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The Art of Deception: Polygraph Lie Detection

By Michael Lawrence Langan, M.D.

"I'd swear to it on my very soul, If I lie, may I fall down cold."

- Rubin and Cherise
(Hunter/Garcia)

The accuracy of polygraphic lie detection is slightly above chance. Nevertheless, State and local police departments and law enforcement agencies across the United States are devoted proponents of this unscientific and specious device. In addition, the American public seems to lend an implicit credence to the "lie detector" as evinced by its ubiquitous use on television crime shows and in "whodunit" literature. It is given overt attributions of credibility on tabloid type talk shows and news shows. For example, in the highly publicized case of Tonya Harding a reporter stated, not with removed objectivity but with sardonic grin and mocking emphasis, that the accused had failed two polygraph tests. The implied assumption is that if the person has failed the polygraph test, then therefore he or she is guilty regardless of other evidence. Bottom line. *Culpa ex machina*. End of story.

Lie detection by the polygraph is based on the premise that the act of telling a lie causes specific, universal, and reproducible physiological responses as manifested by the autonomic nervous system. (Saxe, 1991) These physiological responses, which are largely outside the influence of voluntary control, are then measured by the polygraph instrument. The polygraph itself is simplistic in design. It consists of several devices which are attached to the subject to record blood pressure, pulse, respiration, and galvanic skin response (which is related to perspiration). The results are then recorded on a moving paper by a "kymograph." Hence any change of one of the autonomic nervous system variables will be recorded on the paper as a change from baseline. The polygraph examiner then interprets the tracing. A characteristic change from baseline on a relevant question is interpreted as a lie.

In fact, the polygraph test does measure autonomic nervous system activity. The role of the autonomic nervous system with its sympathetic and parasympathetic branches is well defined within the field of medicine, and was well described by the French physiologist Claude Bernard over a century ago. The primary role of the autonomic nervous system is to maintain bodily homeostasis to allow the individual to exist in a changing

environment.

Simplistically described, the autonomic nervous system is a part of the peripheral nervous system which consists of a variety of outgoing nerve pathways that regulate important physiological functions generally outside of voluntary and conscious control. Thus, respiration, body temperature, heart rate, digestion, sweating, and blood pressure are all, partly or entirely, regulated by the autonomic nervous system. It is divided into sympathetic and parasympathetic branches which have contrasting functions in terms of effect. The sympathetic branch increases heart rate, respiratory rate, blood pressure, and perspiration. It is active at all times but varies with the constantly changing environment, and is especially active during rage or fright and prepares

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the body for the so called "fight or flight" phenomenon. Many of these reactions are caused by the release of epinephrine. The parasympathetic nervous system, on the other hand, is primarily involved with conservation and restoration. It is the sympathetic branch of the autonomic nervous system that the polygraph measures in terms of its activity. Thus, from a medical perspective it is entirely valid that the polygraph will accurately measure sympathetic nervous system activity with its instrumentation.

The false assumption of the polygraph test is that dishonesty is the sole cause of sympathetic arousal during a polygraph examination. Deception is a cognitive phenomenon that cannot be measured. Indeed, throughout the entire history of medicine there has not

been a single scientific study that demonstrated evidence that a cognitive phenomenon (such as love, hatred, truth, altruism, jealousy) could be measured. Since, in the complex realm of truth and deception, there is no known physiological response that correlates with lying, then there is no validity to the test. Although the act of lying can elicit fear and anxiety via the sympathetic nervous system, so can multiple other confounding and complex emotional factors including stress, embarrassment, anger, and fear. "Deception itself cannot be measured directly." (Steinbrook, 1992) In addition, each individual differs in autonomic lability. Some people stay calm with a gun at their head. While others get autonomically excited, with heart thumping and palms sweating at simply shaking someone's hand.

In reality, the examination itself is inherently designed to elicit fear and anxiety. It is an interrogation. If this fear and anxiety are recorded on a relevant question, then you have failed that question according to the polygraph "experts."

The polygraph technique begins with a pre-test. After a sixth-grade level lecture on the nervous system and a proclamation of the tests infallibility, the examiner will go over all of the questions that have been formulated.

