

The Psychological Stress Evaluator: A Recent Development in Lie Detector Technology

For centuries people have sought an objective and verifiable means by which to differentiate truth from falsehood. Primitive societies relied upon trial by ordeal to expose liars, trusting that God would reward the innocent with victory and punish the guilty with defeat.¹ Modern means of lie detection utilize sophisticated chemical and mechanical monitoring devices to detect and accurately record stress induced physiological changes.² Such modern means of physiological lie detection are based on the theory that lying induces a psychologically stressful state which is accompanied by inevitable and observable physiological changes.³

In the late nineteenth and early twentieth centuries, pioneers in the development of the polygraph,⁴ notably Cesare Lombroso, Vittorio Benussi and Harold Burt, recognized that lying was accompanied by such observable physiological responses as changes in blood pressure, pulse rate, breathing rate, breathing amplitude and skin conductivity.⁵ From this initial research into the relationship between prevarication and these physiological responses emerged the modern polygraph.⁶ The polygraph is simply an instrument to accurately monitor these stress related physiological reactions by means of sensors attached to the person being monitored.⁷

¹H. GOITEN, *PRIMITIVE ORDEAL AND MODERN LAW* (1923); W. GIBSON, *ANCIENT MODES OF TRIAL* (1847).

²J. REID & F. INBAU, *TRUTH AND DECEPTION* 1 (1966) [hereinafter cited as REID & INBAU]. This is considered the leading work on the operation of the polygraph.

³McCormick, *Deception-tests and the Law of Evidence*, 15 CALIF. L. REV. 484, 484-85 (1926); REID & INBAU, *supra* note 2, at 1-5; Skolnick, *Scientific Theory and Scientific Evidence: An Analysis of Lie Detection*, 70 YALE L.J. 694 (1961).

⁴See REID & INBAU, *supra* note 2, at 1-3 and F. INBAU, *LIE DETECTION AND CRIMINAL INTERROGATION* 2-5 (2d rev. ed. 1948) for a discussion of the historical development of the polygraph.

⁵Trovillo, *A History of Lie Detection*, (in two parts) 29 J. CRIM. L. & CRIMINOL. 848, 30 J. CRIM. L. & CRIMINOL. 104 (1939).

⁶J. LARSON, *LYING AND ITS DETECTION* (1932).

⁷REID & INBAU, *supra* note 2, at 3-5.

Until recently the polygraph was the only instrument widely used to evaluate a subject's veracity.⁸ In 1971 a new form of lie detector, termed the Psychological Stress Evaluator (PSE), emerged from the laboratory of Dektor Counterintelligence and Security, Inc., of Springfield, Virginia. The PSE is unique in that the sole physiological parameter with which it is concerned is the human voice.

The purpose of this article is to acquaint the legal community with this new and as yet unproven⁹ lie detection instrument. In Section I the PSE is compared with the traditional polygraph in an attempt to evaluate the potential of the PSE as an investigative tool. In Section II the basic theory behind the functioning of the PSE is explored with particular emphasis being placed on the relationship between the human voice, which is monitored by the PSE, and prevarication. In Section III the propriety of admitting PSE results as evidence at trial is evaluated in light of the present state of the law regarding the admission of lie detector examinations.

I. THE PSE AS AN INVESTIGATIVE TOOL

As an investigative tool, the PSE has a number of advantages over the polygraph. The PSE analyzes a recording of the subject's voice rather than the voice itself.¹⁰ This means that the subject need not be present when the tape is analyzed on the PSE. All that is needed is a recorded voice sample.¹¹ Since a cassette tape recorder is adequate to make the voice sample,¹² the investigator enjoys considerable flexibility in his contact with the subject. The recording may be made over the telephone, radio, or television.¹³ A personal interview is not essential.

⁸R. FERGUSON, *THE SCIENTIFIC INFORMER* (1971).

⁹Most of the available information regarding the PSE is from sources with a strong financial interest in its success. Although this author believes that the PSE is proving to be a valuable and accurate investigative tool, until there are substantiating data from non-interested sources it must be regarded as an unproven instrument. See notes 106-113 and accompanying text.

¹⁰The voice is unique as a physiological medium in that, for the purpose of PSE analysis, a simply made tape recording serves "as a completely valid and comprehensive analog" of the voice itself. Training materials (undated), *The PSE-1 Psychological Stress Evaluator* at 3, released by Dektor Counterintelligence and Security, Inc., received from David Villareal, Romark Security Systems, Inc., San Marino, California, September 5, 1973 [hereinafter cited as *Materials*].

¹¹Interview with Jim Barnes, Barnes Investigation Agency, Los Angeles, California, November 10, 1973.

¹²Interview with Joseph Tomlin, Tomlin and Associates, Monterey, California, November 6, 1973. Cassette tapes must be rerecorded at a higher speed onto a Uher recorder before the tape can be played into the PSE for analysis. It is not known what effect this rerecording process has on the validity of the analysis. Letter from Gordon Barland, Department of Psychology, University of Utah, March 28, 1974 [hereinafter cited as *Barland letter*].

¹³Training materials (undated), *PSE Orientation Course* at 2, released by Dektor Counterintelligence and Security, Inc., received from Jim Barnes, Barnes Investigation Agency, Los Angeles, California, November 10, 1973 [hereinafter cited as *PSE Orientation Course*].

Another related advantage of the PSE is that external sensors need not be attached to the person being examined.¹⁴ This is in contrast to a polygraph examination in which the person being examined must be attached to the polygraph by means of external sensors.¹⁵ With most polygraph examinations the subject is placed in a specially designed interrogation room containing the polygraph instrumentation.¹⁶ A tube is wrapped snugly around the subject's chest to monitor respiration.¹⁷ His or her blood pressure-pulse reading is taken by a blood pressure cuff which remains tightly inflated on the upper arm throughout each of the numerous four to five minute interrogation periods.¹⁸ Electrodes to monitor skin conductivity are attached to the subject's hands or fingers.¹⁹ The subject must sit completely still in a straight chair with his forearms resting on "armrests" which are specially designed to detect muscle movement.²⁰

This wiring of the subject to the instrument, somewhat suggestive of being wired for electrocution,²¹ understandably makes the subject uncomfortable. This may in itself induce stress and thereby distort the examination results. The manufacturers of the PSE state that:

These requirements [surrounding the administration of a polygraph examination] . . . can be expected to induce psychological stress in the subject which, in some cases, may be as strong or stronger than the psychological stress [associated with deception] which is to be evaluated, thereby substantially reducing the validity of the examination.²²

With the PSE this potential distortion can be avoided because the subject is normally not wired to the instrument.²³ Furthermore, subjects are more likely to consent to an interview since they need not

¹⁴Materials, *supra* note 10, at 1-2.

¹⁵REID & INBAU, *supra* note 2, at 3-5; Interview with Wayne White, White Security Systems, Sacramento, California, February 26, 1974.

¹⁶REID & INBAU, *supra* note 2, at 5-10.

¹⁷REID & INBAU, *supra* note 2, at 22.

