

Charlatanry and fraud – an increasing problem for forensic phonetics?

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In my talk I will describe one case of charlatanry and one case of fraud in forensic phonetics. Charlatanry can take different forms. One type is when someone appears as an expert without having the necessary qualifications or no qualifications at all. Another form is when some kind of physical device is used or marketed which is based on principles for which there is no scientific support. This is nothing new. The use of voiceprints is a classical case of this type. Charlatans often exploit the fact that people are easily impressed by advanced technology. Today the methods are often claimed to have been made possible only because of recent advances in computer technology. The following two quotes may serve to illustrate my point: “enhanced by the rapid advancements in personal computer technology”, “the worlds most advanced application of this core frequency based technology”. This is how both products I will present here are described by those who market them although in reality they are very unsophisticated products from a technological point of view. By fraud I will refer to methods or devices based on principles which are so obviously false that there can be no doubt that the people who produce them or use them must be aware of it. The second example is of this kind.

A lie detector which can reveal lie and deception in some automatic and perfectly reliable way is an old idea we have often met with in science fiction books and comic strips. This is all very well. It is when machines claimed to be lie detectors appear in the context of criminal investigations that we need to be concerned. Both examples presented here belong in this category. They are of particular interest for forensic phonetics because they are both said to be based on analysis of the human voice. The basic idea behind “lie detectors” based on voice analysis is that there are properties in the voice signal that may be reliably correlated with lie or deception.

A gadget called Voice Stress Analyzer (VSA) or Psychological Stress Evaluator (PSE) has a history that goes back to the seventies. In the sixties it was discovered that in larger muscles like the biceps there is involuntary tremor, called micro tremor, with a frequency in the 8 to 12 Hz range. This gave rise to speculations that the same phenomenon might be present in the larynx muscles and that it may affect the voice source frequency. In particular it was suggested that the tremor might vary as a function of stress in the speaker. Before anybody had a chance to investigate the possible occurrence of micro tremor in the voice, the first “lie detector” based micro tremor in the voice source appeared. (See. Rice, 1978). In the years to follow, many researchers tested voice stress analyzers based on these ideas, but with largely negative results. Hollien surveyed the literature in 1987 and concluded that: “the ability of voice analyzers to detect stress from speech–or to identify spoken deception–have been negative or “mixed” in nature”. He also performed tests of his own, using commercial voice analyzers which turned out to perform at chance level: “stress/nonstress identifications occurred only at chance levels; the lie/nonlie identification scores were quite similar”. But the most decisive blow to the whole concept came much earlier. Already in 1981 Shipp and Izdebski published results from experimental study where they used hooked-wire electrodes inserted into the larynx muscles in order to investigate the possible occurrence of micro tremor, but no micro tremor patterns at all were found. So the whole idea is based on the variation of something that does not even exist. Nevertheless products based on the idea of micro tremor are still marketed and are used by private detectives and, perhaps more alarmingly, by some 1300 police departments in the US. Given the non-existent scientific basis underlying these gadgets one feels justified to call the use of them charlatanry.

An Israeli based company markets the most wonderful tools including both lie detectors and love detectors. The technique behind the lie detector is said to be something called Layered Voice Analysis (LVA) and the assumption is that

every “event” that passes through the brain will leave its “finger prints” on the speech flow. LVA Technology ignores what your subject is saying, and focuses only on his brain activity. In other words, the “how” it is said is crucial and not the “what”.

They are careful not to explicitly call the gadget “lie” detector, but there is absolutely no question that that is what they want us to believe it is:

LVA is capable of detecting the intention behind the lie, and by so doing can lead you in identifying and revealing the lie itself”.

As any one with even the slightest knowledge of voice analysis will know, there is not a shred of evidence for a relationship between voice and brain activity of the proposed kind. And a thorough scrutiny of the description of the method in the American patent documents confirms the suspicion that the method is pure nonsense, perhaps best described as statistics based on digitization artefacts. You would think that a company that markets brain finger-printers and love detectors would give rise to suspicion or at least caution in prospective customers, but that does not in general seem to have been the case. The company is a million dollar business with among others some UK and US insurance companies as customers. There are also reports that its products are used by police departments in the US and perhaps elsewhere.

We may learn something from earlier experience, namely that there is a certain danger in completely ignoring charlatans. Laymen may wrongly interpret the silence as acceptance no matter how outrageous, even ridiculous, the claims may seem to an expert in the field. On the other hand it can be quite time consuming to expose them, time that will have to be taken from other, scientifically more important things. This is a dilemma we must come to grips with.

References

- Hollien, H., L. Geison and J.W. Hicks Jr. (1987). Voice stress evaluators and lie detection. *Journal of Forensic Sciences*, **32**, 405–418.
- Liberman, A. (2003). Apparatus and methods for detecting emotions. *United States Patent, Patent No.: US 6,638,217 B1, Date of Patent: Oct. 28, 2003.*
- Rice, B. (1978). The new truth machines. *Psychology Today*, **12**, 61–78.
- Shipp, T. and K. Izdebski (1981). Current evidence for the existence of laryngeal macro-tremor and micro-tremor. *Journal of Forensic Sciences*, **26**, 501–505.