These questions consist of control questions, relevant questions, and irrelevant questions. The subject will then be attached to the polygraph equipment and the formal testing begins.

The most crucial questions on the polygraph examination, or "Control Question Test," are the control questions and relevant questions. The control questions are garnered from the suspect by asking him an innocuous question which could not be truthfully denied. For example, "Have you ever thought of hurting someone?" or "Have you ever lied to anyone?" The responses to the control questions will elicit some degree of autonomic activity which can then serve as a baseline for which to compare subsequent questions. The relevant questions pertain to the actual investigation at hand. The magnitude of responses to relevant questions and control questions as compared with the irrelevant questions is then interpreted, in a non-blinded manner, by the examiner. The assumption is, that if you are prevaricat-

ing, the relevant questions will cause a greater response than the control questions. So if the question "Have you ever been late for an appointment?" (control question) elicits less of an emotive response on the polygraph equipment than "Did you murder and rape your girlfriend?" (relevant question) you have failed the test. And, according to the American Polygraph Association (APA) you are lying. Assuming the subject is innocent, it is fairly obvious that he would respond with more emotional autonomic activity to a question regarding a recently deceased loved one than he would an inquiry about punctuality. Obvious to everyone, that is, but the APA.

The APA is a professional organization for polygraph examiners who have complete faith in the accuracy of the test. They have their own trade journal *Polygraph* in which they report scientifically worthless studies and brandish anecdotes of the wonders of their trade. The majority of these members can pride themselves on completing a 6 week to 6 month post- high school training course in the art of polygraphy. They have no formal training in medicine, psychology, physiology, or behavior; the very disciplines on which the testing is based. The majority of them cater to the legal system wherein their economic livelihood depends.

Since they are primarily paid to identify guilty suspects, motivational factors may play a part in their eagerness to find the guilty suspect. (Kleinmuntz, 1987)

The accuracy of any test is determined by that tests sensitivity (ability to find a positive) and specificity (ability to find a negative). A polygraph examiner will ardently tell you that the exam has somewhere in the neighborhood of a 95% sensitivity rate. This means that if 100 guilty suspects are given a polygraph exam, 95 of them will be detected through the test. Only five of the 100 will be a false negative and not be detected by this miraculous method. Likewise they will claim a similar specificity rate, and state that if you are telling the truth then you have almost a 100% chance of being cleared by the test. John Reid, the inventor of the Control Question Test claimed 99% accuracy. (Reid and Inbau, 1977)

This is clearly not accurate. The polygraph was not subjected to much critical and scientific investigation until the last two decades. (Saxe, et. al., 1983) Since this time there have been a number of studies of sound scientific design and methodology which clearly refute the high specificity and sensitivity that the polygraph advocates claim. These studies have appeared in reputable peer-reviewed journals and not trade publications. Horvath, for example, reported

a sensitivity of 76 percent and a specificity of 52 percent. (Horvath, 1977) This means that out of 100 liars 76 of them will be detected by the polygraph. What is astonishing though is the specificity of 52 percent. This means that out of 100 people who are not lying, 52 will be identified as telling the truth while 48 of the honest individuals will be branded as liars. The odds are similar to that of a coin toss which would have a specificity of 50 percent. Barland and Raskin's study actually demonstrated a specificity of 45%. Worse than a coin toss. (Barland and Raskin, 1976) Multiple other studies have shown similar results. (Brett, et. al., 1986, Kleinmuntz and Szucko, 1984, Lykken, 1984).

The polygraph examiner likens his "skill" to that of the radiologist reading a chest X-Ray or a cardiologist interpreting an EKG. (Barefoot, 1974) This analogy is not only ridiculous but, in fact, if a medical test had a similar sensitiv-

"It is astounding that the criminal justice system has institutionalized and perpetuated a so-called "technology" that lacks scientific evidence and is in fact rejected by the scientific community."

ity and specificity to that of the polygraph examination it would simply not be used in the field of medicine. They will cite the fact that the polygraph has been used in the United States for greater than 70 years as if longevity is directly related to validity. They will state that they have personally administered hundreds or thousands of these tests, and have almost never been wrong, as if total number of tests given constitutes accuracy.

