Mobile phones as a means of assessing mood and cognitive performance: a pilot field study assessing effects of eating behaviour

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Background

- Recent technological advances and the ubiquity of mobile phone use amongst young adults affords an ideal opportunity for cognitive testing in real-life settings
- Such an approach may allow researchers to combine field testing with levels of control more typical of the laboratory
- This pilot study used mobile phones to examine the effects of feeding behaviour on mood and performance

Methods

- Fourteen healthy young women (mean age 21.1 years, range 18-32) participated
- Over 14 days each participant was sent a daily text message asking them to complete the mobile phone test battery
- The times of these messages varied systematically so that each volunteer received text messages twice at each of seven time-points ranging from 8 am and 8 pm
- No dietary restrictions were placed on the participants

Measures

Initial screening included familiarisation with the testing system and completion of the Dutch Eating Behaviour Questionnaire which includes measures of *retrained, emotional* and *externally-cued* eating.

Visual analogue mood scales

The mobile phone battery contained visual analogue scales assessing 'alert', 'tense', 'tired', 'hungry' and 'full'.

Performance measures

Cognitive tests presented on the mobile phone assessed aspects of attention and spatial working memory:

Serial Sevens

In this version of the task participants were presented with a series of numbers. They responded by pressing buttons labelled 'YES' or 'NO' depending upon whether the number presented was the previous number minus 7. Errors and response times were recorded.

Arrows Flanker Task

The two buttons just below the screen were used for responses. The volunteer pressed the right button if the arrow pointed to the right, the left button if the arrow pointed to the left, as quickly as possible. If the flanker symbols were crosses, no response was to be made. Response times and the number of correct and incorrect responses to each type of stimulus were recorded.

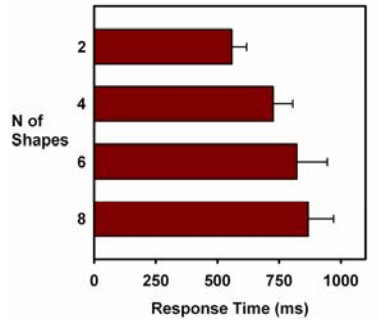
Paired-Associate Learning

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. Response times and errors to sets of 2, 4, 6 and 8 stimuli are recorded.

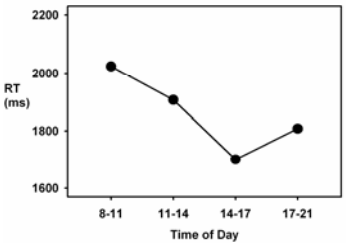
Results

Effects relating to patterns of feeding and performance will be reported elsewhere. Here we restrict ourselves to consideration of results regarding the sensitivity and utility of the mobile phone testing system.

The Paired-Associate Learning task showed a significant effect of complexity ($p < 0.0001$) with longer response times to greater numbers of stimuli. This result suggests that volunteers are attending to the task despite its unsupervised nature.



There was a significant time-of-day effect on Serial Sevens response times ($p = 0.0071$) with faster response times later in the day.



In a follow-up questionnaire most participants (12) found the system 'very easy' or 'moderately easy', and all said it was easier than pencil-and-paper versions.

Overall these results suggest that cognitive testing using mobile phones has enormous potential in the field of behavioural pharmacology.