0.05 (-0.01 - 0.12)	0.17 (0.07 - 0.26)**	0.22 (0.12 - 0.31)**
Age	0.01 (-0.01 - 0.03)	<0.01 (-0.03 - 0.02)	0.04 (0.00 - 0.08)*	0.05 (0.01 - 0.09)**
Location dummies	Yes			
Constant	2.06 (-0.43 - 4.56)	2.40 (-0.58 - 5.37)	-0.50 (-4.80 - 3.79)	-1.59 (-5.98 - 2.80)

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PARAMETERIZE RANKING ALGORITHM

- SRi was regressed onto each judgement separately (controlling for notable significant covariates revealed in initial models) using OLS and the optimum value for η was that which yielded the smallest coefficient of determination.

$$SR_i = 0.5 + \frac{(i-1) - \eta(n-i)}{2[(i-1) + \eta(n-i)]}$$

- $\eta > 1$ indicates an upward bias and that respondents are more influenced by more intoxicated drinkers

- $\eta < 1$ indicates a downward bias and that respondents are more influenced by more sober drinkers.

- For all judgements respondents were more influenced by those who were more sober:
  - perceived drunkenness $\eta = 0.45$
  - extreme drinking $\eta = 0.12$
  - long-term health $\eta = 0.09$
  - liver cirrhosis $\eta = 0.12$

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SUMMARY

- Three hypotheses: BrAC, Social Norm, Rank

- Clearly BrAC and Rank correlated (BrAC is a component of Ri), but Rank explains more of the variance in judgements than BrAC and Social Norm

- It appears that it is the presence of less intoxicated individuals in the reference group that influences perceptions most.

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IMPLICATIONS/PREDICTIONS

- Mixed NTE (Policy)
  - Introduce more sober individuals
  - Policy might be able to do something (saturation policies)
  - Implications for density – it might be that density-harm relationship is better explained by social references and lack of "variation" in NTE users
- "Contagion" across social networks
  - Swap "average" drinker with extreme drinker
  - Social Norm – the average increases for all and therefore all feel less at risk
  - Relative rank – rank only changes for those above the mean – "stretches the distribution"
- Relative rank – as reference group changes so does perceived risk, attitudes **are not stable**
- Advice needs to capitalise on contextual information (e.g. "90% drinkers drink less than 3 units/day") rather than more formulaic don't drink more than 3 units/day

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A FEASIBILITY STUDY OF A LICENSED PREMISE INTERVENTION TO REDUCE ALCOHOL MISUSE AND VIOLENT INJURY

- Medical Research Council – SC Moore (Dental), JP Shepherd (Dental), L Moore (CISHE), S Murphy (CISHE)
- Iain Brennan, Ellie Byrne, Susan Moore
- Eugene Rourke, Emma Westlake, countless surveyors

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Questions?

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