¹⁸REID & INBAU, *supra* note 2, at 23-26; Interview with Gordon Barland, Los Angeles, California, November 9, 1973. Some of the newest polygraphs employ a low-pressure cuff which uses electronic amplification to record blood pressure-pulse changes. Since this low pressure cuff does not significantly obstruct the venous return of blood to the heart, longer examinations are possible. However, even with this low pressure cuff, most polygraph examiners employ standard questioning techniques and do not utilize a longer interrogation period. Barland letter, *supra* note 12.

¹⁹REID & INBAU, *supra* note 2, at 11.

²⁰This instrumentation to detect muscle movement has been added to some polygraphs following the research of John Reid which disclosed that conscious manipulation of the voluntary muscles may mislead the operator. See Reid, *Simulated Blood Pressure Responses in Lie-Detector Tests and a Method for Their Detection*, 36 CRIM. L. & CRIMINOL. 201 (1945).

²¹Interview with Joseph Tomlin, *supra* note 12.

²²PSE Orientation Course, *supra* note 13, at 2.

²³Some PSE examiners routinely place a microphone around the subject's neck to obtain a high quality recording. Barland letter, *supra* note 12.

be "hooked-up" to an instrument.²⁴

The polygraph requires personnel trained in polygraph technique to conduct the entire operation.²⁵ Normally a polygrapher will interpret the polygraph charts at the same time he is conducting the interrogation.²⁶ In contrast, with the PSE an expert in instrument operation and chart interpretation is needed only for the final tape analysis.²⁷ Although the conclusion of the PSE analyst will be more valid if he is able to observe the interrogation of the subject,²⁸ the interrogation does not need to be performed by an expert in the operation of the PSE.

Another advantage of the PSE over the polygraph is the flexibility of potential questioning techniques.²⁹ The PSE examiner may analyze selected portions of long narrative statements for the presence or absence of stress.³⁰ With the polygraph the operator is limited to four or five minutes of examination time before he must stop to release the blood pressure cuff.³¹ During this four to five minute examination period the polygraph examiner has time to ask approximately ten questions, allowing time for the body to normalize between each response.³² Of these ten questions at least six will be irrelevant or control questions, which means that only three or four relevant questions may be asked during any period of interroga-

²⁴Interview with Joseph Tomlin, *supra* note 12; Letter from Robert Beck, Seaboard Service Systems, Inc., Detroit, Michigan, to Charles McQuiston, Dektor Counterintelligence and Security, Inc., Springfield, Virginia, April 20, 1972.

²⁵Interview with Wayne White, *supra* note 15.

²⁶Interview with Jim Barnes, *supra* note 11.

²⁷Interview with Joseph Tomlin, *supra* note 12.

²⁸Interview with Wayne White, *supra* note 15; Barland letter, *supra* note 12.

²⁹REID & INBAU, *supra* note 2, at 17, states concerning the polygraph:

The relevant test questions used in any examination should be confined to a single case investigation. The polygraph technique is not effective for simultaneous testing regarding two or more related occurrences. Moreover, there is a severe limitation as to the issues that may be explored even in regard to a single incident. The psychological explanation for this is the fact that between one incident (or issue) and another incident (or issue), a subject who is lying as to both may have so much greater concern for the one than for the other that there will be very little or perhaps no physiological reaction when questioned about the other incident (or issue) . . . when in fact he had lied about both of them.

³⁰The manufacturers of the PSE state that it is well suited for the analysis of narrative statements since the functional indicator of stress sensed by the PSE appears to be controlled by the central nervous system while those sensed by the polygraph are controlled by the autonomic nervous system. Autonomic nervous system stress indicators experience a holdover phenomenon while those controlled by the central nervous system experience immediate recovery after the removal of the stressing stimuli. PSE Orientation Course, *supra* note 13, at 17-19; Interview with Jim Barnes, *supra* note 11.

³¹Interview with Gordon Barland, *supra* note 18.

³²REID & INBAU, *supra* note 2, at 11-40.

tion.³³ The examiner's questions must be answered "yes" or "no."³⁴ The same ten questions will be repeated during the subsequent interrogation periods.³⁵ The scope of the polygraph interrogation is thus much more limited than that permitted with the PSE.

A PSE examiner's conclusions are subject to quick and inexpensive verification by an independent operator.³⁶ The verification need not be made from the first operator's charts,³⁷ nor need the subject be called in for an additional session. For the price of a long distance telephone call a subject's pre-recorded responses may be transmitted over the telephone line³⁸ to any PSE operator in the country. The transmitted tape recording may then be played into a PSE and examined for the presence or absence of stress.

New and exciting uses for the PSE are continually being discovered. The PSE has been used to monitor astronaut stress during both normal operational maneuvers and spacecraft malfunction.³⁹ PSE analysis of cockpit recordings taken from fatal aircraft accidents has helped investigators pinpoint the onset of equipment failure.⁴⁰ The PSE has been used by psychologists to monitor stress manifested during the consumption of alcohol,⁴¹ during the discussion of stress provoking family situations,⁴² and during recitation before large and small audiences.⁴³ Another area of great potential is historical re-

³³ REID & INBAU, *supra* note 2, at 16-21; Barland letter, *supra* note 12.

³⁴ REID & INBAU, *supra* note 2, at 26.

³⁵ REID & INBAU, *supra* note 2, at 21.

³⁶ "Dektor maintains a free consultation service with the examiners, whereby the examiner's tape can be transmitted to Dektor by telephone and his evaluation of the test results are confirmed (or criticized) . . ." Letter from Allan D. Bell, Jr., president of Dektor Counterintelligence and Security, Inc., March 15, 1974 [hereinafter cited as Bell letter].

³⁷ Experienced polygraph examiners can effectively interpret one another's charts if standard examination technique is utilized. "Out of 559 cases where two examiners both reached some decision about a subject's truthfulness, they agreed 534 times, or 95.5% of the time." G. Barland, *The Reliability of Polygraph Chart Interpretation* 5, April 15, 1972 (unpublished presentation before the American Polygraph Association Seminar, Chicago, Illinois).

³⁸ By means of a magnetic coil an examiner can transmit tape recordings over the telephone. These recordings are suitable for PSE analysis. PSE Orientation Course, *supra* note 13, at 2; Interview with Joseph Tomlin, *supra* note 12.

³⁹ This testing was performed by the Planar Corporation, Springfield, Virginia. Copies of the results are available from Dektor Counterintelligence and Security, Inc., Springfield, Virginia [hereinafter cited as Planar Report]. For a report on Russian efforts to detect stress in the voice of cosmonauts see Simonov and Frolov, *Utilization of Human Voice for Estimation of Man's Emotional Stress and State of Attention*, 44 AEROSPACE MED. 256 (1973).

⁴⁰ Planar Report, *supra* note 39.

⁴¹ *Id.*

⁴² G. Alan Smith, *Analysis of the Voice* (unpublished report), available from its author, Department of Psychology, Powick Hospital, Worchester, England [hereinafter cited as Smith]; see also Sproston, *Doctor Uses Voice to Evaluate Stress Revealed in Voice*, *The Burlington Free Press* 21, May 29, 1973.

