

Language test as a smartphone app

November 29 2011

Dok or dog – which of these is a real word, and which is not?

Researchers use lexical decision tasks like this to find out what happens in the brain when people read words. Up to now, such experiments were carried out in the language laboratories of institutes and universities, where the participants sat in front of a computer monitor and indicated whether the sequence of letters presented on a screen made sense or not by pressing "yes" and "no" buttons. As part of an international research project, scientists at the Max Planck Institute for Psycholinguistics in Nijmegen, the Netherlands, have liberated this traditional test from the confines of their research laboratory. Since December of last year, they offer the lexical decision task as an app in seven languages, which can be downloaded onto smartphones. As a result, in just four months' time they have collected the volume of data it would normally take them three years to obtain.

"This is truly revolutionary in many respects," says psycholinguist David Peeters, who is working at the Max Planck Institute and is responsible for the Dutch part of the study – which involves a total of six institutes and universities from six different countries. "The coordinated use of the new communications technology makes it possible for us to carry out our research on a previously inconceivable scale," he explains enthusiastically. "It is entirely possible that we will discover things about the functioning of the brain in this way that could not be uncovered up to now using the smaller-scale experiments carried out in our language laboratory," he notes.

During lexical decision tasks, the test subjects are usually presented with

a word from their native language which appears on a computer monitor or, in the case of the current study, on a smartphone display. Their response time provides the researchers for instance with information about whether common or concrete words are recognised more quickly than rare or abstract ones. Such experiments also provide valuable data sources for research on language and reading disorders.

The scientists decided to carry out the first phase of this project in seven languages which use the Roman alphabet: English, Basque, Catalan, Dutch, French, Malay and Spanish. They made application programs with the lexical decision task for these languages available in the [app](#) stores of a well-known smartphone provider, and drew attention to the new app through advertising. The apps specially developed for this purpose contained tests comprising between 50 and 140 words that appear randomly on the smartphone display. The participants were also given the option of forwarding additional information about themselves - for example their age, gender, native language and whether they were left-handed or right-handed - by email to the researchers.

The invitation to "game for science" was very well received by the smartphone user community. The highest number of emails received by the researchers originated from The Netherlands: David Peeters has now received over 5,000 responses from his compatriots. "Our app is actually one of the five most frequently downloaded apps in its category," says the Max Planck researcher, clearly delighted at the unexpectedly positive response to the app.

Peeters and his colleagues intend to start working on the actual analyses when they have at least 10,000 test results per country. However, the initial indications are already very promising. "For instance, we have discovered that the test via smartphone is just as reliable as that carried out under standard conditions in the laboratory," reports Peeters.

Moreover, it is already clear that a far larger target group can be reached using the new technology than in the traditional way. "Students between 18 and 24 years of age usually participated in our test series in the language laboratory. Using the apps, we can now also reach older people from different professional backgrounds, and this makes our findings far more representative," says Peeters, explaining another advantage of this new approach.

However, this is not the only reason why this project is of such great interest to Peeters and his colleagues. For him, the opportunities it provides for comparative research are at least as interesting as the other new dimensions it offers. "We are now also able to relate the test results from different languages with each other," he explains. Of particular interest here are words that are found in different languages like "film" and "taxi". "I suspect that recognition of the word "taxi" is faster in France than, for example, in England, as the word 'taxi' arises more frequently in French than in English, which also has the word 'cab' as a synonym."

The researchers do not wish to limit themselves to the seven languages currently being researched and are considering making the word recognition apps available in other languages that use non-Roman characters, for example Greek, Japanese and Chinese. "This will finally make it possible to survey data from other cultures in a reliable way and on a large scale, and this, in turn, will enable us to verify the universality of cognitive theories."

Provided by Max-Planck-Gesellschaft

Citation: Language test as a smartphone app (2011, November 29) retrieved 3 May 2024 from <https://medicalxpress.com/news/2011-11-language-smartphone-app.html>

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