Assessing mood and performance in an everyday life setting using a mobile phone: Acceptability and compliance

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Mobile Phone Testing

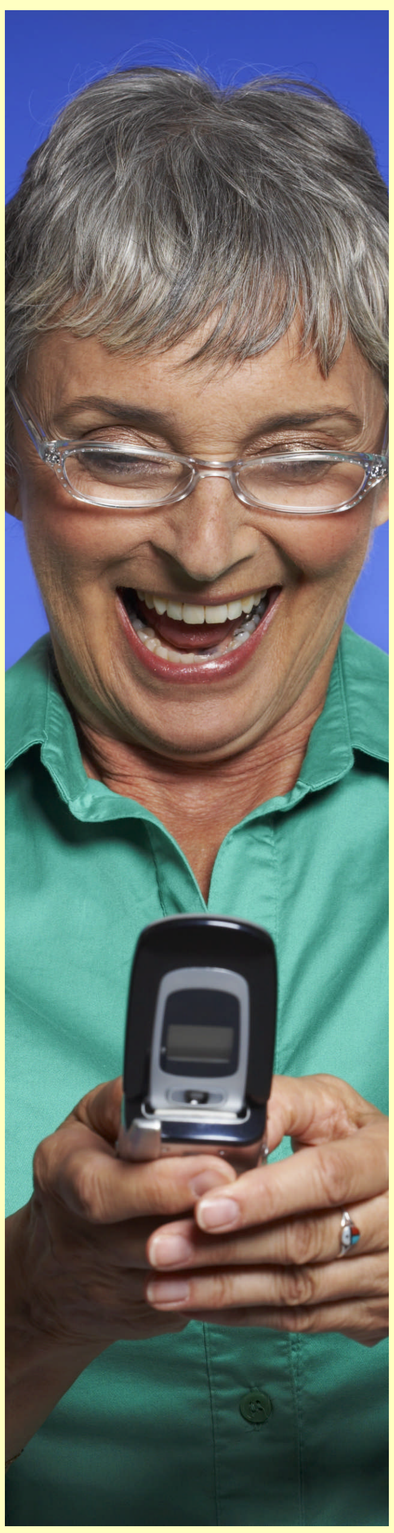
Neuropsychological assessments are often implemented on computer, to provide standardised presentation of stimuli and automated recording of results. The introduction of highly portable computing devices such as Personal Digital Assistants (PDAs) has allowed smaller devices to be used as test platforms.

Modern mobile phones have sufficient computing power to support cognitive testing applications, and the screen size is adequate for a wide variety of tests. The widespread availability and familiarity of mobile phones makes them attractive candidates for use in a variety of situations where portability is valuable. These include:

- Everyday testing, where assessments are administered at different times of day, and completed in the user's normal environment, such as home, place of work
- Field studies, where investigators recruit participants in locations such as pubs, clubs or music festivals, and provide a device for them to use.
- Experimental research carried out in locations where portability is important, such as hospital wards.

We have used up a mobile phone system to assess the effects of alcohol in everyday life, and to compare it to lab assessments. The system includes 3 cognitive tests, described below, taking about 10 minutes, plus questions on alcohol consumption and subjective assessments.

The tests are set up in Java®. After completion of assessments, data are automatically sent to a central server for review and analysis.



Number Pairs

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

If they are the same (above, left), the subject presses the **Yes** (4) button as quickly as possible, if not (above, right), the **No** (6) button.

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

Word-Number:

Word-Number pairs, e.g. Peanut – 7, appear on the screen one at a time. The words alone then appear, and the task is to tap the number key for each of the 8 words.