⁴³ M. Brenner, *Stagefright and Stevens' Law*, (April 1974) (unpublished presen-

search, since many statements of historical figures are stored on magnetic tape.⁴⁴ The PSE is also well suited for pre-employment screening or hijack prevention.⁴⁵ For example, the subject can be asked to state his destination. If his response shows stress he can be singled out for more complete interrogation.

Although the PSE is already proving to have great potential as an investigative tool, its greatest lure and its greatest danger stem from its suitability for covert operation.⁴⁶ Any conversation which can be recorded on tape is vulnerable to PSE analysis without the consent of the parties to the conversation. No telephone or informal conversation, regardless of its confidentiality, is immune. For example, a recording of a settlement conference could be examined to discover the approximate amount for which opposing counsel is willing to settle. Extensive treatment of the problems stemming from the covert operation of the PSE is beyond the scope of this article, but the reader should be aware of the threat to the right of privacy.⁴⁷

tation before the Eastern Psychological Convention) [hereinafter cited as Brenner].

⁴⁴The PSE has been used by a journalist to check on the veracity of interviewees, see Vetter, *The Lie Machine*, PLAYBOY 92 (April 1973); by Roger Grace, writing the *Perspectives* column in the Los Angeles Daily Journal (August 15, 1973; August 23, 1973; September 6, 1973), to evaluate the veracity of various Watergate witnesses; and, by George O'Toole to investigate the assassination of President Kennedy, see O'Toole, *Assassination Tapes*, PENTHOUSE 45 (August 1973).

⁴⁵Phillips, *Voice Analysis Machine Detects Little White Lies*, Chicago Tribune § 1, at 3 (September 3, 1972).

⁴⁶Richard Stone, the Florida Secretary of State, effectively banned the use of the PSE within Florida by the issuance of Administrative Rule No. 1C-4.05, November 2, 1973. The Secretary of State finds

that such devices or machines [i.e., the PSE] are being sold for the purpose of detecting truth and deception by measuring the spoken word and that they are being used for such purpose both with and without the knowledge and consent of the examinee, even surreptitiously; . . . that these machines, as a result of their unregulated use in this State, pose a serious and immediate threat to the citizens of Florida in controvention of their fundamental State and Federal Constitutional guarantees, freedoms, and liberties against invasion of privacy and self-incrimination; . . . that the foregoing facts of sale and use of these machines invite Orwellian consequences if their use is not properly licensed and regulated

See note 107.

⁴⁷Allan D. Bell, Jr., president of Dektor Counterintelligence and Security, Inc., writes: "The right to privacy, as far as the PSE is concerned, can be restated as the right to attempt to lie in the ordinary course of job application, etc.; and here is the dichotomy between the applicant's right to attempt to conceal a lie and the prospective employer's right to attempt to discover a possible deception. It would seem that instrumentation would produce a more accurate judgment than the means now at the disposal of the employer, such as noting, during an interview, body language, averted glances, blushing, hyper-ventilation, etc." Bell letter, *supra* note 36.

II. THE PSE AND VOICE PSYCHO-PHYSIOLOGY

The PSE, like all lie detectors, measures and records physiological parameters which are influenced by the presence of psychological stress.⁴⁸ The PSE analyzes the human voice, or, more particularly, detects the presence or absence of muscle micro-tremor superimposed on the two major sound components of the voice, the glottal tone and the formant frequencies.⁴⁹ In order to understand the basic theory behind the functioning of the PSE an elementary understanding of the human voice is important.

The first of the two major sound components of the human voice, the glottal tone, results when the high pressure air flow, produced by a muscular reduction in the size of the chest cavity, causes the vocal chords to vibrate.⁵⁰ A flat monotonous tone very unlike the final speech sound, it is similar to the dry buzz of a party horn. The frequency of the glottal tone generally varies from 100 to 300 cycles per second depending on the sex, intonation and age of the speaker.⁵¹

The second major component of the human voice, formant frequencies, results from the excitement of air within the various cavities of the head, throat, and chest by the glottal tone.⁵² The glottal tone has been compared to a hammer hitting a bell, with the tones of the various formant producing cavities being analogous to the tones of bells of different sizes and shapes.⁵³ Each formant producing cavity affects the glottal tone differently, weakening sound waves of one frequency and reinforcing sound waves of another.⁵⁴ Formant frequencies, which are generally above 800 cycles per second, give the voice a pleasing, rich quality and add carrying power to the voice.⁵⁵

Superimposed on both the glottal tone and formant frequencies is an inaudible voice component known as human micro-tremor.⁵⁶ The normal relaxed human skeletal muscle experiences a small undulation at a frequency of approximately 8 to 12 cycles per second.⁵⁷ The

⁴⁸PSE Orientation Course, *supra* note 13, at 1-2; REID & INBAU, *supra* note 2, at 1.

⁴⁹PSE Orientation Course, *supra* note 13, at 20; Materials, *supra* note 10, at 3-7.

⁵⁰PSE Orientation Course, *supra* note 13, at 11; H. KAPLAN, *THE ANATOMY AND PHYSIOLOGY OF SPEECH* 4 (1972) [hereinafter cited as KAPLAN].

⁵¹Materials, *supra* note 10, at 1-4.

⁵²C. MEANO & A. KHOURY, *THE HUMAN VOICE IN SPEECH AND SONG* 73-89 (1967).

⁵³Videotape lecture by Charles McQuiston, an inventor of the PSE, viewed at Barnes Investigation Agency, Los Angeles, California, November 10, 1973.

⁵⁴KAPLAN, *supra* note 50, at 5.

⁵⁵Materials, *supra* note 10, at 3; KAPLAN, *supra* note 50, at 5.

⁵⁶PSE Orientation Course, *supra*, note 13, at 19.

⁵⁷For articles dealing with micro-tremor see Awazu, *Studies on Human Minor Tremor*, 15 JAP. J. PHYSIOL. 579 (1965); Brumlik, *On the Nature of Normal Tremor*, 12 NEUROL. 159 (1962); Stiles, *Reciprocal Innervation: Phase Analysis of Demodulated EMGs from Antagonistic Muscles*, 34 J. APPL. PHYSIOL. 294

muscles controlling both the vocal chords and the formant producing cavities experience this muscular undulation. By varying the tension of the vocal chords and by affecting the shape of the formant cavities this undulation causes inaudible shifts in the formant frequencies.⁵⁸ The effect of micro-tremor on a particular formant frequency is illustrated by Figure I. The first box illustrates the low frequency micro-tremor; the second box represents the formant frequency; the third box illustrates the summation of the two.⁵⁹

