

Mobility behavior may be the key to predicting, promoting individual well-being

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Credit: Matheus Bertelli from Pexels.com

DSI postdoctoral fellow Sandrine Müller uses smartphone sensor data to study human behavior.

A research team led by Müller, a Data Science Institute postdoctoral research fellow, and Heinrich Peters, a Columbia Business School (CBS) doctoral candidate, has linked mobility behavior to well-being by exploring associations between different kinds of mobility behaviors (e.g., time spent in transit, number of locations visited, and total distance covered) and several indicators of well-being (e.g., depression, loneliness, and stress).

Müller, Peters, and their co-authors, including Sandra Matz, David W. Zalaznick Associate Professor of Business at CBS; Wang Weichen, a Two Sigma quantitative researcher; and Gabriella Harari, an assistant professor of communication at Stanford University, published their findings in a special issue on behavioral personality science in the age of big data of the *European Journal of Personality*.

To examine the links between mobility behaviors and well-being, Müller, Peters, et al., examined questionnaire and GPS data from 2,319 psychology students from a large university in the United States. At the beginning of the study, the researchers collected students' reports of their general levels of loneliness and depression. Additionally, students used their smartphones to answer questions about their anxiety, affect, stress, and energy four times a day over the course of the next two weeks.

One unique aspect of the study is that Global Positioning System (GPS) data were also collected during this time. The GPS data were transformed into several measures of mobility behaviors, which were condensed into three broad types of mobility patterns: distance (behaviors related to the distance a person traveled), entropy (the distribution of time a person spent in different places), and routine (the regularity of a person's mobility patterns).

"After linking these mobility patterns to participants' well-being scores, we found that mobility was related to well-being on the daily level, as

well as on the level of an aggregate across the study period," Müller said. "This demonstrates that mobility behavior is not only important for understanding how people feel on a particular day, but may also predict how they feel across a longer time."

Distance and entropy specifically related to time spent in social places were related to more positive well-being. Routine behaviors were related to depression and loneliness. Taken together, these findings show that individuals' mobility [behavior](#) may indeed be useful in predicting their well-being.

"While it was not something our study was aiming to do, I think it definitely gives ideas for future studies on interventions and real-world applications," Müller said. "There's potential for learning individual patterns and showing that on the days where people go to certain places, they feel better. By giving them suggestions to try certain things, we can try to make them feel better."

More information: Sandrine R. Müller et al. Investigating the Relationships Between Mobility Behaviours and Indicators of Subjective Well-Being Using Smartphone-Based Experience Sampling and GPS Tracking, *European Journal of Personality* (2020). [DOI: 10.1002/per.2262](#)

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