

A field study of the effects of ethanol on human performance and mood

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Background

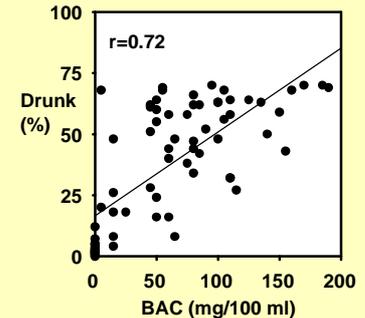
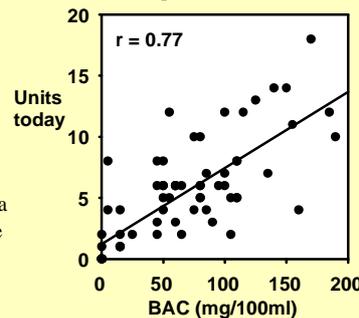
Many studies in the laboratory have demonstrated the impairment caused by ethanol (alcohol) on human cognitive and psychomotor performance (1), and epidemiological work has repeatedly shown the increased risk of accidents associated with alcohol use in driving and other everyday life situations (2). However little field research has been carried out to document the effects of ethanol on human performance in an everyday setting (3). Laboratory studies differ from everyday ethanol consumption in many ways. Comparison with field work would provide a valuable check on the importance of these factors.

The Study

We carried out the study in a number of pubs in central Edinburgh. Potential volunteers were approached and asked if they would be willing to take part. Those who agreed were given a brief description of the procedures and asked not to drink until the end. They completed a questionnaire including questions about what they had drunk, then carried out a series of cognitive tests and subjective scales, and finally were breathalysed to obtain blood alcohol concentration (BAC).

Results

70 volunteers (44 males and 26 females) completed the study. They were aged 18-55 years (mean 23) and reported alcohol intake was 0-75 units/week (mean 23). Volunteers reported consuming between 0 and 18 units of ethanol prior to taking part in the study, and their BACs ranged from 0-190 mg/100 ml. There was a highly significant ($p < 0.001$) correlation between consumption and BAC., and between BAC and VAS Sober—Drunk scores.



Visual Analogue Scales (VAS).

The scale appears with two anchor points, but no position marker



The volunteer presses a Left or Right button and a cursor appears on that side. The volunteer then presses the buttons to set the cursor position



Arrow Flankers.

Five symbols appear on the screen. The volunteer attends to the central arrow.



In this case the volunteer should press the left button, as the central arrow points left. The flankers can be arrows or neutral stimuli (squares)



Paired-Associate Learning.

Two shapes appear, one on the left, the other on the right of the screen



Then single shapes appear. The volunteer presses the Left or Right button to indicate on which side the shape originally appeared.



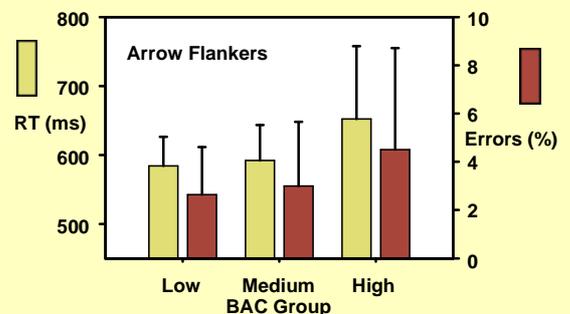
Performance tests showed lower correlations than VAS with BAC. These were significant for a number of tests:

Test/Measure	r	sig
Arrow Flankers RT	0.48	$p < 0.001$
Arrow Flankers Err	0.41	$p < 0.001$
Paired Associates RT	-0.09	n.s.
Paired Associates Err	0.28	$p < 0.05$
ZigZag Maze Time	0.11	n.s.
ZigZag Maze Err	0.28	$p < 0.05$

r: correlation with BAC; RT: Response Time; Err: Error score

Serial sevens and time estimation were also carried out. These did not show significant correlation with BAC. Overall, the effect of ethanol was more marked for error scores than for speed, in agreement with previous results.

Results from the arrow flankers are shown with BAC broken down into three groups: Low (less than 40 mg/100 ml); Medium (40-80) and high (Over 80).



References.

1. Bartholow, B. D., Pearson, M., Sher, K. J., Wieman, L. C., Fabiani, M., & Gratton, G. (2003) Effects of alcohol consumption and alcohol susceptibility on cognition: a psychophysiological examination, *Biological Psychology*, 64: 167-190.
2. Hingson, R. & Winter, M. (2003) Epidemiology and consequences of drinking and driving, *Alcohol Res. Health*, 27: 63-78
3. Mayes, R., Tiplady, B., & Scholey, A. Alcohol and performance: A pilot field study. Poster presented at BAP, Harrogate, UK, 25-28th July 2005. 2005.

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Conclusions

1. Portable testing methods allow Impairments to performance with ethanol to be assessed in a field setting
2. The effects of ethanol are similar to those seen in the laboratory
3. Comparisons of ethanol effects between field and lab settings in the same individuals would be valuable