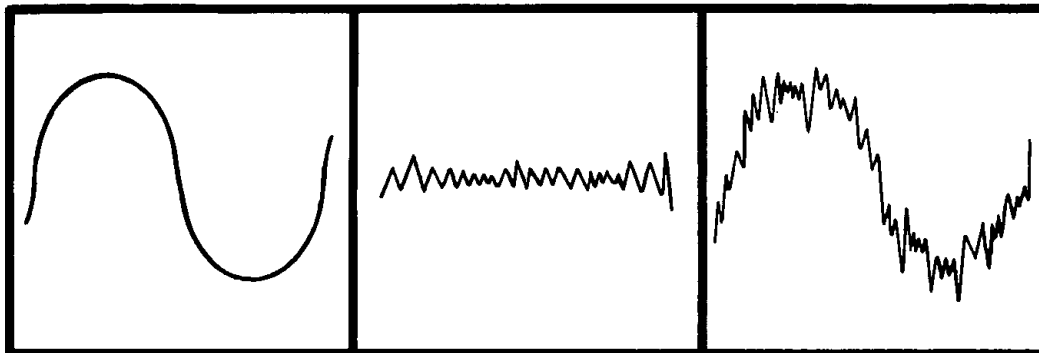


FIGURE I

Graph by Kate Bisharat

Micro-tremor naturally and inevitably occurs in the relaxed skeletal muscle.⁶⁰ Although the source of micro-tremor is presently unknown,⁶¹ the most recent research suggests that it is a result of the mechanical stimulation of the entire body caused by the beating of the heart, which sends shock waves reverberating throughout the length of the body so that the completely relaxed muscle is thrown into a series of oscillations.⁶²

The researchers at Dektor Counterintelligence and Security, Inc. have determined that the muscles controlling the vocal chords are subject to mild muscular tension when slight to moderate stress is created within the subject.⁶³ This stress and resultant tension, al-

(1973); Tomonaga, *On the Effect of Heart Beat on Minor Tremor*, 15 JAP. J. PHYSIOL. 560 (1965); Fox & Randall, *Relationship Between Forearm Tremor and the Biceps Electromyogram*, 29 J. APPL. PHYSIOL. 103 (1970) [hereinafter cited as Fox].

⁵⁸PSE Orientation Course, *supra* note 13, at 19.

⁵⁹Interview with Jim Barnes, *supra* note 11.

⁶⁰Awazu, *Studies on Human Minor Tremor*, 15 JAP. J. PHYSIOL. 579 (1965); Brumlik, *On the Nature of Normal Tremor*, 12 NEUROL. 159 (1962).

⁶¹See notes 114-117 and accompanying text.

⁶²See Brumlik, *On the Nature of Normal Tremor*, 12 NEUROL. 159 (1962); Van Buskirk & Fink, *Physiologic Tremor, An Experimental Study*, 12 NEUROL. 361 (1962); Van Buskirk *et al.*, *The Non-nervous Cause of Normal Physiologic Tremor*, 16 NEUROL. 217 (1966); Yap & Boshes, *The Frequency and Pattern of Normal Tremor*, 22 ELECTROENCEPH. CLIN. NEUROPHYSIOL. 197 (1967); and PSE Orientation Course, *supra* note 13, at 20.

⁶³PSE Orientation Course, *supra* note 13, at 20.

though indiscernible to the subject, is sufficient to virtually eliminate the micro-tremor which is observed in the voice of the normal unstressed subject.⁶⁴ Thus, a psychologically stressful state causes the physiological repression of muscle micro-tremor.

The PSE detects and charts micro-tremor as it appears in the human voice in the middle voice frequencies (*i.e.*, approximately 1000 cycles per second).⁶⁵ The PSE has four modes by which the operator is able to make sophisticated analysis of various articulations.⁶⁶ The first two modes do not detect or record micro-tremor.⁶⁷ These modes are used to quickly screen portions of long narrative statements.⁶⁸ The examiner looks for changes in respiration and voice amplitude which may be indicative of deception.⁶⁹ Once potential deception is discovered by either of the first two modes the operator will then utilize modes III and IV. With Mode III a tape recording of the subject's responses is played into the PSE at one-fourth the normal speed, permitting detailed evaluation of individual responses, with particular emphasis being placed on the presence or absence of micro-tremor.⁷⁰ Mode IV, which is very similar to Mode III, is used where a more detailed analysis is required.⁷¹ It is particularly helpful when an examiner has a subject whose responses indicate considerable stress throughout the interview, because it enables the operator to determine the responses with the most stress.⁷² Figure II shows a stress free statement characterized by the presence of micro-tremor as it is displayed in Mode III. Figure III shows a stressed statement, characterized by varying degrees of micro-tremor repression, as it is displayed in Mode III.

III. PROPRIETY OF ADMITTING RESULTS OF PSE EXAMINATIONS AT TRIAL

Historically, when ruling on the admission of lie detector tests (primarily the polygraph) courts have been guided by the standard set forth in *Frye v. United States*.⁷³ In 1923 the Court of Appeals for the District of Columbia Circuit, in ruling on the propriety of admitting the results of a primitive systolic blood pressure lie de-

⁶⁴*Id.*

⁶⁵Interview with Jim Barnes, *supra* note 11; PSE Orientation Course, *supra* note 13, at 20.

⁶⁶PSE Orientation Course, *supra* note 13, at 21-25.

⁶⁷PSE Orientation Course, *supra* note 13, at 21-22.

⁶⁸Interview with Jim Barnes, *supra* note 11.

⁶⁹Green, *Truth Verification*, SECURITY WORLD 38, 41 (October 1973) [hereinafter cited as Green].

⁷⁰Green, *supra* note 69, at 41; PSE Orientation Course, *supra* note 13, at 23-24.

⁷¹Green, *supra* note 69, at 41; PSE Orientation Course, *supra* note 13, at 24-25.

⁷²Interview with Jim Barnes, *supra* note 11.

⁷³293 F. 1013 (D.C. Cir. 1923).

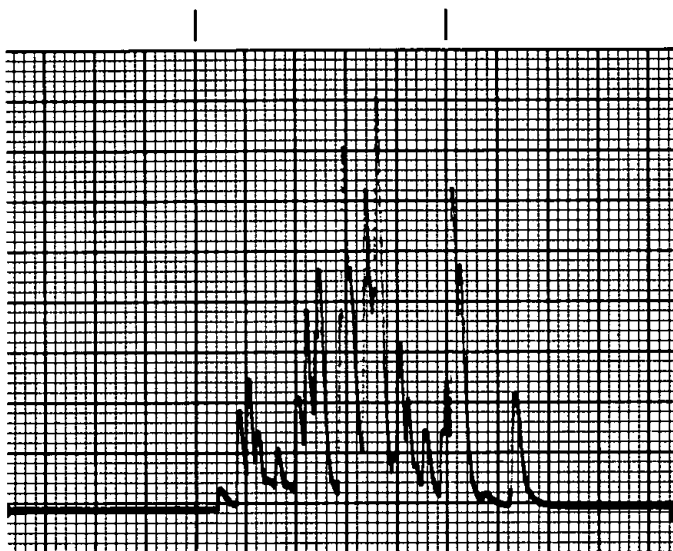


FIGURE II*



FIGURE III*

*Charts supplied by Dektor Counterintelligence and Security, Inc.

tector test by the defendant in a murder trial, stated:

Just when a scientific principle or discovery crosses the line between the experimental and demonstrable stages is difficult to define. Somewhere in this twilight zone the evidential force of the principle must be recognized, and while courts will go a long way in admitting expert testimony deduced from well recognized scientific principle or discovery, the thing from which the deduction is made must be sufficiently established to have gained *general acceptance in the particular field in which it belongs*.