They are so convinced of the accuracy of the polygraph that they regard opponents of polygraphy as communists and do-nothing professors. (Arther, 1986) It doesn't occur to them that someone with a Ph.D. and years of research experience, in the very subjects they ignorantly dabble in, may know something more than they do.

It is astounding that the criminal justice system has institutionalized and perpetuated

a so called "technology" that lacks scientific evidence and is in fact rejected by the scientific community. It is as ludicrous as procuring the so called "love meter" machine from the amusement park which measures galvanic skin response and placing it in the courtroom. But in a backward legal system which has been known to use psychics to help with unsolved murders and has allowed the mentally retarded to serve as jurors, it is not entirely surprising. The tool is useful to them, however, in that 25 to 50 percent of examinees will, under the tense psychological pressure of the exam, confess to the misdeed at hand. (Lykken, 1981, Lykken, 1991) Persuaded that they have been proven dishonest by "scientific" means they give up hope. It is usual for the polygraph examiner to interrogate the subject who has failed the test. They will state that there is no way now to deny the objective guilt demonstrated by this impartial and unbiased scientific device, and that the only available option is to confess.

The assessment by the polygrapher is genuinely convincing because, sadly, he believes it himself. Thus the instrument is clearly useful as a confession inducing device. One wonders, over the past 70 years, how many false confessions have been obtained in this way from innocent persons.

In summary, the polygraph is a ludicrous implementation of pseudo-science at its worst. The members of the APA are non-scientists practicing science, and the consequences are often dire. Lykken reports the cases of three men who were convicted of murder largely due to the polygraph examiners testimony that in their "expert opinion" they had failed the test. All three were subsequently found to be innocent. (Lykken, 1991) Polygraph examiners ignore such cases or rationalize that they are due to the rare incompetence of some examiners.

The continued use of polygraphic lie detection has the potential to cause much harm to those who are judged dishonest by its results. The specificity and sensitivity are not dissimilar to that of a coin toss. Innocent suspects have about a 50/50 chance. One failure is all it takes to ruin your life. Since the 1923 Federal Court decision of *Frye vs United States* (293 F 1013 [DC Cir 1923]), polygraph evidence has not been admissible in federal court cases because there was deemed a lack of scientific validity to the test. This travesty however is still used widely by the state court system. Furedy characterizes the continued use of polygraphy as a serious

"social disease." (Furedy, 1987) State laws regarding abuse of the polygraph must change, and it is time for the medical and scientific communities to educate lawmakers and policy makers about the true validity of this perversion of science. It must be forever banished to the same realm of parapsychology as the Ouija Board, phrenology, and palmistry. The relatively conservative American Medical Association's Council on Scientific Affairs recommended that the polygraph not be used in pre-employment screening and security clearance. (Council on Scientific Affairs, 1986) It is time to extend this recommendation across the board, and put the greater than 3000 anachronistic polygraph examiners in the United States out of business.

Meanwhile, if you are asked to take a polygraph test—don't do it. Those involved in the criminal justice system, including lawyers, are largely uneducated in the realm of scientific scrutiny and experimental methodology.

They may not separate science and pseudoscience, and erroneously believe that the polygraph is an accurate scientific instrument. Their interactions are with polygraph examiners who proselytize its use, and they have little or no interaction with scientists, psychologists, and physicians who refute its use. Refuse to take the test and educate them. Cite the Frye doctrine, go to the medical library, copy the scientific articles which belie its validity, and present them to whom ever requested you to take the test. State that the principles and assumptions underlying polygraphy are not supported by our understanding of psychology, neurology, and physiology. Then put the burden of proof on their heads. Tell them to present you with scientific evidence that corroborates the validity of the test. There is simply no rational basis for a machine to detect liars.

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HE HATES IT!

SO WHAT?... HERE'S WHAT THEY SAY...

