

Human behavior is 93 percent predictable, research shows

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Distinguished Professor of Physics Albert-László Barabási's findings are published in the current issue of *Science* magazine Photo by Craig Bailey

(PhysOrg.com) -- Human behavior is 93 percent predictable, a group of leading Northeastern University network scientists recently found. Distinguished Professor of Physics Albert-László Barabási and his team studied the mobility patterns of anonymous cell-phone users and concluded that, despite the common perception that our actions are random and unpredictable, human mobility follows surprisingly regular patterns. The team's research is published in the current issue of *Science* magazine.

“Spontaneous individuals are largely absent from the population. Despite the significant differences in travel patterns, we found that most people are equally predictable,” said Barabási, who is also director of Northeastern's world-leading Center for [Complex Network](#) Research.

“The predictability represents the probability we can foresee an individual's future whereabouts in the next hour based on his or her previous trajectory.”

Barabási and his team also discovered that regardless of the different distances people travel, the 93 percent predictability remains true both for those who travel far distances on a regular basis and for those who typically stay close to home.

“We tend to assume that it’s much easier to predict the movement of those who travel very little over those who regularly cover thousands of miles,” said Chaoming Song, PhD of the Center for Complex Network Research and lead author of the paper “Yet, we have found that despite our heterogeneity, we are all almost equally predictable.”

The researchers were also surprised to find that the regularity and predictability of individual movement did not differ significantly across demographic categories, including age, gender, language groups, population density, and urban versus rural locations.

In earlier research on human [mobility patterns](#), published in a 2008 issue of *Nature* magazine, Barabási and his team studied the real-time trajectory of 100,000 anonymous cell-phone users (randomly selected from more than 6 million users) and found that, despite the diversity of their travel history, humans follow simple reproducible patterns.

“While most individuals travel only short distances and a few regularly move over hundreds of miles, they all follow a simple pattern regardless of time and distance, and they have a strong tendency to return to locations they visited before,” explained Barabási.

In this current project, the network scientists studied three months of anonymous cell-phone data capturing the mobility patterns of 50,000

users chosen randomly from a pool of 10 million.

“We now know that when it comes to processes driven by human mobility—such as epidemic modeling, urban planning, and traffic engineering—it is scientifically possible to predict people’s movement and positively impact how societies address public health and urban development,” added Song.

Additional coauthors on the paper, titled “Limits of Predictability in [Human Mobility](#),” are Zehui Qu and Nicholas Blumm, both doctoral candidates in the Center for Complex Network Research.

More information: Limits of Predictability in Human Mobility, *Science*, [DOI:10.1126/science.1177170](https://doi.org/10.1126/science.1177170)

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