We think systolic pressure deception test has not yet gained such *standing and scientific recognition among physiological and psychological authorities* as would justify courts in admitting expert testimony deduced from the discovery, development, and experiments thus far made. (emphasis added)⁷⁴

Out of the *Frye* case rose what is commonly referred to as the "general scientific acceptance" test.⁷⁵ Prior to 1972, only one reported case held that lie detector results satisfied the "general scientific acceptance" test.⁷⁶ The evidence was excluded in all other cases.⁷⁷

⁷⁴*Id.* at 1014.

⁷⁵MCCORMICK, LAW OF EVIDENCE 491 (Cleary rev. ed. 1972).

⁷⁶*People v. Kenny*, 167 Misc. 51, 3 N.Y.S.2d 383 (Queens County Ct. 1938). Some courts have admitted lie detector evidence pursuant to pre-trial stipulation on the theory that parties to the case are permitted to stipulate evidence, even inadmissible evidence, upon the theory of waiver. *See State v. Valdez*, 91 Ariz. 274, 371 P.2d 894 (1962); *People v. Houser*, 85 Cal. App. 2d 686, 193 P.2d 937 (1948); *People v. Davis*, 270 Cal. App. 2d 841, 76 Cal. Rptr. 242 (1969); *State v. Brown*, 177 So. 2d 532 (Fla. 1965); *State v. Freeland*, 255 Iowa 1334, 125 N.W.2d 825 (1964); *State v. Lowry*, 163 Kan. 622, 185 P.2d 147 (1947). Other jurisdictions have refused to admit lie detector evidence pursuant to pre-trial stipulation reasoning that "if the . . . tests are as unpredictable and misleading as the courts are so certain they are, then their reliability and usefulness to the court and jury remain the same, regardless of whether they are admitted by stipulation or not." *Romero v. State*, 493 S.W.2d 206, 213 (Tex. Crim. App. 1973); *LeFevre v. State*, 242 Wis. 416, 8 N.W.2d 288 (1943); *State v. Trimble*, 68 N.M. 406, 362 P.2d 788 (1961); *People v. Potts*, 74 Ill. App. 2d 301, 220 N.E.2d 251 (1966); *People v. Zazzetta*, 27 Ill. 2d 302, 189 N.E.2d 260 (1963).
⁷⁷Cases applying the strict rule excluding lie detector evidence are catalogued at 23 A.L.R.2d 1306. *See particularly* *People v. Carter*, 48 Cal. 2d 737, 312 P.2d 665 (1957); *People v. Jones*, 52 Cal. 2d 636, 343 P.2d 577 (1959); *State v. Arnwine*, 67 N.J. Super. 483, 171 A.2d 124 (App. Div. 1961); *Marks v. United States*, 260 F.2d 377 (10th Cir 1958), *cert. denied*, 358 U.S. 929 (1959); *United States v. Bando*, 244 F.2d 833 (2d Cir. 1957); *People v. Leone*, 25 N.Y.2d 511, 255 N.E.2d 696, 307 N.Y.S.2d 430 (1969); *State v. Walker*, 37 N.J. 208, 181 A.2d 1 (1962), *cert. denied*, 371 U.S. 850 (1962); *People v. Ferguson*, 1 Cal. App. 3d 68, 81 Cal. Rptr. 418 (1969). Many commentators have praised the strict application of the "general scientific acceptance" standard. *See particularly* *Burkey, The Case Against the Polygraph*, 51 A.B.A.J. 855 (1965); *Highleyman, The Deceptive Certainty of the "Lie Detector"*, 10 HASTINGS L.J. 47 (1958); *Laymon, Lie Detectors — Detection by Deception*, 10 S.D.L. REV. 1 (1965); *Levin, Lie Detectors Can Lie!*, 15 LAB. L.J. 708 (1964); *Skolnick, Scientific Theory and Scientific Evidence: An Analysis of Lie Detection*, 70 YALE L.J. 694 (1961); *Stermbach et al., Don't Trust the Lie Detector*, 40 HARV. BUS. REV. 127 (1962).

Scholars have criticized this result. They argue that the courts are going beyond the authority of *Frye*, setting a standard considerably higher than mere "general scientific acceptance."⁷⁸ Professor McCormick writes that "'General Scientific Acceptance' is a proper condition for taking judicial notice of scientific facts, but not a criterion for the admission of scientific evidence."⁷⁹ Another commentator has stated that "the standards of admissibility by which lie detector evidence has been judged are general acceptance *and* infallibility."⁸⁰ The "general scientific acceptance" test has been applied in an inconsistent manner by some courts to admit other forms of scientific evidence which are concededly not completely accurate,⁸¹ notably radar for speeders,⁸² ballistics evidence⁸³ and voice prints.⁸⁴ Although there are valid policy reasons for treating these other forms of evidence less strictly than lie detector results,⁸⁵ to do so without express consideration of the factors justifying different judicial treatment promotes apparent judicial inconsistency.⁸⁶

Recently, all courts considering the admission of lie detector results have departed from the so-called "general scientific acceptance" test⁸⁷ and have applied the "logical relevance" test:

⁷⁸"One reason usually given . . . [for the exclusion of lie detector evidence] is that the tests have not won sufficient acceptance in their community. If we thus deflate the requirement to the normal standard which simply demands that the theory or device be accepted by a substantial body of scientific opinion, there can be little doubt that the . . . [polygraph] technique meets this requirement." MCCORMICK, LAW OF EVIDENCE 174 (1954).

⁷⁹MCCORMICK, LAW OF EVIDENCE 363 (1954); see also Strong, *Questions Affecting the Admissibility of Scientific Evidence*, 1970 U. ILL. L. FORUM I, II.

⁸⁰Kaplan, *The Lie Detector: An Analysis of its Place in the Law of Evidence*, 10 WAYNE L. REV. 381, 385 (1964); see also Forkosch, *The Lie Detector and the Courts*, 16 N.Y.U.L. REV. 202 (1939); Note, *The Polygraphic Technique: A Selective Analysis*, 20 DRAKE L. REV. 330 (1971).

⁸¹Boyce, *Judicial Recognition of Scientific Evidence in Criminal Cases*, 8 UTAH L. REV. 313, 325 (1963): "In the past the willingness of courts to accept scientific evidence has not been logically consistent. The rule in *Frye v. United States*, which appears to be applied by the majority of courts in determining whether to accept evidence obtained from the operation of a scientific device is, for the most part, a different standard from the rule of law applicable in cases of expert testimony." Note, *Evolving Methods of Scientific Proof*, 13 N.Y.L.F. 677 (1967); *United States v. Ridling*, 350 F. Supp. 90, 95 (E.D. Mich. 1972).

