- Faculty ExpertsNews by

Research casts doubt on voice-stress lie detection technology

By Gerry Everding

Click here to read the PDF of the entire article

Feb. 10, 2004 — Voice-stress analysis, an alternative to the polygraph as a method for lie detection, is already widely used in police and insurance fraud investigations. Now, however, it is being touted as a powerful and effective tool for an array of new applications — everything from the screening of potential terrorists in the nation's airports to catching wayward spouses in messy marital disputes.

Despite its booming popularity, a number of federally sponsored studies have found little or no scientific evidence to support the notion that existing voicestress technologies are capable of consistently detecting lies and deceptions.

"We tested one of the more popular voice-stress lie detection technologies and got dismal results, both in the system's ability to detect people actually engaged in deception and in its ability to exclude those not attempting to be deceptive," said Mitchell S. Sommers, an associate professor of psychology in Arts & Sciences at Washington University in St. Louis."In our evaluation, voice-stress analysis detected some instances of deception, but its ability to do so was consistently less than chance — you could have gotten better results by flipping a coin," Sommers said.

Sommers' research was supported by and conducted in conjunction with the Department of Defense Polygraph Institute (DODPI), located in Fort Jackson, S.C. Findings were presented at the World Congress of International Conference of Psychophysiology in July 2002. An academic paper on the study is under review for journal publication.

Sommers' study assessed the ability of Vericator, a computer-based system that evaluates credibility through slight variations in a person's speech, to detect deception in a number of different scenarios. Participants were questioned using different forms of interrogation and under conditions inducing various levels of stress. In one scenario, for example, participants were questioned about a mock crime that they had witnessed but voice analysis correctly identified deception in only about 24 percent of individuals who were being deceptive. It also incorrectly identified deception among 18 percent of non-deceivers. In another experiment, Sommers induced high levels of stress by having participants play a video game that got increasingly difficult. Although none of the participants in this study were deceptive, Vericator still indicated that about 20 percent of the individuals were lying.

"Voice-stress analysis is fairly effective in identifying certain variations in stress levels in human speech, but high levels of stress do not necessarily correlate with deception," Sommers said. "It may someday be possible to refine voicestress analysis so that it is capable of distinguishing among various sources of stress and accurately identifying those that are directly related to deception. However, all the research that I've seen thus far suggests that it's wishful thinking, at best, to suggest that current voice-stress analysis systems are capable or reliably detecting deception."

In theory, voice-stress analysis works by measuring slight inaudible fluctuations in the human voice known as "micro-tremors." Voice-stress analysis systems, which generally include a microphone, tape recorder and related computer analysis equipment, are designed to recognize micro-tremor patterns that indicate when a speaker delivers words under stress, and specifically when those moments of stress are generated by an attempt to lie or deceive. Voice patterns are analyzed, graphed and displayed on a computer screen.

Various distributors of voice-stress analysis systems suggest that recent advances in the technology, such as layered voice-stress analysis, have elevated voice-stress lie detection to new levels of dependability and effectiveness. Some suggest that the dismal performance of voice-stress analysis lie detection in recent federal studies can be attributed to improper test conditions or to tests being conducted using outdated and inferior versions of the technology. Still, while many governmental investigative, military and law enforcement agencies have expressed an eagerness to find a credible new means of lie detection, study after study has failed to yield strong scientific evidence in support of the technology.

Other reports, research on validity of voice-stress analysis lie detection:

"A review of the literature revealed that there have been no scientific studies conducted, to date, to measure the validity of the computer stress analyzed to detect deception," concluded a November 2003 study by the Virginia Department of Professional and Occupational Regulation. "It has been argued that the computer stress analyzer is more cost effective,

convenient, and more user friendly than the traditional polygraph equipment, however, one question still remains unanswered: how reliable is the equipment in its actual ability to detect, measure, and display changes in voice frequency? Has it ever been scientifically measured? The answer to this question is 'no.'"

Similar conclusions were reached in "Voice Stress Devices and the Detection of Lies," an overview of current voice-stress technologies written by Donald J.Krapohl, Andrew H. Ryan and Kendall W. Shull; and published in Policy Review, the official publication of the International Chiefs of Police National Law Enforcement Policy Center. The American Polygraph Association offers an online overview on understanding "Truth v. Myth" when it comes to comparing voice stress and polygraph technologies.

Selected news coverage of voice-stress lie detection technologies/controversies:

"Called Ex-Sense Pro, the V software measures voice for a variety of parameters including deception, excitement, stress, mental effort, concentration, hesitation, anger, love and lust," according to a Jan. 16, 2004, article in the engineering trade journal EE Times. "It may sound like a joke from a secret agent television parody like 'Get Smart' or an Austin Powers movie, but the time has arrived for 'Voice Analysis Eyeglasses.' And it's no laughing matter," according to a Jan. 25, 2004, article on the Israeli21c news site. An Associated Press story from the Las Vegas Consumer Electronics show suggests the "truth specs" will be available in early 2004 at a cost of $400-$500.

Voice-stress analysis technology, an anti-fraud weapon said to be used in secret by some U.S. insurers, may soon get a public debut in New Mexico, according to an article in the Oct. 20, 2003, issue of National Underwriter, an insurance industry trade journal. Daniel Hays, associate editor, reports that the state superintendent of insurance is considering the use of voice-stress analysis in a national center processing insurance claims.

"Police Use of Voice Stress Analysis Generates Controversy," by Margie Wylie, Newhouse News Service. "Court TV's" Christina Lewis asks: "Is this lie detector telling the truth?" A Jan. 10, 2004, newspaper article in the North California Times suggests voice-stress analysis offers a low-cost option for settling marital disputes. The article reports that a Chicago-based company has sold more than 5,000 "Handy Trusters" in the past year, although a spokesman for the company couldn't identify any scientific research that has been conducted to verify the company's claim of an "84 percent accuracy rate." An online version of this news article carried a related advertisement for "Truster Lie Detector, Free shipping anywhere in the world, Portable and Accurate: http://trusters.com."

"A company called V-Entertainment is bringing voice-analysis technology to consumers. It's a technology that's been used in the security and defense fields for some time, but now it's available to you and me," according to an online news report by KLAS-TV, Las Vegas, Nev.