Your circle of friends, not your Fitbit, is more predictive of your health

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Student Union Outdoor Fun on Quad. Credit: Barbara Johnston/University of Notre Dame

Wearable fitness trackers have made it all too easy for us to make assumptions about our health. We may look to our heart rate to determine whether we really felt the stress of that presentation at work this morning, or think ourselves healthier based on the number of steps we've taken by the end of the day.

But to get a better reading on your overall health and wellness, you'd be better off looking at the strength and structure of your circle of friends, according to a new study in the Public Library of Science journal, *PLOS ONE*.

While previous studies have shown how beliefs, opinions and attitudes spread throughout our social networks, researchers at the University of Notre Dame were interested in what the structure of social networks says about the state of health, happiness and stress.

"We were interested in the topology of the social network—what does my position within my social network predict about my health and well-being?" said Nitesh V. Chawla, Frank M. Freimann Professor of Computer Science and Engineering at Notre Dame, director of the Interdisciplinary Center for Network Science and Applications and a lead author of the study. "What we found was the social network structure provides a significant improvement in predictability of wellness states of an individual over just using the data derived from wearables, like the number of steps or heart rate."

For the study, participants wore Fitbits to capture health behavior data—such as steps, sleep, heart rate and activity level—and completed surveys and self-assessments about their feelings of stress, happiness and positivity. Chawla and his team then analyzed and modeled the data, using machine learning, alongside an individual's social network characteristics including degree, centrality, clustering coefficient and number of triangles. These characteristics are indicative of properties like connectivity, social balance, reciprocity and closeness within the social network. The study showed a strong correlation between social network structures, heart rate, number of steps and level of activity.

Social network structure provided significant improvement in predicting one's health and well-being compared to just looking at health behavior

data from the Fitbit alone. For example, when social network structure is combined with the data derived from wearables, the machine learning model achieved a 65 percent improvement in predicting happiness, 54 percent improvement in predicting one's self-assessed health prediction, 55 percent improvement in predicting positive attitude, and 38 percent improvement in predicting success.

"This study asserts that without social network information, we only have an incomplete view of an individual's wellness state, and to be fully predictive or to be able to derive interventions, it is critical to be aware of the social network structural features as well," Chawla said.

The findings could provide insight to employers who look to wearable fitness devices to incentivize employees to improve their health. Handing someone a means to track their steps and monitor their health in the hopes that their health improves simply may not be enough to see meaningful or significant results. Those employers, Chawla said, would benefit from encouraging employees to build a platform to post and share their experiences with each other. Social network structure helps complete the picture of health and well-being.

"I do believe these incentives that we institute at work are meaningful, but I also believe we're not seeing the effect because we may not be capitalizing on them the way we should," Chawla said. "When we hear that health and wellness programs driven by wearables at places of employment aren't working, we should be asking, is it because we're just taking a single dimensional view where we just give the employees the wearables and forget about it without taking the step to understand the role social networks play in health?"

More information: Suwen Lin et al. Social network structure is predictive of health and wellness, *PLOS ONE* (2019). DOI: 10.1371/journal.pone.0217264

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