⁸²*United States v. Dreos*, 156 F. Supp. 200 (D.C. Md. 1957).

⁸³*Goodall v. United States*, 180 F.2d 397 (D.D.C. 1950), *cert. denied*, 339 U.S. 987 (1950).

⁸⁴*Trimble v. Hedmans*, 192 N.W.2d 432 (Minn. 1971); *United States v. Raymond*, 337 F. Supp. 641 (D.D.C. 1972).

⁸⁵Radek, *The Admissibility of Polygraph Results in Criminal Trials: A Case for the Status Quo*, 3 LOYOLA L.J. 289, 295 (1972); see notes 126-134 and accompanying text.

⁸⁶Boyce, *Judicial Recognition of Scientific Evidence in Criminal Cases*, 8 UTAH L. REV. 313 (1963).

⁸⁷The "logical relevance" test has been applied to both admit lie detector evidence, see *United States v. Ridling*, 350 F. Supp. at 90 (E.D. Mich. 1972); and *United States v. Zeiger*, 350 F. Supp. 685 (D.D.C. 1972), *rev'd. per curiam*, 475 F.2d 1280 (D.C. Cir. 1972), and to exclude lie detector evidence, see *United*

- (1) that nothing is to be received into evidence which is not logically probative of some matter requiring to be proved; and
- (2) that everything which is thus probative should come in unless a clear ground of policy of law excludes it.⁸⁸

These courts address themselves to the central question of whether the results of a particular lie detector examination are sufficiently reliable to allow admission in light of the possible prejudicial effects of such admission. Although the "logical relevance" test appears to have replaced the "general scientific acceptance" test as the proper standard by which to evaluate the admission of lie detector results, the courts applying the "logical relevance" test differ as to the degree of reliability which is sufficient to justify admission.

*United States v. Zeiger*⁸⁹ and *United States v. Ridling*,⁹⁰ two United States District Court cases, were the first to apply the "logical relevance" test. Both courts admitted the polygraph results into evidence. The *Ridling* court required a quantum of reliability such that the "opinions of the [polygraph] experts . . . [will] assist the trier of fact to understand the evidence."⁹¹ The *Zeiger* court notes, "[t]he general criterion required for the admission of evidence is its relevance or tendency to prove a material fact."⁹² Since the technique "can achieve accuracy of better than 50%"⁹³ this court held that "current polygraph technique possesses a degree of reliability which satisfies the courts of its probative value."⁹⁴

The *Zeiger* and *Ridling* opinions, which were followed by much commentary,⁹⁵ appeared to open the door to the admission of the polygraph and other related devices. However, their conclusion, that the polygraph possesses the quantum of reliability mandated by the "logical relevance" test, has not met with approval. *Zeiger* was reversed on appeal in a short *per curiam* opinion.⁹⁶ The result in *Ridling* was expressly disapproved by the Fifth Circuit in *United*

States v. Wilson, 361 F. Supp. 510 (D.C. Md. 1973); and *United States v. Urquidez*, 356 F. Supp. 1363 (C.D. Cal. 1973). See Note, *Problems Remaining for the "Generally Accepted" Polygraph*, 53 B.U.L. REV. 375 (1973); Note, *The Emergence of the Polygraph at Trial*, 73 COLUM. L. REV. 1120 (1973).

⁸⁸J. THAYER, A PRELIMINARY TREATISE ON EVIDENCE AT THE COMMON LAW 264 (1898).

⁸⁹350 F. Supp. at 685 (D.D.C. 1972).

⁹⁰350 F. Supp. at 90 (E.D. Mich. 1972).

⁹¹*Id.* at 95.

⁹²350 F. Supp. at 685, 687-88 (D.D.C. 1972).

⁹³*Id.* at 687.

⁹⁴*Id.* at 688.

⁹⁵See Note, *The Emergence of the Polygraph at Trial*, 73 COLUM. L. REV. 1120 (1973); Note, *How Some Courts Have Learned to Stop Worrying and Love the Polygraph*, 51 N.C.L. REV. 900 (1973); Note, *Problems Remaining for the "Generally Accepted" Polygraph*, 53 B.U.L. REV. 375 (1973).

⁹⁶475 F.2d at 1280 (D.C. Cir. 1972).

*States v. Frogge*⁹⁷ which stated "nothing in *United States v. Ridling* . . . persuades us to abandon the traditional view [that polygraph evidence is not admissible at trial]." ⁹⁸ (citations omitted)

Since *Ridling* and *Zeiger*, two other Federal District Courts, in *United States v. Urquidez*⁹⁹ and *United States v. Wilson*,¹⁰⁰ have reconsidered the strict rule excluding lie detector evidence. Both the *Urquidez* and *Wilson* court followed the "logical relevance" test used in *Ridling* and *Zeiger*, assessing the reliability of the evidence and balancing this against the prejudicial effect of its admission. In both cases the courts refused to find that the polygraph technique possesses sufficient reliability to justify the admission of such evidence.

The *Urquidez* and *Wilson* courts required more than a statistical showing that the particular lie detection device (in this case the polygraph) reached the correct result in the majority of cases. Indeed, both courts recognized that the polygraph technique is valid. The court in *Urquidez* stated, "I have become convinced by the testimony in this case that there is much to the polygraphic art . . . The physiological and technical assumptions upon which it relies appear to be valid."¹⁰¹ In *Wilson* the court notes that "studies conducted by private and governmental organizations assess the validity and reliability of the [polygraph] technique at 70% to 95%."¹⁰² These courts, conceding the statistical accuracy of the polygraph, evaluated the "many variables, other than the ultimate question of truth or falsity, that can influence the results of a polygraph test."¹⁰³ Noting that great reliance is placed on the examiner's ability to evaluate such uncontrolled and little understood factors as the psychological and physiological makeup of the subject, these courts declined to accord the polygraph a place in a court proceeding.¹⁰⁴

The cases applying the "logical relevance" test when dealing with the admissibility of polygraph results¹⁰⁵ point up four factors which have been determinative: (1) the statistical accuracy of the instrument, (2) the acceptance of the basic theory in scientific circles, (3) examiner training and skill plus the care with which the examination is conducted, and (4) policy considerations militating against the

⁹⁷476 F.2d 969 (5th Cir. 1973).

⁹⁸*Id.* at 970.

⁹⁹356 F. Supp. at 1363 (C.D. Cal. 1973).

¹⁰⁰361 F. Supp. at 510 (D.C. Md. 1973).

¹⁰¹356 F. Supp. at 1367 (C.D. Cal. 1973).

¹⁰²361 F. Supp. at 512 (D.C. Md. 1973).

¹⁰³*United States v. Urquidez*, 356 F. Supp. at 1365 (C.D. Cal. 1973).

¹⁰⁴In *United States v. Wilson*, 361 F. Supp. at 512 (D.C. Md. 1973), the court writes, "The distinction . . . [between polygraphy and other forms of scientific evidence] is that polygraphy . . . remains an art with *unusual responsibility* placed on the examiner."