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

Study Aims and Outline

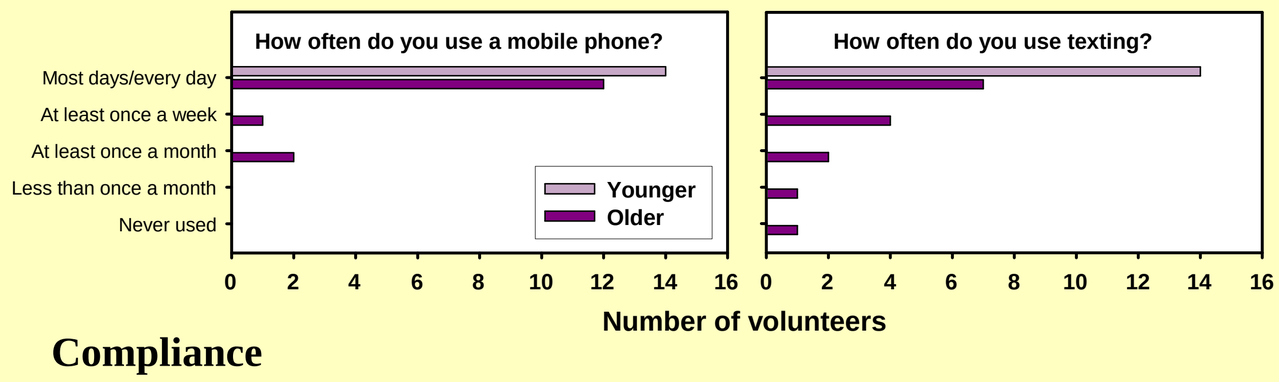
Previous work has shown that the mobile phone system is practicable and effective for collecting everyday data, but was in a mainly young population (Tiplady et al., 2009). The present study used a more representative population, and included assessments of ease of use and acceptability of the system.

Thirty volunteers, 16 males and 14 females, aged 19-64 years (mean 37.4) took part. All completed the study. They received text (SMS) messages twice a day on the mobile phones, and were asked to complete the test/questionnaire application as soon as practicable after receiving the text.

At the end of the study they completed a questionnaire concerning their familiarity with technology, and their views on the mobile phone system. Results are presented by age, using a median split (33 years).

Volunteers' Use of Technology

All of the volunteers used a PC, and all but one older volunteer used a PC on a daily basis. The majority of volunteers (11/14 younger and 10/14 older) had never used a PDA/handheld computer. All of the younger group used a mobile phone on a daily basis, and all also used texting on a daily basis. Mobile phone use, and particularly texting, was somewhat less common in the older group.



Compliance

Compliance was defined as the percentage of scheduled assessments completed before the next text was sent out. Overall compliance was 85%, and this was similar for the two age groups.

Acceptability

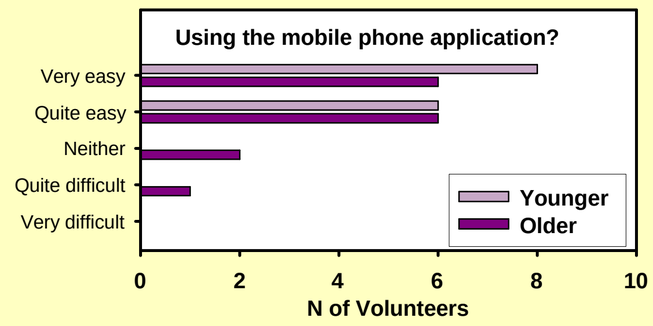
All volunteers found the test application acceptable to use. Four younger and two older volunteers reported problems in the questionnaire. Two of these were related to failure of data transmission, although volunteers had been informed in the startup session that this was not important, as any data not transmitted would either be sent on a later occasion, or collected from the phone memory at the end of the study. None of the reported problems prevented volunteers from successfully completing the study.

Problem	N
Didn't transmit data	2
Tests very dull	1
Feedback to incorrect responses slowed me down	1
*Mobile given was different from my own. Took me a while to get started	1
*Small keys on the phone – big fingers!	1

* Older volunteer (>33 years)

Ease of Use

All the younger volunteers, and the majority (11/14) of the older volunteers found the application either very or quite easy to use.



Summary and Conclusions

1. The cognitive test application was successfully used by all volunteers who took part. Compliance was good, both in younger and older volunteers.
2. All users found the system acceptable, and the majority found it easy to use
3. Improved training procedures, particularly for those less used to mobile phone technology, could be helpful.

Reference.
Tiplady et al. (2009) Alcoholism Clin Exp Res, in press.

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