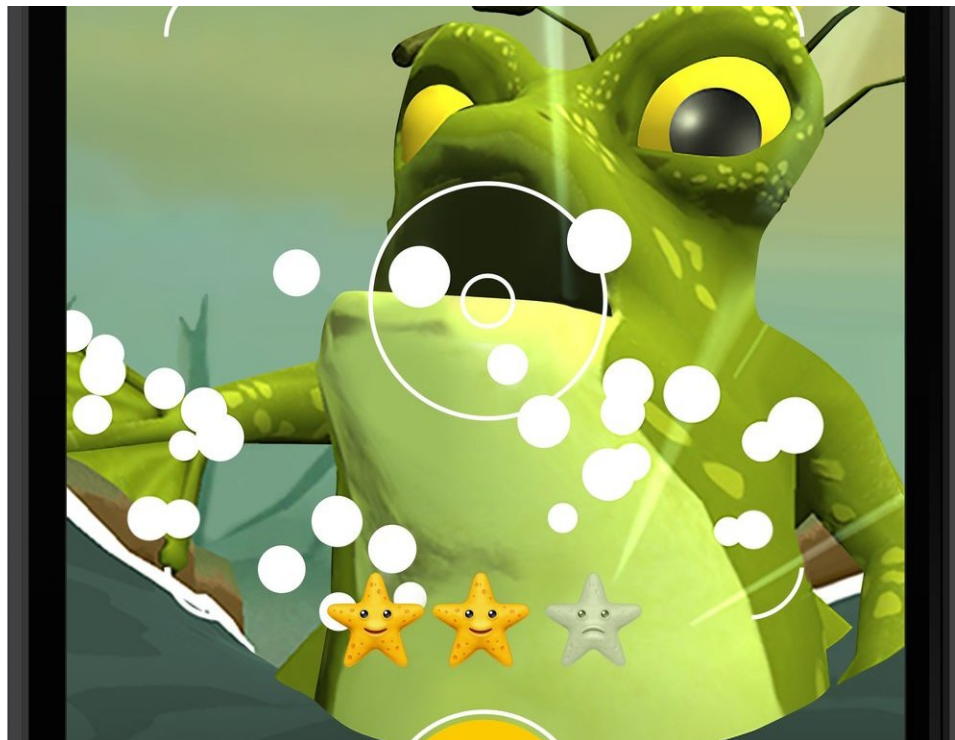


Nordic nations, North Americans and Antipodeans rank top in navigation skills

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Screenshot of Sea Hero Quest mobile game. Credit: Deutsche Telekom AG

People in Nordic countries, North America, Australia, and New Zealand have the best spatial navigational abilities, according to a new study led by UCL and the University of East Anglia.

Researchers assessed [data](#) from over half a million people in 57

countries who played a specially-designed mobile game, which has been developed to aid understanding into [spatial navigation](#), a key indicator in Alzheimer's disease.

With so many people taking part the team were able to reveal that spatial navigation ability across all countries declines steadily across adulthood. However, a country's GDP also had a significant bearing with Nordic countries among the highest performing along with those in North America, Australia, and New Zealand.

And men performed better than women, but the [gender gap](#) narrowed in countries with greater gender equality, according to the study published today in *Current Biology*.

The paper is the first publication of findings from a collaborative project led by Deutsche Telekom, using the mobile game 'Sea Hero Quest', which is seeking to establish benchmarks in navigation abilities in order to help dementia research.

"We've found that the environment you live in has an impact on your spatial navigation abilities," said the study's lead author, Professor Hugo Spiers. "We're continuing to analyse the data and hope to gain a better understanding of why people in some countries perform better than others."



Screenshot of Sea Hero Quest mobile game. Credit: Deutsche Telekom AG

The research team has so far collected data from over four million people who have played Sea Hero Quest. In the [mobile game](#), people play as a sea explorer completing a series of wayfinding tasks.

For the current study, the researchers restricted the data to those who had provided their age, gender and nationality, and were from countries with at least 500 participants.

As part of their analysis, the research team corrected for video game ability by comparing participants' main results to their performance in tutorial levels which assessed aptitude with video games.

While age most strongly correlated with navigational performance,

researchers also found that country wealth, as measured by GDP (gross domestic product), correlated with performance. The researchers say this relationship may be due to associations with education standards, health and ability to travel. They focused on GDP for this analysis as it was a standard metric available for every country, but as part of the ongoing research project they will follow up with further comparisons of other factors.

The researchers also speculate about more specific factors. Top performing countries including Finland, Denmark, and Norway all share a national interest in orienteering, a sport relying on navigation, while the other top performing countries—New Zealand, Canada, the United States, and Australia—all have high rates of driving, which may also boost navigation ability.

Comparing the country-level results to the World Economic Forum's Gender Gap Index, the researchers found a correlation between country-wide gender inequality and a larger male advantage in spatial navigation ability. The gender gap in game performance was also smaller in countries with greater economic wealth. "Our findings suggest that sex differences in cognitive abilities are not fixed, but instead are influenced by cultural environments, such as the role of women in society," said study co-author Dr. Antoine Coutrot, who completed the research at UCL before moving to the French National Centre for Scientific Research (CNRS). Gender equality has previously been found to eliminate differences in maths performance in school. The current study is the first to connect gender inequality to a more specific cognitive measure.



Screenshot of Sea Hero Quest mobile game. Credit: Deutsche Telekom AG

The researchers say that, in the future, an adapted version of the game, first launched by Deutsche Telekom in 2016, may be used as a screening tool for an early warning sign of dementia, as well as a means to monitor disease progress and as an outcome measure for clinical trials.

"Standard current tests for dementia don't effectively tap into the primary initial symptom of being disoriented in space, so we are trying to find an easy way of measuring that, efficiently validated by crowd-sourcing our data," said Professor Spiers.

"It's promising to see that the effect of nationality is relatively small, as it suggests that the game could be used as a relatively universal test for spatial navigation abilities," said co-lead author Professor Michael

Hornberger (The University of East Anglia).

The study was conducted by researchers at UCL, the University of East Anglia, McGill University, Bournemouth University, ETH Zurich and Northumbria University. The data collected by Sea Hero Quest is stored in a secure T-Systems server in Germany and all analysis by the UCL and UEA-led team is conducted on entirely anonymous data. From September 2018, Deutsche Telekom will be providing access to this unprecedented data set in order to aid future discoveries, not only in dementia but across the wider field of neuroscience research. Access will be granted via a bespoke, secure web portal, allowing cloud based analysis of the data. It is facilitated by T-Systems.

"We are excited to announce that we will be making this unique data set accessible to researchers across the world to continue to support studies of this kind," said Deutsche Telekom Chief Brand Officer, Hans-Christian Schwingen. "Sea Hero Quest demonstrates the power of mobile technology in helping to collect important data at scale, advancing research into some of the most pressing healthcare issues of our time."

"The data from Sea Hero Quest is providing an unparalleled benchmark for how human navigation varies and changes across age, location and other factors. The ambition is to use these data insights to inform the development of more sensitive diagnostic tools for diseases like Alzheimer's, where navigational abilities can be compromised early on. With such a huge number of people participating in Sea Hero Quest, this really is only the beginning of what we might learn about navigation from this powerful analysis," said Tim Parry, Director at Alzheimer's Research UK, which funded the analysis.

More information: Antoine Coutrot et al, Global Determinants of Navigation Ability, *Current Biology* (2018). [DOI:](#)

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