¹⁰⁵See note 87.

admission of lie detector evidence. These same four factors must be considered when ruling on the admission of PSE results at trial.

A. STATISTICAL ACCURACY OF THE INSTRUMENT¹⁰⁶

The reliability of the voice as a physiological indicator of deception has not been adequately substantiated.¹⁰⁷ The researchers at Dektor Counterintelligence and Security, Inc. report an accuracy rate ranging from 100% in high stress criminal interrogations to between 91% and 98.4% for lower stress non-criminal interrogations.¹⁰⁸ These success figures have not been verified by the reports of independent investigators.¹⁰⁹ The abstract of an unpublished paper presented by Joseph F. Kubis before the Acoustical Society of America dealing with the accuracy of the PSE and comparing it with that of the polygraph states:

The results indicate (1) all three physiological indices [associated with the polygraph (*i.e.*, respiration, blood pressure-pulse, and skin conductivity)] attain greater accuracy than the voice analysis technique . . . ; (3) while the overall accuracy of the polygraph was statistically significant, the accuracy . . . [of the PSE technique] was within chance expectation. It may be concluded that the . . . voice analysis technique [*i.e.*, the PSE] . . . in [its] present state of development, cannot be validly used as [a] lie detector . . . within a simulated theft paradigm.¹¹⁰

¹⁰⁶ REID & INBAU, *supra* note 2, at 234:

A statistical determination of the accuracy of the polygraph technique is practically impossible, just as it is in so many other fields involving the testing of human beings [*i.e.*, the PSE]

In many case investigations involving the use of the polygraph technique, the truth or falsity of the examiner's findings is never factually established by subsequent events or disclosures. Proof is often lacking, therefore, as to whether the examiner in any given case was right or wrong. Nor can the accuracy of the polygraph technique be determined in a psychology laboratory setting or by the use of fictitious crimes under other testing circumstances. This limitation prevails for the simple reason that it is practically impossible to simulate conditions comparable to those involved in actual case situations.

¹⁰⁷ Richard Stone, the Florida Secretary of State, effectively banned the use of the PSE within Florida by the issuance of Administrative Rule No. 1C-4.05, November 2, 1973. The Secretary of State finds, "That there is insufficient evidence at this time to establish these machines' predictability, accuracy, reliability and validity in detecting truth and deception, nor have they been sufficiently tested to establish such . . ." See *supra* note 46.

¹⁰⁸ PSE Orientation Course, *supra* note 13, at 3-5.

¹⁰⁹ See Planar Report, *supra* note 39; Smith, *supra* note 42; Brenner, *supra* note 43.

¹¹⁰ Program at 63, 86th meeting, Acoustical Society of America, Los Angeles, California, November 9, 1973 (unpublished report). The report abstracted (No. LWL-CR-03B70) is entitled "Comparison of Voice Analysis and Polygraph as Lie Detection Procedures." It was prepared by Joseph Kubis for the U.S. Army Land Warfare Laboratory, Aberdeen Proving Ground, Maryland. The results of the Kubis report have been soundly criticized by officials at Dektor Counter-

Likewise, in an unpublished paper presented before the same meeting of the Acoustical Society of America it is reported that the PSE did no better than chance in a low stress (contrived) experiment.¹¹¹ However, in the same paper it is reported that results from a high stress (criminal) interrogation were statistically significant.¹¹² In this high stress experiment, skin conductivity was the most effective single component in detecting lies, voice was second, respiration third and blood pressure-pulse fourth.¹¹³

B. THE ACCEPTANCE OF THE BASIC THEORY IN SCIENTIFIC CIRCLES

An independent researcher engaged in experimental evaluation of the PSE writes, "there is . . . reasonable doubt as to the nature of the physiological mechanism which underlies the stress-related changes in the voice."¹¹⁴ At present there are two unresolved theories concerning the origin of muscle micro-tremor.¹¹⁵ One theory, the "mechanical filter hypothesis,"¹¹⁶ attributes micro-tremor to the stimulation of the body by the action of the heart. The other theory, the "self-oscillation hypothesis,"¹¹⁷ relates micro-tremor to the structure of

intelligence and Security, Inc., who maintain that there were sufficient uncontrolled variables to render the report scientifically invalid. They note that (1) there were six polygraph examiners as opposed to one PSE examiner, (2) there were 137 subjects evaluated on the polygraph while only 49 were evaluated on the PSE, and (3) of the 49 tapes submitted for PSE analysis most were of such poor quality that PSE analysis was impossible. This critique of the Kubis report, "The Kubis Report of 1973: An Invalid Study," was obtained from Dektor Counterintelligence and Security, Inc., Springfield, Virginia. The poor quality of the tape recordings was confirmed by the PSE examiner who participated in this study. Barland letter, *supra* note 12. See also *supra* note 106.

¹¹¹ G. Barland, Use of Voice Changes in the Detection of Deception 4-7, (unpublished report) available from its author, Department of Psychology, University of Utah.

¹¹² *Id.*

¹¹³ *Id.* at 10.

¹¹⁴ Letter from Gordon Barland, Department of Psychology, University of Utah, October 4, 1973; Dr. John W. Heisse, representing the International Society of Stress Analysts, in an address prepared for all legislative subcommittees and legislators, December 1, 1973, states, "No effort is made in this discussion to explain the origin of micro-muscle tremor . . . [M]uch of this theory readily falls into the realm of conjecture and speculation"

¹¹⁵ Nicholson *et al.*, *Activity of the Nervous System During the Let-down, Approach and Landing: A Study of Short Duration High Workload*, 41 AEROSPACE MED. 436, 446 (1970); Fox, *supra* note 57, at 103.

¹¹⁶ Fox, *supra* note 57, at 103; Brumlik, *On the Nature of Normal Tremor*, 12 NEUROL. 159 (1962); Van Buskirk & Fink, *Physiologic Tremor, An Experimental Study*, 12 NEUROL. 361 (1962); Van Buskirk *et al.*, *The Non-nervous Causes of Normal Physiologic Tremor*, 16 NEUROL. 217 (1966); Yap & Boshes, *The Frequency and Pattern of Normal Tremor*, 22 ELECTROENCEPH. CLIN. NEUROPHYSIOL. 197 (1967).

¹¹⁷ Fox, *supra* note 57, at 103; Halliday and Redfearn, *Finger Tremor in Tabetic Patients and its Bearing on the Mechanism Producing the Rhythm of Physiological Tremor*, 21 J. NEUROL. NEUROSURG. PSYCHIAT. 101 (1957); Lippold *et al.*,

the neuro-muscular system. Neither theory presents a satisfactory explanation for the origin of micro-tremor. Furthermore, there has been no published material dealing with the repression of micro-tremor. The physiological mechanism by which micro-tremor repression occurs in the voice is unknown.

