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What your voice can reveal about your health

Scientists say the way you talk could help diagnose a range of conditions, from heart disease to Parkinson's — and can also show how fertile you are!

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Too loud, too common, too posh, too mousey? Some of us may fret about what our voice says about us. But soon it may be a life-saver, giving doctors vital clues as to whether we are at risk of parkinson's, heart disease or even alzheimer's.

in the latest breakthrough, doctors have used short recordings of speech to assess if people are at risk of a heart attack caused by clogged arteries.

Cardiologists at the Mayo Clinic in the u.S. told the american College of Cardiology conference last month how their study of more than 100 patients showed that an artificial-intelligence computer programme can accurately predict coronary artery disease — a build-up of plaque in the heart's arteries — by analysing three 30-second clips of patients' voices.

the computer was fed 10,000 voice samples from patients with coronary artery disease. From these, it learnt to detect problems from 80 tell-tale features of the patients' voices, such as changes in frequency, pitch, volume and phrasing that are so subtle they can't be picked up by the human ear.

the 108 patients in the study, all due to undergo a coronary angiogram (an X-ray that assesses the condition of the heart's arteries), were asked to record samples of themselves reading a prepared text.

those which the computer algorithm scored as 'high risk' for heart disease also had angiograms suggesting they were more than twice as likely to suffer heart problems than those scored as 'low risk'.

over the next two years, nearly 60 per cent of high-risk patients were admitted to hospital for chest pain or heart attacks, compared with 30 per cent of those with a low-risk speech.

SCieNtiStS aren't sure why certain voice features may indicate heart disease. one theory is that it's to do with the autonomic nervous system — the part that controls bodily processes we don't consciously think about, including heart rate and speech.

Since the same system controls both these functions, it is possible that problems with the heart somehow send subtly audible ripples through our speech.

a similar system is being piloted in the Netherlands to detect early signs of dementia. the project, at the alzheimer Centre amsterdam, is asking older people to record their voices on smartphones and send them in for analysis by a computer algorithm.

the algorithm picks up subtle changes in pitch, clarity and linguistic habits, such as using only simple verbs and making slight mispronunciations, which can be some of the very early indicators of dementia.

Meanwhile, researchers in Italy are using voice algorithms to detect Parkinson's disease — already known to cause hypokinetic dysarthria, where speech is soft, monotone and lacks articulation.

In February, scientists in Rome reported in the journal *Frontiers in Neurology* how their study of more than 200 older people showed the computer algorithm could detect the disease even in people yet to show symptoms.

John Rubin, a consultant ear, nose and throat surgeon and head of the voice disorders unit at University College London hospitals NHS Foundation Trust, says voice research has great potential.

'People have been interested in using the voice to make diagnoses for a long time,' he says. 'Since the 1970s, research has identified that people can reasonably well identify how old someone is from hearing them speak. It's where this type of research started.'

A 2016 study at Nottingham Trent University found that most people can decode clues about others' health, height and age — all from listening to their voices. Researchers said voice analysis may be an evolutionary trait to help us choose a suitable mate.

The voice may even give clues to a woman's fertility, according to a 2019 study at James Madison University in Virginia, published in *Evolutionary Psychology*.

It recorded women counting from one to ten once a week for four weeks, and played them to male volunteers. The voice of a woman at peak fertility was perceived to be so sexy that the sound of her merely counting out numbers caused male listeners' testosterone levels to rise.

Dr Melanie Shoup-Knox, a psychologist who led the study, says there may be a physical explanation for subtle fertility-related changes in female speech.

'The larynx is particularly sensitive to sex hormones,' she says. 'These may promote or obstruct vocal clarity, depending on the level of hormones.'

Speaking clearly may also make a woman more attractive, according to scientists from the University of California, Irvine and the University of Utah, who found that men rated women's voices as 73 per cent more attractive if they enunciated with a high degree of intelligibility.

But this only works with women, says Dr Daniel Stehr, a psychologist who co-authored the study. Men, he says, can get away with mumbling, and poor diction may even make them sound more attractively masculine.

And while a deep voice in a man might be perceived as sexually attractive, research suggests it bears little relation to fertility.

'On the contrary, men whose voices were rated as more attractively low tended to have lower concentrations of sperm in their ejaculate,' evolutionary biologists at the University of Western Australia warned in the journal *PLoS One* in 2011.

Regardless of whether you're a tenor or bass, articulate or mumbly, the past two years of pandemic lockdowns and social isolation have wreaked havoc with our voices, say researchers from Trinity College Dublin.

They surveyed 1,575 people on the number of times they had suffered from a hoarse voice or vocal tract discomfort since the first coronavirus lockdown.

Writing in the *Journal of Voice* at the end of 2020, they blamed a huge increase in the use of video calls on the fact that 85 per cent of respondents had complained of sore throats and hoarseness since the pandemic had begun.

As Mr Rubin explains: 'Since the start of the pandemic, many of us have come to rely on Zoom or suchlike to communicate. We are talking to each other from rooms with differing acoustics. This makes things sound different so we may strain our voices to talk louder.'

'We're also often sitting slumped and leaning towards the computer, which is not good posture and can have an impact on the health of our voices. If we want to look after our voices, the answer is to stay physically fit, by doing something such as taking a brisk walk three or four times a week.'

'What we eat and drink is important, too. Acid reflux can cause damage to your vocal cords, so if this is a problem, it is best not to eat spicy, fatty foods. And we need to keep ourselves hydrated, with two to three litres of liquid a day, consumed steadily over that time.'