- Respiration

Health

How you breathe could reveal a lot about your health

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SANDY HUFFAKER/CORBIS VIA GETTY IMAGES

Breathing exercises could help treat health conditions

FORGET facial recognition – there could be a new way to identify you. Researchers have discovered that we all seem to have a "respiratory fingerprint", a unique way of breathing that could revolutionise how we diagnose and treat various health conditions.

The breakthrough comes from Timna Soroka at the Weizmann Institute of Science in Israel and her colleagues, who have developed a wearable device that captures the subtle nuances of how we breathe.

The idea that breathing patterns contain health information isn't new. But without a wearable device that could record nasal breathing data as a person moves around, research was limited to data collected from hospital patients, who tend to have their breathing monitored for less than an hour.

To get around this, Soroka and her colleagues created a wearable device and gave it to 97 people who wore it for 24 hours. They then trained an algorithm to recognise unique combinations of 24 parameters – everything from the volume of air breathed in to how often breath-holding occurred. The algorithm could identify the participants with almost 97 per cent accuracy, and this signature remained stable over a two-year follow-up period (*Current Biology*, doi.org/prkr).

Nevertheless, "don't expect to have a nasal airflow recording next time you go to the bank", says team member Noam Sobel, also at the Weizmann Institute. The goal isn't to use the device for biometrics, he says, but for valuable health information.

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For instance, a person's body mass index (BMI) could be predicted by a combination of parameters of the nasal cycle, the rhythm in which each nostril alternates between being more or less open than the other.

This cycle is governed by the balance of your sympathetic nervous system, which prepares the body for a "fight or flight" response, and the parasympathetic system, which calms the body, says Sobel. "So by measuring airflow in your nostrils, you're actually gaining a measure of your sympathetic arousal, and that seems to be a predictor of BMI."

This raises an intriguing possibility, says Sobel: rather than weight gain causing breathing changes, could breathing patterns influence weight? "If that's true, we'll find the breathing pattern that makes you thin and our whole group will retire and go live on an island," he says.

The respiratory data also revealed correlations between aspects of breathing and levels of anxiety and depressive symptoms, such as people with high levels of depressive symptoms inhaling faster.

The team is now investigating whether breathing patterns actually cause these symptoms, to see whether they can be used to diagnose some common mental health conditions, which could then potentially be treated via breathing exercises.

"It's not hard to imagine a future where every patient is given a nasal airflow monitoring device that tracks treatment, provides feedback and predicts outcomes for a range of disorders," says Torben Noto at Osmo in New York, an AI firm aiming to give computers a sense of smell. "It has the potential to have a huge impact on human health." Noto came up with the 24 breathing metrics the team used, but wasn't involved in the study. ▮

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