DENNIS PRESTON HAS VERY SCHIZOPHRENIC MUSICAL TASTES... I COULD GO ON AND ON, BUT SUFFICE TO SAY, THIS IS ECLECTIC AND DIFFERENT DIFFERENT DOES NOT MEAN BAD, IT MEANS REFRESHING... DON'T TRY TO PIGSON HOLE IT, JUST SIT BACK AND ENJOY... RUMIC, WHITE THROES MAGAZINE!... TOYS FROM HELL FROM CHRISTEN DOMS NEWEST FURVEOR OF SANCTIFIED STRANGENESS... IF YOU CAN'T FIND SOMETHING YOU LIKE WITHIN THIS IS SONG PSYCHEDELIC METAL FOLK OF UNKOUNTRY RSTOURR, THEN THERE'S SOMETHING WRONG WITH YOUR EARS... DANNY THUEAT, I SANCTIFIED PRESS!... A MIXED BAG IN MUSICAL STYLES AND OPINIONS EXPRESSED BUT ENOUGH HERE TO KEEP YOU ENTERTAINED AND INVOLVED - DAN KENNEDY, THE CUTTING EDGE!... AS A WHOLE THIS DISC IS VERY BROAD IN THE RANGE OF MUSIC WHICH IS ON IT... PRODUCTION WISE YOU WOULD NEVER KNOW THAT IT WAS NOT A MAJOR LABEL RELEASE. TRY IT, YOU MAY JUST FIND YOURSELF ENJOYING IT. - MARK FUGS, CHRISTIAN METAL REVUE (HEY FOLKS, IT'S NOT A TOTALLY METAL ALBUM DEB)!... OVERALL, VERY GOOD. - JAM RAG!... RECORDED OVER 10 YEARS AND COMPILED OVER TWO DECADES, TOYS FROM HELL FEATURES TULCIMER AND MANDOLIN BACKED AGAINST SOME HEAVY METAL AND COUNTRY FOLK GUITAR ATTITUDES. THERE IS ENOUGH MATERIAL FOR NEARLY THREE FULL ALBUMS... - RICARDO OONEY, LANSING STATE JOURNAL!... I ENJOYED IT SO MUCH THE NEXT TIME I DO PLAY IT - IT SOMEHOW ENDS UP PLAYING AT LEAST TWICE! - PAUL BERG 192.686, JACKSON PRISON, MI!... DUCKY COOL ALBUM, DUDE!... ROBERT RUIHE, WBYU-FM, GRAND RAPIDS, MI!... ITS INTERESTING WORK BETWEEN FOLK, COUNTRY AND ROCK MUSIC... ALSO WE CAN SAY THAT MUSIC OF TOYS FROM HELL IS A LITTLE UNUSUAL FOR AMERICAN MUSIC WHICH WE CAN HEAR BEFORE - OLEG ODPRIENKO & SERGEY TISOV, RADIO DANGERINE WAVE, MOSCOW, RUSSIA!... ITS DIFFICULT TO SAY WHAT IS THE KIND OF MUSIC OF THIS CD RECORD FULL OF EXCELLENT MUSIC AND WORDS. THIS IS A VERY ORIGINAL MUSIC. SOMETIMES IT REMINDS SOME SUBLIME MISTERIUM TURNING INTO PERFECT FUN. I GUESS THE BEST WAY TO CALL IT IS "THE DEN PRESTON'S MUSIC", BECAUSE SO CALLED WE CAN'T TAKE AWAY ANYTHING OF ITS ORIGINALITY!! - MARIUSZ ORGANISCIAK, RUSH RADIO. I HAVE TO SAY THAT IT IS VERY SENSITIVE MUSIC AND MAKE WITH SENTIMENT. - JOSEF SEDLON, RADIO I, CZECHOSLOVAKIA!... I WAS SURPRISED! IT WAS PRETTY GOOD ACTUALLY. - VIDELIN TOMOV, BULGARIAN RADIO!... WE ARE SEVERAL IN THE RADIO WHO LOVE YOUR CD FOR DIFFERENT REASON. THERE ARE FULL OF REACTIONS BUT ALWAYS GOOD!... THIERRY LOSEFELD, RADIO BOOMERANG, FRANCE!...

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