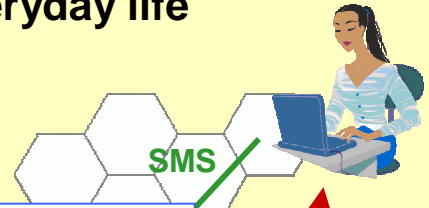




The use of a mobile phone for assessing mood and performance in everyday life

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Assessments in Everyday Life


- **Ecological validity:** Artificial constraints of lab or clinic settings are avoided
- **Frequent** objective and subjective assessments allow fluctuating conditions to be followed in detail
- **Momentary** ratings of subjective state avoid recall bias
- **Associations** between different aspects of life can be investigated, e.g. between food intake or sleep quality and subsequent alertness or memory
- **Portable** technology allows an increasing range and scope of naturalistic assessments to be made

Pros and Cons of Mobile (Cell) Phones

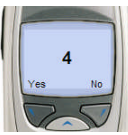
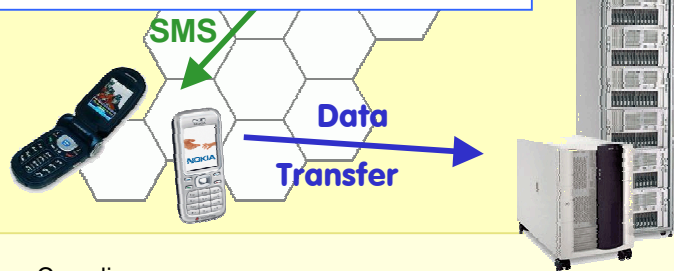
- **Widespread and Familiar:** There are more mobile than landline connections in many countries. A substantial and very rapidly growing proportion of people in the developing world have mobile phones
- **Standard:** Applications can be written to run on a wide range of phones, and transmit securely to a web sever.
- **Small and portable:** In many ways an advantage, but leads to the main limitation of mobile phones, which is screen size. A wide range of objective and subjective measures can, however, be effectively set up on mobiles.

Memory Scanning

A set of five digits is shown on the phone screen



Single digits appear. The user presses YES or NO as quickly as possible

Aim of Study
To assess the effects of alcohol on cognitive performance and subjective state in a naturalistic setting. Volunteers used mobile phones to record alcohol consumption and to carry out tests of memory, attention and reaction time.

Methods
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 were asked to complete 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. They carried out the following tests:

Memory Scanning, shown above.

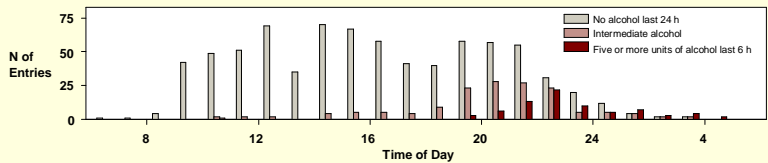
Number-Pair Matching Sets of five digits appear on the computer screen one set at a time. The task is to press YES if digits two and four are the same, NO otherwise.

Sustained Attention to Response Task (SART). Single digits appear in a random sequence on the screen. The task is to press a button to each digit except 3, when no response should be made

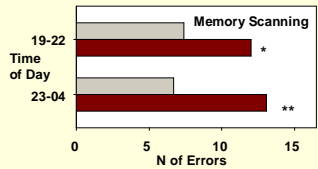
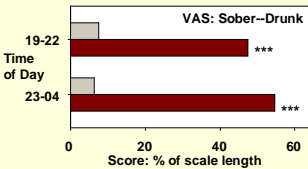
Visual Analogue Scales. Feelings of drunkenness, drowsiness, and mood were recorded.

Statistical analysis for paired comparisons used the Wilcoxon signed ranks test

Compliance
No specific time-windows were set for completing assessments, as the aim was to obtain data over a wide range of times, not at defined intervals. Entries were made to over 80% of text messages (i.e. before the next message was sent). Distribution of entries over time is shown below:



Effects of alcohol
Thirty of the 38 volunteers had at least one entry where five or more units of alcohol (50g) were drunk within the past 6 h. The maximum number of units reported was 20 (median 7). With one exception these entries were between 7 pm and 4 am. Test scores were compared with those for the same volunteers without alcohol over the same time period. Drunkenness, and to a lesser extent drowsiness, increased with alcohol. Error scores were increased ($p < 0.05$) with alcohol for all three tests. Errors have been shown to be particularly affected by alcohol in laboratory studies. Reaction times increased for memory scanning and SART:



Summary and Conclusions

1. The effects of alcohol were clearly seen on both subjective and objective measures
2. The pattern of effects was similar to those seen in laboratory studies with marked effects of alcohol on errors in these tests.
3. Compliance was good, with a wide range of assessment times
4. These results show that mobile phones are an effective way of collecting cognitive performance data in an everyday life setting, with sensitivity to effects within the normal range of behaviour.

References.
Memory Scanning: Sternberg S (1975) *Qu J Exp Psychol.* 27: 1-32.
SART: Manly T et al. (2000) *Clin Neuropsych Ass.* 3: 167
Number Pairs: Farquhar K et al. (2002) *J Psychopharmacol.* 16: 379-384.
VAS: Tiplady et al. (2008) Poster, this session
Errors: Tiplady B (2003) *J Psychopharmacol.* 17: 41-49.
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