C. EXAMINER TRAINING AND SKILL AND CARE WITH WHICH EXAMINATION CONDUCTED

Two major factors affecting the reliability of a PSE examination are the qualifications of the individual examiner and the care with which the interrogation is conducted.¹¹⁸ The PSE, like the polygraph, monitors physiological responses to psychological stress.¹¹⁹ The examiner must exercise care and skill to minimize stress from sources other than prevarication which would distort the results.¹²⁰

John Reid and Fred Inbau, two leading authorities on the use of the polygraph, state that "the most important factor involved in the use of any . . . [lie detection] instrument is the ability, experience, education, and integrity of the examiner himself."¹²¹ These authorities recommend that an examiner complete college and receive at least six months individualized training in the use of the polygraph before he be allowed to testify in court.¹²² A bill currently before the California Senate would require a polygraph examiner to have 250 hours of academic class instruction, to have no fewer than 100 hours of directed practical exercises, and to have delivered at least 300

The Rhythmical Activity of Groups of Motor Units in the Voluntary Contraction of Muscle, 137 J. PHYSIOL. (Lond.) 473 (1957); Marsden *et al.*, *The Role of the Ballistocardiac Impulse in the Genesis of Physiological Tremor*, 92 BRAIN 647 (1969).

¹¹⁸ Interview with Jim Barnes, *supra* note 11.

¹¹⁹ PSE Orientation Course, *supra* note 13, at 1-2.

¹²⁰ PSE Orientation Course, *supra* note 13, at 3. In *Henderson v. State*, 94 Okla. Crim. 45, 51-52, 230 P.2d 495, 501-02 (1951), *cert. denied* 343 U.S. 898 (1951) the court notes some of the factors which may obscure lie detector results as:

- (1) Emotional tension — "nervousness" — experienced by one who is innocent and telling the truth . . . but who is nevertheless affected by (a) fear . . . and (b) a guilt complex . . .
- (2) Physiological abnormalities . . .
- (3) Mental abnormalities, such as (a) feeble-mindedness . . . (c) psychoneuroses . . .
- (4) Unresponsiveness in a lying or guilty subject because of (a) lack of fear of detection; (b) apparent ability consciously to control responses by means of certain mental sets or attitudes . . . (c) a condition of . . . "adrenal exhaustion" . . . (d) rationalization . . . (e) extensive interrogation prior to the test.

At the present time, such factors influencing the results of a PSE examination are inadequately understood. An inordinate amount of reliance is placed on the examiner's ability to ferret out unsuitable subjects.

¹²¹ REID & INBAU, *supra* note 2, at 4.

¹²² Inbau & Reid, *The Lie Detector Technique: A Reliable and Valuable Investigative Aid*, 50 A.B.A.J. 470, 471 (1964).

specific polygraph examinations before he could qualify to testify in court.¹²³

At present, the manufacturer of the PSE will certify any person who passes its three day course on instrument orientation and chart interpretation to be a qualified PSE operator.¹²⁴ A spokesman for the newly formed International Society of Stress Analysts says emphatically that this is not enough training.¹²⁵ Until suitable standards for the ethical and technical training of PSE operators are established and enforced the courts should be reluctant to give the mark of judicial approval to the PSE.

D. POLICY CONSIDERATIONS

The major policy considerations militating against the admission of lie detector evidence have been catalogued in a recent law review note:¹²⁶

(1) that the jury will put inordinate weight on the testimony of the examiner;¹²⁷ (2) that, although the testimony of a ballistics or fingerprint expert is usually significant, "a demonstrated lie or truth to the question 'Did you kill X?' would invariably be conclusive";¹²⁸ (3) that examination results offered unilaterally by the defendant would always be favorable to him and his opponent would not be able to examine him under the lie detector, nor to cross-examine him should he refuse to take the stand;¹²⁹ (4) that, even where the defendant consents to take an examination, while incarcerated the conditions under which the consent is obtained and the examination is given may be a factor in producing results unfavorable to the defendant;¹³⁰ (5) that the presumption of innocence may be threatened by the inordinate weight likely to be given to failing to take a[n] . . . examination once such examination results become general-

¹²³ S.B. 119. Passed by the California State Senate, May 9, 1973, by vote of 21-11. It is currently pending before the Assembly Judiciary Committee.

¹²⁴ Bell letter, *supra* note 35. In this letter, Mr. Bell points out that this course is designed for individuals with prior investigative training.

¹²⁵ "It is the unanimous opinion of the Society's Executive Committee that three days of training is most insufficient, even for the most experienced investigator." Letter from Russell Kriete, president of the International Society of Stress Analysts, October 31, 1973.

¹²⁶ Note, *Problems Remaining for the "Generally Accepted" Polygraph*, 53 B.U.L. REV. 375, 377 (1973). Footnotes 127-132 were taken from this source.

¹²⁷ Radek, *The Admissibility of Polygraph Results in Criminal Trials: A Case for the Status Quo*, 3 LOYOLA L.J. 289, 295 (1972); Koffler, *The Lie Detector — A Critical Appraisal of the Technique as a Potential Undermining Factor in the Judicial Process*, 3 N.Y.L.F. 123, 138 (1957).

¹²⁸ Levitt, *Scientific Evaluation of the "Lie Detector,"* 40 IOWA L. REV. 440, 458 (1955); Highleyman, *The Deceptive Certainty of the "Lie Detector,"* 10 HASTINGS L.J. 47 (1958).

¹²⁹ *State v. Bohner*, 210 Wis. 651, 659, 246 N.W. 314, 318 (1933) (dicta).

¹³⁰ F. BAILEY & H. ROTHBLATT, INVESTIGATION AND PREPARATION OF CRIM. CASES § 381, at 327 (1970).

ly admitted;¹³¹ and (6) that a compulsory examination would be violative of the defendant's privilege against self-incrimination.¹³²

Thus far few courts have considered these factors since, prior to 1972, results from lie detector examinations were universally inadmissible as a rule of law. However, the courts which have evaluated the impact of these factors¹³³ have balanced the harmful effects of such evidence against the judicial policy in favor of admitting all relevant evidence. This judicial balancing process has been extensively evaluated in several recent notes,¹³⁴ and a reevaluation need not be attempted here.

IV. CONCLUSION

The PSE shows potential as an investigative tool, particularly in regard to its flexibility and ease of operation. However, until the PSE is shown to be statistically reliable as an indicator of deception and the many factors influencing such results are adequately understood, it must take its place with other lie detection instruments, at the sidelines of the judicial process.

Robert W. Lambert

¹³¹ Boyle, *A Bar Association's Viewpoint Regarding the Lie Detector Technique*, 50 J. CRIM. L. & CRIMINOL. 99 (1959); Silving, *Testing of the Unconsciousness in Criminal Cases*, 69 HARV. L. REV. 683, 692 (1956).

¹³² Skolnick, *Scientific Theory and Scientific Evidence: An Analysis of Lie Detection*, 70 YALE L.J. 694, 725 (1961).

¹³³ See note 87.

¹³⁴ Note, *Problems Remaining for the "Generally Accepted" Polygraph*, 53 B.U.L. REV. 375 (1973); Note, *The Emergence of the Polygraph at Trial*, 73 COLUM. L. REV. 1120 (1973).