Ethanol and performance in the laboratory and everyday life

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Laboratory and Everyday Life Assessments

The controlled laboratory setting has many advantages:

- Standard doses can be given and documented
- Measurements of blood alcohol concentrations are straightforward and can be done frequently during the test period
- Conditions during testing can be standardised and distractions avoided
- A wide range of assessment methods can be used

However many aspects are artificial:

- People choose their type of drink, dose, and rate of drinking – they do not usually drink, for example seven units of vodka in 10 minutes
- Drinking is normally in a social setting.

Everyday life (naturalistic) assessment provides a valuable check on the validity of lab findings, and allows studies of associations between different aspects of daily life such as those between food intake or sleep quality and subsequent alertness or memory.

The availability of portable devices such as mobile phones and handheld computers (PDAs) makes such everyday life studies increasingly practicable.

Mobile Phone Assessment System

- Volunteers used mobile phones to carry out cognitive tests and mood assessments
- Text messages (SMS) were sent to volunteers when assessments were due.
- Data were transmitted to web server after each assessment
- Researcher could review data online to check compliance

Number Pairs

A set of seven digits appears on the screen. The task is to check if he **second** and **fourth** digits are the same

If they are the same (left), the subject presses the **Yes** button as quickly as possible, if not, the **No** button (right).

Memory Scanning: A set of five digits is shown on the phone screen.. Single digits appear. The volunteer presses Yes or No as quickly as possible to indicate whether the digit was in the set

SART: Single digits appear at random. The task is to press a button to each digit except 3, when no response should be made

VAS: Feelings of drunkenness, drowsiness, and mood were recorded (right)

Aims of Study

To compare the effects of ethanol on cognitive function and psychomotor performance in everyday drinking situations and in a laboratory setting in terms of both degree of impairment and effects on specific aspects of function

Everyday Life Setting

38 healthy volunteers (20 male) aged 18-54 years (mean 22.8) were sent text (SMS) messages twice a day at different times over 14 days. They completed mobile phone assessments as soon as possible after receiving each text message. They recorded number of alcoholic drinks consumed, having been asked not to change their normal drinking during the study

30 of the 38 volunteers had at least one entry where 5 or more units (50g ethanol) were drunk within the past 6 h. The maximum was 20 units (median 7). Previous work (Tiplady et al., 2007) suggests that a reported intake of 7 units corresponds to a blood alcohol concentration of about 95 mg/100 ml.

With one exception these entries were between 7 pm and 4 am. Test scores were compared with those for the same volunteers without ethanol over the same time period.

Laboratory Setting

26 of the volunteers took part in the lab study. They received ethanol and placebo on separate days in random order and completed assessments at intervals up to 2h after the drink.

Mean blood alcohol concentrations were 124 mg/100 ml

Results

Ethanol was associated with significant impairment and subjective feelings of drunkenness in both laboratory and everyday life settings. The effects were seen for both speed and error scores. The magnitude of the effects was generally similar, and no significant differences were seen between everyday life and lab situations when within-subjects comparisons were made using paired t-tests (Table). If anything, the trend was towards a greater effect of ethanol in the everyday life situation, though average BACs inferred from previous work were somewhat lower than for the lab situation (95 vs 124 mg/100 ml). Subjective drunkenness was very similar in both settings.

References.
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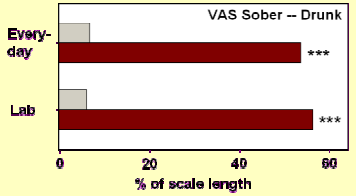
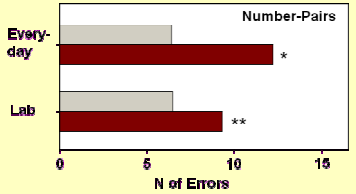
Memory Scanning: Sternberg S (1975) Qu J Exp Psychol. 27: 1
SART: Manly T et al. (2000) Clin Neuropsych Ass. 3: 167
Number Pairs: Farquhar K et al. (2002) J Psychopharmacol. 16: 379





Light bars: No alcohol consumed in past 24 h

Dark bars: Five or more units of alcohol in last 6 h

Variable	Naturalistic		Laboratory		p
	Mean	S.D.	Mean	S.D.	
Reaction Time (msec)					
SART	49	151	42	97	0.83
Memory Scanning	0	178	33	56	0.34
Number Pairs	60	267	41	69	0.72
N of Errors					
SART FP	0.66	2.32	0.73	1.82	0.90
SART FN	1.35	5.83	0.81	1.98	0.63
Memory Scanning	5.51	11.91	2.69	4.79	0.24
Number Pairs	6.58	11.23	2.62	6.87	0.11

Summary and Conclusions

1. The observed effects of ethanol are not greatly affected by the setting in which they are measured.
2. Both speed and accuracy of performance are impaired in both settings
3. Everyday assessment using mobile pones is a valid and practicable way of assessing cognitive function

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